

#### ENERGY STAR Multifamily New Construction, Version 1.0

Note: This is a draft of a work in progress for the purposes of stakeholder feedback. There may be errors with formatting, numbering, etc.

This document provides <u>detailed</u> instructions for determining the ENERGY STAR <u>ERIHERS Index</u> Target, the highest <u>ERInumerical HERS Index</u> value that each rated multifamily unit may achieve to earn the ENERGY STAR. Note that, in addition to meeting the ENERGY STAR <u>ERIHERS Index</u> Target for each unit, <u>unitprojects</u> shall also meet all Mandatory Requirements for All Multifamily New Construction <u>Projects</u> in Exhibit 2 of the <u>National Program Requirements for -</u>ENERGY STAR <u>Certified</u> Multifamily New Construction, Version <u>1.9/ 1.1 / OR-WA 1.21</u> National Program Requirements.

A <u>sRESNET-accredited Home Energy Rating</u> software <u>rating toolprogram approved by an EPA-Approved Verification Oversight Organization</u> shall automatically determine (i.e., without relying on a user-configured ENERGY STAR <u>Multifamily</u> Reference Design) this target for each rated unit. This shall be done by configuring the ENERGY STAR <u>Multifamily</u> Reference Design in accordance with Exhibit 1, the Expanded ENERGY STAR <u>Multifamily</u> Reference Design Definition, and calculating its associated <u>ERIHERS Index</u> value. This value, rounded to the nearest whole number, shall equal the ENERGY STAR <u>HERS IndexERI</u> Target.



### ENERGY STAR Multifamily New Construction, Version 1.0

Exhibit 1: Expanded ENERGY STAR Multifamily Reference Design Definition

Building Component	Expanded Expanded		TAR Mult	tifamily Re	eference De	sign Definition 41				
Foundations:	Expanded ENERGY STAR Multifamily Reference Design Definition 41  Construction Type & Structural Mass: Same as Rated Unit 2, 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 Unit 2, 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 Unit <sup>2</sup> Insulation: <sup>3,4</sup> Choose appropriate insulation level below;									
	Basement Wall Continuous Insulation			etor only a	onlies to cor	nditioned basements	hsmt 's if ar	oplicable i	nsulation	
	shall be located on interior side of wall			o, a	ppoo to oo.	<u> </u>	, o,	-poab.o,		
	<ul> <li>Floor assemblies above crawlspace fo</li> </ul>			igured to n	neet the app	olicable floor assemb	ly U-factor li	isted in the	building	
	component section for Floors Over Un			II la a Caracata		lah basuladan Dusah.	. The Second	- C b - 0		
	<ul> <li>Slab floors with a floor surface less that downward from the top of the slab on t</li> </ul>									
	Climate Zone:	CZ 1	CZ 2	CZ 3	CZ 4	CZ 4 C & 5	CZ 6	CZ 7	CZ 8	
	Slab Insulation R-Value:	0	0	0	10	10	15	15	20	
	Slab Insulation Depth (ft):	0	0	0	2	2	2	2	2	
	Basement Wall		•	•		7.5		4.0	40.5	
	Assembly Continuous Insulation R-Value:	0	0	0	7.5	7.5	7.5	10	12.5	
Floors Over	Construction Type: Wood frame									
Unconditioned Spaces:	Gross Area: Same as Rated Unit_2									
орасез.	Insulation: 3, 4 Climate Zone:		CZ 2	C7 2	CZ 4	CZ 4 C & 5		C7 7	C7 0	
		<b>CZ 1</b> 0.282		<b>CZ 3</b> 0.033			CZ 6	CZ 7	CZ 8	
Above-Grade	Floor Assembly U-Factor: Interior and Exterior Construction Type: Woo		0.052	0.033	0.033	0.033	0.033	0.033	0.033	
Walls:	Gross Area: Same as Rated Unit <sup>2</sup>	<u>u name</u>								
Traile.	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:	0.089	0.089	0.089	0.064	0.051	0.051	0.051	0.036	
Thermally Isolated Sunrooms:	None									
Doors:	Area: Same as Rated Unit <sup>2</sup>									
	Orientation: Same as Rated Unit <sup>2</sup>									
	U-Factors Values and SHGCs, based on EN									
	Door Type:		<b>Opaque</b> 0.21			1/2-Lite	> 1/2-Lite			
	U- <u>Factor</u> Value: SHGC:	-	.∠1 l/aA	0.27 0.30			0.32 0.30			
Glazing:			_	ailabla wal		0.00		0.00		
G.a.z.ig.	Total Area <sup>6</sup> : AGF = 0.15 x CFAAFL x FA x F, without exceeding available wall area <sup>6</sup> Orientation: Same as Rrated Uunit <sup>2</sup> , by percentage of area									
	Onemation Same as Nate Utilit , by per	entage of are		aliable wal	raica					
	Interior Shade Coefficient: Same as Energy		ea			y <u>ANSI / RESNET / I</u>	CC Std. 301	RESNET'	<del>}</del>	
	Interior Shade Coefficient: Same as Energy sta_ndard 7		ea			y <u>ANSI / RESNET / I</u>	CC Std. 301	RESNET'	<del>}</del>	
	Interior Shade Coefficient: Same as Energy standard <sup>7</sup> External Shading: None	Rating HERS	ea Referenc	ce Home, a	as defined by	y <u>ANSI / RESNET / I</u>	CC Std. 301	RESNET	<b>}</b>	
	Interior Shade Coefficient: Same as Energy sta_ndard <sup>7</sup> External Shading: None Assembly U-Factors Values and SHGCs, ba	Rating HERS	ea Reference RGY STAR	ce Home, a	as defined by					
	Interior Shade Coefficient: Same as Energy sta.ndard <sup>7</sup> External Shading: None Assembly U-Factors Values and SHGCs, ba Climate Zone:	Rating HERS sed on ENER CZ 1	ea Reference RGY STAR CZ 2	ce Home, a	as defined by	CZ 4 C & 5	CZ 6	CZ 7	CZ 8	
	Interior Shade Coefficient: Same as Energy sta_ndard <sup>7</sup> External Shading: None Assembly U-Factors Values and SHGCs, ba	Rating HERS	ea Reference RGY STAR	ce Home, a	as defined by					
	Interior Shade Coefficient: Same as Energy sta.ndard <sup>7</sup> External Shading: None Assembly U-Factors Values and SHGCs, ba Climate Zone: U-Value:	sed on ENER CZ 1 0.60 0.27	RGY STAR CZ 2 0.60 0.27	R Windows CZ 3 0.35 0.30	cz 4 0.32 0.40	CZ 4 C & 5 0.30	<b>CZ 6</b> 0.30	<b>CZ 7</b> 0.30	<b>CZ 8</b> 0.30	
	Interior Shade Coefficient: Same as Energy sta.ndard <sup>7</sup> External Shading: None Assembly U-Factors Values and SHGCs, ba Climate Zone: U-Value: SHGC:	sed on ENER CZ 1 0.60 0.27	RGY STAR CZ 2 0.60 0.27	R Windows CZ 3 0.35 0.30	cz 4 0.32 0.40	CZ 4 C & 5 0.30	<b>CZ 6</b> 0.30	<b>CZ 7</b> 0.30	<b>CZ 8</b> 0.30	
	Interior Shade Coefficient: Same as Energy sta.ndard 7 External Shading: None Assembly U-Factors Values and SHGCs, ba Climate Zone: U-Value: SHGC: Class AW Assembly U-Factors Values (i.e., 5 Climate Zone: Fixed Window U-Factor	Rating HERS  Sed on ENER  CZ 1  0.60  0.27  Structural) Wi  CZ 1  0.50	RGY STAR CZ 2 0.60 0.27 indows ba CZ 2 0.50	R Windows CZ 3 0.35 0.30 sed on 20	CZ 4 0.32 0.40 12 IECC	CZ 4 C & 5 0.30 0.40	CZ 6 0.30 0.40	CZ 7 0.30 0.40 CZ 7 0.29	CZ 8 0.30 0.40	
	Interior Shade Coefficient: Same as Energy sta.ndard 7 External Shading: None Assembly U-Factors Values and SHGCs, ba Climate Zone: U-Value: SHGC: Class AW Assembly U-Factors Values (i.e., SC Climate Zone: Fixed Window U-Ffactor Operable Window U-Ffactor	Rating HERS  Sed on ENER  CZ 1  0.60  0.27  Structural) Wi  CZ 1  0.50  0.65	RGY STAR CZ 2 0.60 0.27 indows ba CZ 2 0.50 0.65	R Windows  CZ 3  0.35  0.30  sed on 20  CZ 3  0.46  0.60	CZ 4 0.32 0.40 12 IECC CZ 4 0.38 0.45	CZ 4 C & 5 0.30 0.40 CZ 4 C & 5 0.38 0.45	CZ 6 0.30 0.40 CZ 6 0.36 0.43	CZ 7 0.30 0.40 CZ 7 0.29 0.37	CZ 8 0.30 0.40 CZ 8 0.29 0.37	
	Interior Shade Coefficient: Same as Energy sta_ndard 7 External Shading: None Assembly U-FactorsValues and SHGCs, bat Climate Zone: U-Value: SHGC: Class AW Assembly U-FactorsValues (i.e., State Climate Zone: Fixed Window U-Factor Operable Window U-Factor SHGC:	Rating HERS  Sed on ENER  CZ 1  0.60  0.27  Structural) Wi  CZ 1  0.50	RGY STAR CZ 2 0.60 0.27 indows ba CZ 2 0.50	R Windows  CZ 3  0.35  0.30  sed on 20  CZ 3  0.46	CZ 4 0.32 0.40 12 IECC CZ 4 0.38	CZ 4 C & 5 0.30 0.40 CZ 4 C & 5 0.38	CZ 6 0.30 0.40 CZ 6 0.36	CZ 7 0.30 0.40 CZ 7 0.29	CZ 8 0.30 0.40 CZ 8 0.29	
Skylights:	Interior Shade Coefficient: Same as Energy sta_ndard 7 External Shading: None Assembly U-FactorsValues and SHGCs, ba Climate Zone: U-Value: SHGC: Class AW Assembly U-FactorsValues (i.e., SC Climate Zone: Fixed Window U-Factor Operable Window U-Factor SHGC: None	Rating HERS  Sed on ENER  CZ 1  0.60  0.27  Structural) Wi  CZ 1  0.50  0.65	RGY STAR CZ 2 0.60 0.27 indows ba CZ 2 0.50 0.65	R Windows  CZ 3  0.35  0.30  sed on 20  CZ 3  0.46  0.60	CZ 4 0.32 0.40 12 IECC CZ 4 0.38 0.45	CZ 4 C & 5 0.30 0.40 CZ 4 C & 5 0.38 0.45	CZ 6 0.30 0.40 CZ 6 0.36 0.43	CZ 7 0.30 0.40 CZ 7 0.29 0.37	CZ 8 0.30 0.40 CZ 8 0.29 0.37	
	Interior Shade Coefficient: Same as Energy sta_ndard 7 External Shading: None Assembly U-FactorsValues and SHGCs, bat Climate Zone: U-Value: SHGC: Class AW Assembly U-FactorsValues (i.e., State Climate Zone: Fixed Window U-Factor Operable Window U-Factor SHGC: None Construction Type: Wood frame	Rating HERS  Sed on ENER  CZ 1  0.60  0.27  Structural) Wi  CZ 1  0.50  0.65	RGY STAR CZ 2 0.60 0.27 indows ba CZ 2 0.50 0.65	R Windows  CZ 3  0.35  0.30  sed on 20  CZ 3  0.46  0.60	CZ 4 0.32 0.40 12 IECC CZ 4 0.38 0.45	CZ 4 C & 5 0.30 0.40 CZ 4 C & 5 0.38 0.45	CZ 6 0.30 0.40 CZ 6 0.36 0.43	CZ 7 0.30 0.40 CZ 7 0.29 0.37	CZ 8 0.30 0.40 CZ 8 0.29 0.37	
Skylights:	Interior Shade Coefficient: Same as Energy sta_ndard 7 External Shading: None Assembly U-FactorsValues and SHGCs, ba Climate Zone: U-Value: SHGC: Class AW Assembly U-FactorsValues (i.e., SClimate Zone: Fixed Window U-Factor Operable Window U-Factor SHGC: None Construction Type: Wood frame Gross Area: Same as Rated Unit 2	Rating HERS  Sed on ENER  CZ 1  0.60  0.27  Structural) Wi  CZ 1  0.50  0.65	RGY STAR CZ 2 0.60 0.27 indows ba CZ 2 0.50 0.65	R Windows  CZ 3  0.35  0.30  sed on 20  CZ 3  0.46  0.60	CZ 4 0.32 0.40 12 IECC CZ 4 0.38 0.45	CZ 4 C & 5 0.30 0.40 CZ 4 C & 5 0.38 0.45	CZ 6 0.30 0.40 CZ 6 0.36 0.43	CZ 7 0.30 0.40 CZ 7 0.29 0.37	CZ 8 0.30 0.40 CZ 8 0.29 0.37	
Skylights:	Interior Shade Coefficient: Same as Energy sta_ndard 7 External Shading: None Assembly U-FactorsValues and SHGCs, ba Climate Zone: U-Value: SHGC: Class AW Assembly U-FactorsValues (i.e., SClimate Zone: Fixed Window U-Factor Operable Window U-Factor SHGC: None Construction Type: Wood frame Gross Area: Same as Rated Unit 2 Insulation: 3	Rating HERS  CZ 1  0.60 0.27  Structural) Wi  CZ 1  0.50 0.65 0.27	ea S Reference CZ 2 0.60 0.27 indows ba CZ 2 0.50 0.65 0.27	R Windows  CZ 3 0.35 0.30 sed on 20  CZ 3 0.46 0.60 0.30	CZ 4 0.32 0.40 12 IECC CZ 4 0.38 0.45 0.40	CZ 4 C & 5 0.30 0.40 CZ 4 C & 5 0.38 0.45 0.40	CZ 6 0.30 0.40 CZ 6 0.36 0.43 0.40	CZ 7 0.30 0.40 CZ 7 0.29 0.37 0.40	CZ 8 0.30 0.40 CZ 8 0.29 0.37 0.40	
Skylights:	Interior Shade Coefficient: Same as Energy sta_ndard 7 External Shading: None Assembly U-FactorsValues and SHGCs, bat Climate Zone: U-Value: SHGC: Class AW Assembly U-FactorsValues (i.e., SC Climate Zone: Fixed Window U-Factor Operable Window U-Factor SHGC: None Construction Type: Wood frame Gross Area: Same as Rated Unit 2 Insulation: 3 Climate Zone:	Rating HERS  CZ 1  0.60 0.27  Structural) Wi  CZ 1  0.50 0.65 0.27	ea 6 Reference CZ 2 0.60 0.27 indows ba CZ 2 0.50 0.65 0.27	CZ 3 0.35 0.30 sed on 20 CZ 3 0.46 0.60 0.30	CZ 4 0.32 0.40 12 IECC CZ 4 0.38 0.45 0.40	CZ 4 C & 5 0.30 0.40 CZ 4 C & 5 0.38 0.45 0.40	CZ 6 0.30 0.40 CZ 6 0.36 0.43 0.40	CZ 7 0.30 0.40 CZ 7 0.29 0.37 0.40	CZ 8 0.30 0.40 CZ 8 0.29 0.37 0.40	
Skylights: Ceilings:	Interior Shade Coefficient: Same as Energy sta_ndard 7 External Shading: None Assembly U-FactorsValues and SHGCs, bat Climate Zone: U-Value: SHGC: Class AW Assembly U-FactorsValues (i.e., SC Climate Zone: Fixed Window U-Factor Operable Window U-Factor SHGC: None Construction Type: Wood frame Gross Area: Same as Rated Unit 2 Insulation: 3 Climate Zone: Ceiling Assembly U-Factor:	Rating HERS  CZ 1  0.60 0.27  Structural) Wi  CZ 1  0.50 0.65 0.27  CZ 1  0.027	ea B Reference CZ 2 0.60 0.27 indows ba CZ 2 0.50 0.65 0.27 CZ 2 0.027	CZ 3 0.36 0.46 0.60 0.30  CZ 3 0.46 0.60 0.30	CZ 4 0.32 0.40 12 IECC CZ 4 0.38 0.45 0.40	CZ 4 C & 5 0.30 0.40 CZ 4 C & 5 0.38 0.45 0.40	CZ 6 0.30 0.40 CZ 6 0.36 0.43 0.40	CZ 7 0.30 0.40 CZ 7 0.29 0.37 0.40	CZ 8 0.30 0.40 CZ 8 0.29 0.37 0.40	
Skylights:	Interior Shade Coefficient: Same as Energy sta_ndard 7 External Shading: None Assembly U-FactorsValues and SHGCs, bat Climate Zone: U-Value: SHGC: Class AW Assembly U-FactorsValues (i.e., SC Climate Zone: Fixed Window U-Factor Operable Window U-Factor SHGC: None Construction Type: Wood frame Gross Area: Same as Rated Unit 2 Insulation: 3 Climate Zone:	Rating HERS  CZ 1 0.60 0.27  Structural) Wi CZ 1 0.50 0.65 0.27  CZ 1 0.027  sq. ft. per 300	ea S Reference CZ 2 0.60 0.27 indows ba CZ 2 0.50 0.65 0.27 CZ 2 0.027 0 sq. ft. ce	CZ 3 0.36 0.46 0.60 0.30  CZ 3 0.46 0.60 0.30	CZ 4 0.32 0.40 12 IECC CZ 4 0.38 0.45 0.40	CZ 4 C & 5 0.30 0.40 CZ 4 C & 5 0.38 0.45 0.40 CZ 4 C & 5 0.027	CZ 6 0.30 0.40 CZ 6 0.36 0.43 0.40	CZ 7 0.30 0.40 CZ 7 0.29 0.37 0.40	CZ 8 0.30 0.40 CZ 8 0.29 0.37 0.40	
Skylights: Ceilings:	Interior Shade Coefficient: Same as Energy sta_ndard 7 External Shading: None Assembly U-FactorsValues and SHGCs, bat Climate Zone: U-Value: SHGC: Class AW Assembly U-FactorsValues (i.e., SC Climate Zone: Fixed Window U-Factor Operable Window U-Factor SHGC: None Construction Type: Wood frame Gross Area: Same as Rated Unit 2 Insulation: 3 Climate Zone: Ceiling Assembly U-Factor: Construction Type: Vented with aperture = 1	Rating HERS CZ 1 0.60 0.27 Structural) Wi CZ 1 0.50 0.65 0.27  CZ 1 0.027 sq. ft. per 300 linear ft. of du	RGY STAR CZ 2 0.60 0.27 indows ba CZ 2 0.50 0.65 0.27  CZ 2 0.027 0 sq. ft. ce uctwork ai	CZ 3 0.36 0.46 0.60 0.30  CZ 3 0.46 0.60 0.30	CZ 4 0.32 0.40 12 IECC CZ 4 0.38 0.45 0.40	CZ 4 C & 5 0.30 0.40 CZ 4 C & 5 0.38 0.45 0.40 CZ 4 C & 5 0.027	CZ 6 0.30 0.40 CZ 6 0.36 0.43 0.40	CZ 7 0.30 0.40 CZ 7 0.29 0.37 0.40	CZ 8 0.30 0.40 CZ 8 0.29 0.37 0.40	



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Solar Absorptance = 0.92

Emittance = 0.90



### ENERGY STAR Multifamily New Construction, Version 1.0

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

Heating	Heating capacity shall be selected in	accordance w	ith ACCA Ma								
Systems:	Heating capacity shall be selected in accordance with ACCA Manual S based on building heating and cooling loads may be calculated and equipment capacity selected in accordanceing to t withhe latest edition of ACCA Manual J, Eighth Edition, ASHRAE 2009-Handbook of Eughamentals, or an substantively equipment computation procedure; otherwise, same as Pated Homel Init										
	Fundamentals, or an substantively equivalent computation procedure; otherwise, same as Rated Home Unit.  Fuel Type: Same as Rated Unit 2.8										
	System Type: Same as Rated Unit _, except Reference Design shall be configured with air-source heat pump in CZ 1-6 where Rated Unit is										
	modeled with ground-source heat pump, electric strip or baseboard heat, and Reference Design shall be configured with ground-source										
	heat pump in CZ 7 & 8 where Rated Unit is modeled with air-source or ground-source heat pump, electric strip or baseboard heat; applicable efficiency selected from below <sup>9</sup>										
	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	90	90	90	90	90		
	Oil Furn. AFUE:	80	80	80	85	85	85	85	85		
	Gas Boiler AFUE:	80 80	80	80	85 85	85 85	85 85	85 85	85 85		
	Oil Boiler AFUE: Air-Source Heat Pump HSPF:	8.2	80 8.2	80 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	3.5	3.5		
	For non-electric warm furnaces and n	on-electric bo	ilers, the Elec	ctric Auxiliary	Energy sha	all be determine	d in accord	dance with the			
	methodology for the Energy Rating R										
Cooling	Cooling capacity shall be selected in										
Systems:	equipment capacity selectedin accord							E <del>2009</del> Handb	ook of		
	Fundamentals, or an substantively eq Fuel Type: Same as Rated Unit <sup>2, 8</sup>	uivaient <u>comp</u>	butation proce	edure, <del>otnerv</del>	<del>rise, same a</del>	is Raieu Home	<del>Unii.</del>				
	System Type: Same as Rated Unit_,	excent Refere	nce Design s	shall be confi	aured with a	air-source heat	numn in C	7 1-6 where R:	ated Linit		
	modeled with ground-source heat pur										
	Unit is modeled with air-source or gro										
	Climate Zone:	CZ 1	CZ 2	CZ 3	CZ 4	CZ 4 C & 5	CZ 6	CZ 7	CZ 8		
	AC SEER:	14.5	14.5	14.5	13	13	13	13	13		
	Air-Source Heat Pump SEER:	14.5	14.5	14.5	14.5	14.5	14.5	n/a	n/a		
	Ground-Source Heat Pump EER:	n/a	n/a	n/a	n/a	n/a	n/a	16.1	16.1		
Service	Use (Gallons per Day): Same as Ene	rgy RatingHEI	RS Reference	e Home, as c	lefined by A	NSIRESNET's	/ RESNET	/ ICC Std. 301	, except		
				,							
	for reduced usage resulting from the	equipment spe	ecified in the	Lighting, App	liances, Fix	tures, & Interna	ıl Gains Se	ctionstandard.	7, 11		
Heating	for reduced usage resulting from the example Tank Temperature: Same as Energy	equipment spe	ecified in the	Lighting, App	liances, Fix	tures, & Interna	ıl Gains Se	ctionstandard.	7 <u>, 11</u> indard. 7		
Heating	for reduced usage resulting from the carrier Tank Temperature: Same as Energy Recirculation Pump: 0 kWh per year	equipment spe	ecified in the	Lighting, App	liances, Fix	tures, & Interna	ıl Gains Se	ctionstandard.	7 <u>, 11</u> Indard. 7		
Heating	for reduced usage resulting from the of Tank Temperature: Same as Energy Recirculation Pump: 0 kWh per year Fuel Type: Same as Rated Unit <sup>2,8</sup>	equipment spe RatingHERS I	ecified in the Reference Ho	Lighting, Apportude Apportude Lighting Light Lig	oliances, Fix ned by <u>ANSI</u>	tures, & Interna / RESNET / IC	al Gains Se C Std. 301	ctionstandard. RESNET's sta	ndard. 7		
Heating	for reduced usage resulting from the of Tank Temperature: Same as Energy Recirculation Pump: 0 kWh per year Fuel Type: Same as Rated Unit <sup>2,8</sup> System Type: Conventional storage v	equipment spe RatingHERS I vater heater w	Reference Ho	Lighting, Appome, as defined	oliances, Fix led by ANSI of Rated U	tures, & Interna / RESNET / IC nit, unless Rate	d Unit uses	ctionstandard. RESNET's sta	ndard. 7		
Heating	for reduced usage resulting from the of Tank Temperature: Same as Energy Recirculation Pump: 0 kWh per year Fuel Type: Same as Rated Unit <sup>2,8</sup>	equipment spe RatingHERS I vater heater w	Reference Ho	Lighting, Appome, as defined	oliances, Fix led by ANSI of Rated U	tures, & Interna / RESNET / IC nit, unless Rate	d Unit uses	ctionstandard. RESNET's sta	ndard. 7		
Heating	for reduced usage resulting from the of Tank Temperature: Same as Energy Recirculation Pump: 0 kWh per year Fuel Type: Same as Rated Unit 2.8 System Type: Conventional storage vheater in which case select 50 gallon using tank size of Reference Unit.  Gas Storage Tank Capacity: 44	equipment spe RatingHERS I vater heater w	Reference Ho	Lighting, Apporne, as defined as	oliances, Fix led by ANSI of Rated U	tures, & Interna / RESNET / IC nit, unless Rate	d Unit uses ct applicable > 55	ctionstandard. RESNET's sta	ndard. 7		
Water Heating Systems:	for reduced usage resulting from the of Tank Temperature: Same as Energy Recirculation Pump: 0 kWh per year Fuel Type: Same as Rated Unit 2.8 System Type: Conventional storage wheater in which case select 50 gallon using tank size of Reference Unit.  Gas Storage Tank Capacity: 44 Gas DHW EF:	equipment spe RatingHERS I vater heater w	Reference Ho	Lighting, App ome, as defined equal to that 60 gallon tanted ≤ 55 Gal 0.67 EF	oliances, Fix led by ANSI of Rated U	tures, & Interna / RESNET / IC	d Unit uses ct applicable > 55 0.77	ctionstandard. RESNET's sta sinstantaneous e efficiency fro Gal EF	ndard. 7		
Heating	for reduced usage resulting from the of Tank Temperature: Same as Energy Recirculation Pump: 0 kWh per year Fuel Type: Same as Rated Unit 2.8 System Type: Conventional storage v heater in which case select 50 gallon using tank size of Reference Unit.  Gas Storage Tank Capacity: 44 Gas DHW EF:  Electric Storage Tank Capacity: 14	equipment spe RatingHERS I vater heater w	Reference Ho	equal to that 60 gallon tanl  ≤ 55 Gal  0.67 EF  ≤ 55 Gal	oliances, Fix led by ANSI of Rated U	tures, & Interna / RESNET / IC	d Unit uses ct applicable > 55 0.77 > 55	ctionstandard. RESNET's sta s instantaneous le efficiency fro Gal EF	ndard. 7		
Heating	for reduced usage resulting from the of Tank Temperature: Same as Energy Recirculation Pump: 0 kWh per year Fuel Type: Same as Rated Unit 2.8  System Type: Conventional storage v heater in which case select 50 gallon using tank size of Reference Unit-Gas Storage Tank Capacity: 44  Gas DHW EF:  Electric Storage Tank Capacity: 14  Electric DHW EF:	equipment spe RatingHERS I water heater w tank for gas s	ecified in the Reference Ho with tank size ystems and 6	equal to that 60 gallon tanl  ≤ 55 Gal  0.67 EF  ≤ 55 Gal  0.95 EF	of Rated Unic for electric	tures, & Internative / RESNET / IC	d Unit uses ct applicable > 55 0.77 > 55 2.00	ctionstandard. RESNET's sta s instantaneous le efficiency fro Gal EF Gal EF	s water		
Heating	for reduced usage resulting from the of Tank Temperature: Same as Energy Recirculation Pump: 0 kWh per year Fuel Type: Same as Rated Unit 2.8 System Type: Conventional storage vheater in which case select 50 gallon using tank size of Reference Unit.  Gas Storage Tank Capacity: 44 Gas DHW EF:  Electric Storage Tank Capacity: 14 Electric DHW EF:  Oil Storage Tank Capacity: 1412	equipment spe RatingHERS I water heater w tank for gas s	rith tank size ystems and 6	equal to that 60 gallon tanl  ≤ 55 Gal  0.67 EF  ≤ 55 Gal  0.95 EF	of Rated United For Control of Rated United For Control of Control	nit, unless Rates systems. Selections of the control of the contro	d Unit uses ct applicable > 55 0.77 > 55 2.00 70 Ga	ctionstandard. RESNET's sta	s water om below		
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ENERGY STAR Multifamily New Construction, Version 1.0

Revised 1006/1504/2018



### ENERGY STAR Multifamily New Construction, Version 1.0

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

Lighting,	Lighting: Fraction of qualifying Tier I fixtures to all fixtures in qualifying light fixture locations 90% for interior; 0% for exterior and garage							
Appliances,	Refrigerator: 423 kWh per year							
Water	Dishwasher: 0.66 EF, when dishwasher present in the Rated Unit; otherwise same as Rated Unit (i.e. RESNET default)Place Setting							
Fixtures & Internal Gains:	Capacity Same as Rated Unit Home <sup>2</sup> ; use 12 settings if no dishwasher installed in Rated UnitHome							
	Clothes Washer: Use the ENERGY STAR values below, even if no clothes washer is installed. Exception: when specified in the Rated Unit							
	or Common Space except lif installed clothes washer is not available as ENERGY STAR certified (e.g., top-loading commercial clothes							
					le as ENERGY STAR			
	Unit clothes washe						<u></u>	
		LER	\$/kWh	AGC	\$/therm	CAPw	IMEF	
	ENERGY STAR	1 <u>52</u> 33	0.12	9 <u>12</u>	1.09	4.4 <u>2</u>	2.0 <u>6</u> 7	
	Clothes Dryer: Fiel	ld Use Factor is 1.	04 and CEF is 3.9	3 for electric and 3.	43 for gas, even if no	clothes dryer is insta	alled. Exception: If	
	installed clothes dr	yer is not availabl	e as ENERGY STA	AR certified (e.g., co	ommercial clothes dry	ers, Combination Al	I-In One Washer-	
	Dryers), model the same as the Rated Unit clothes dryerWhen specified in the Rated Unit or Common Space, Field Use Factor is 1.04 and							
	CEF is 3.93 for electric and 3.43 for gas except if "Not available as ENERGY STAR" selected; otherwise same as Rated Unit							
	Ceiling Fan: 122 CFM per Watt; Quantity = Number of bedrooms + 1 when ceiling fans present in the Rated Unit; otherwise Quantity = 0							
	Water fixtures: all showers and faucets ≤ 2.0 gpm; F <sub>oti</sub> =0.95							
	Internal Gains: Same as Energy Rating Reference Home, as Defined by RESNET's standardANSI / RESNET / ICC Std. 301, except							
	forincluding adjustments to accounted for the high-efficiency lighting, refrigerator, dishwasher, clothes washer, clothes dryer, and ceiling							
	fans specified in this section and & appliances listed above. 7							
Internal	Same as Energy RatingHERS Reference Home, as defined by ANSI / RESNET / ICC Std. 301RESNET's standard. 7							
Mass:	Additional mass specifically designed as a Thermal Storage Element for the Rated Unit shall be excluded.							



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#### FootnNotes:

- Any parameter not specified in this exhibit shall be identical to the value entered for the Rated Unit. Where envelope building components do not exist in the Rated Unit, such as a foundation or slab, they should not be modeled in the ENERGY STAR Multifamily Reference Design. Where the envelope component is adiabatic in the Rated Unit, it shall also be adiabatic in the Multifamily Reference Design.
- 2. "Same as Rated Unit" indicates that the parameter shall be identical to the value entered for the Rated Unit.
- 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 unit, then the thermal boundary of the ENERGY STAR Multifamily 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. All Reference Design window and door U-value\_factor\_and SHGC requirements for non-structural windows are based on the ENERGY STAR Program Requirements for Residential Windows, Doors, and Skylights Version 5.0 as outlined at <a href="https://www.energystar.gov/windows">www.energystar.gov/windows</a>, except that SHGC values have been assumed for CZ 4C & 5-8. 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 <u>ERIHERS Index</u> Target, the following formula shall be used to determine total window area of the ENERGY STAR <u>Multifamily</u> Reference Design:

 $AGF = 0.15 \times CFAAFL \times FA \times F$ 

#### Where:

- AGF = Total <u>glazingfenestration</u> area
- <u>CFAAFL</u> = Total floor area of directly conditioned floor areaspace
- FA = (<u>Gross Aa</u>bove-grade thermal boundary <u>gross</u>-wall area) / (<u>Gross Aa</u>bove-grade boundary wall area + 0.5 x <u>Gross</u>
  <u>Bb</u>elow-grade <u>thermal</u> boundary wall area)
- F = 1- 0.44 x (<u>Gross c</u>Common wall area) / (<u>Gross Aa</u>bove-grade thermal boundary wall area + <u>Gross c</u>Common wall area)

#### And where:

- Thermal boundary wall is any wall that separates conditioned space from unconditioned space, <u>outdoor environment</u>, or <u>the surrounding soilambient conditions</u>;
- Above-grade thermal boundary wall is any portion of a thermal boundary wall not in contact with soil;
- Below-grade boundary wall is any portion of a thermal boundary wall in soil contact; ANDand
- Common wall is the total wall area of walls adjacent to another conditioned spaceliving unit, not including foundation walls.
- 7. The version of ANSI / RESNET / ICC Std. 301 utilized by RESNET for HERS ratings shall be used to configure this parameter RESNET requires that all RESNET-accredited Home Energy Rating software programs automatically configure this parameter per ANSI / RESNET / ICC 301-2014 when calculating a HERS index value.
- 8. Fuel type(s) shall be same as Rated Unit, including any dual-fuel equipment where applicable. For a Rated Unit 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.
- For a Rated Unit without a heating system, the ENERGY STAR Multifamily Reference Design Multifamily Unit shall be configured with a 78% AFUE gas furnace system, unless the Rated unit has no access to natural gas or fossil fuel delivery. In such cases, the ENERGY STAR Multifamily Reference Design Multifamily Unit shall be configured with a 7.7 HSPF air-source heat pump.

9.

- 9-10. For a Rated Unit without a cooling system, the ENERGY STAR Multifamily Reference Design Multifamily Unit 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 drain water heater recovery.
- 12. To determine domestic hot water (DHW) EF requirements for additional tank sizes, use the following equation: Oil DHW EF ≥ 0.70 (0.002 x Tank Gallon Capacity).



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40.13. For a Rated Unit with conditioned space below, that does not indirectly use corridor air as the ventilation supply air, the ENERGY STAR Multifamily Reference Design shall be configured with an infiltration rate of 0.255 cfm50/ft² and software shall either automatically apply a 15% reduction to the compartmentalization results of the Rated Unit or instruct the Rater to apply the reduction. If automatically applied, the software shall make that known, such that the Rater does not also apply the same reduction, which is based on the RESNET Guidelines for Multifamily Energy Ratings.