HERS$_{H2O}$ and WaterSense
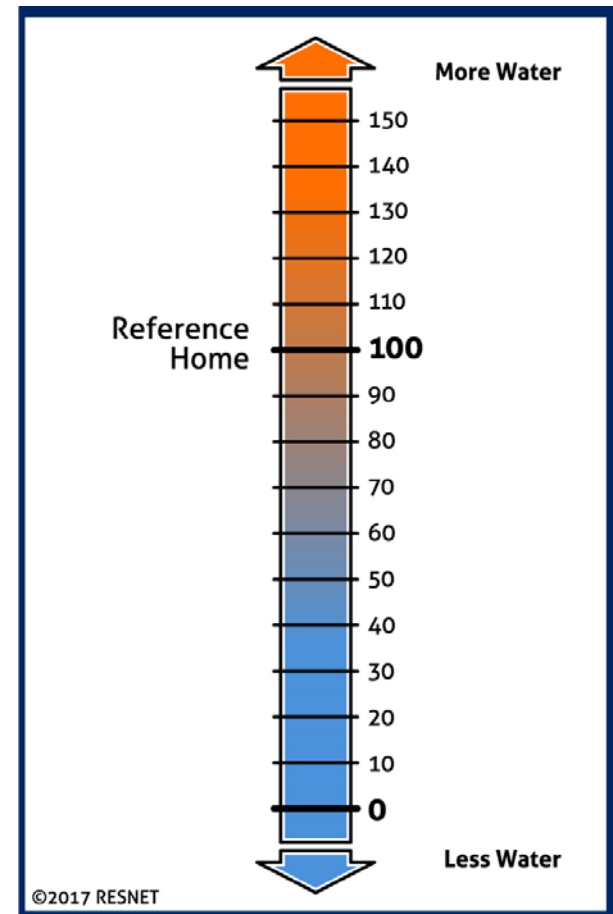
February 27, 2019

**Ryan Meres, Program Director**
RESNET

Key Objectives for HERS$_{H2O}$

- Nationwide applicability

- Suitable for both new and existing homes

- Encompasses both indoor and outdoor water efficiency

- Practical and affordable to administer

- Scores usable for quantitative comparison

Development Process

Technical Guidelines → ANSI Standard → Reference in Codes and other Standards ??
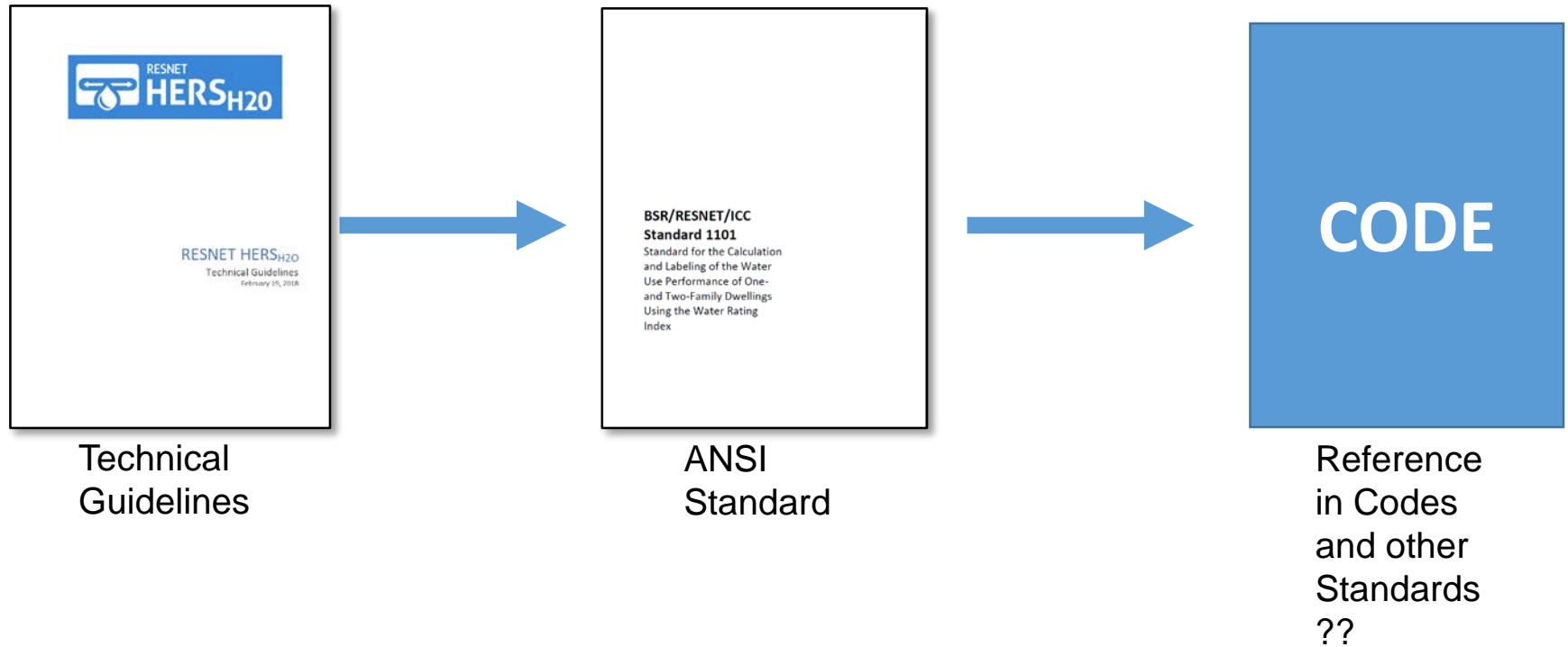
Technical Guidelines serve as the basis for the Water Rating Index Standard (BSR/RESNET/ICC 1101-201x).

This Standard will provide a uniform methodology for evaluating, rating and labeling the indoor and outdoor water use performance of one- and two-family dwellings.

Components of a Water Rating

Shower Heads

Kitchen Faucet

Lavatory Faucets

Toilet Flush Volume

Irrigation

Pool or Spa

Components of a Water Rating

Clothes Washer

Water Softener

Leaks/Other Water Use

Excess Pressure

Dishwasher

Other Factors Included in the Rating

House Size

Geographic Location

Number of Bedrooms

Lot & Landscape Size

Hot Water Distribution Layout

Hot Water Pipe Insulation

Rated Home Credits

Indoor model will respond to:
- More efficient plumbing products
- Efficient Appliances
- More efficient plumbing distribution

Normalized for:
- Climate
- Size of house & predicted occupancy

Outdoor model will respond to:
- Smaller landscapes (the reference landscape is fixed based on lot size)
- More efficient irrigation technology
  - Smart controllers
  - More efficient emitters, as expressed by the Residential Irrigation Capacity Index (RICI)

Normalized for:
- Climate

Calculation Spreadsheet

Indoor Calculation Fields

	A	B	C	D	E	F	G	H	I	J	K
1					**Example Water Use Calculations**						
3	**User input fields are yellow**			**Water Use**	**Cold Wtr**	**Hot Wtr**	**Total Wtr**	**Home characteristics:**		**Drain Water Heat Recovery:**	
4	Location (pull down)	Castle Rock, CO		Shower_gpd	7.0	17.1	24.1	CFA	2400	Showers connected	all
5	Distribution system	std		KitchF_gpd	4.1	10.1	14.2	Nbr	3	Equal flow?	yes
6	HW pipe Insulation	none		LavF_gpd	1.8	4.5	6.4	Nfl	2	CSA 55.1 DWHR$_{eff}$	54.0%
7	Shower (gpm)	2.5		Waste_gpd	4.5	11.2	15.7	Bsmt	0	$Tmains =$	55.9
8	Kitch Faucet (gpm)	2.2		CW_gpd	20.6	3.9	24.5	**Appliances:**		$WHinTadj =$	0.00
9	Lav Faucet efficiency	std		DW_gpd		4.3	4.3	Dishwasher	std	$WHinT =$	55.9
10	Std sys pipe length	89		Toilets_gpd	21.9		21.9	Clothes washer	std		
11	Recirc sys loop length	159		Soft_gpd	0.0		0.0	WF	9.5		
12	Recirc sys branch length	10		Other_gpd	15.7	2.1	17.8	**Toilets:**			
13	Recirc pumpWatts	50		EP_gpd	0.0	0.0	0.0	gf	1.6		
14	DW heat recovery?	no		Indoor_gpd	75.7	53.2	128.9	**Water Softener:**			
15				Outdoor_gpd	67.8	0.0	67.8	Softener	no		
16	Lot Area (ft2)	5,000		Total_gpd	143.5	53.2	196.6	gal/remove	5.0	allons/1,000 grains removed	
17	Landscaped Area (ft2)	2,348		Ref_In =	75.7	53.2	128.9	**Outdoors:**			
18	$\%\ Outdoor\ H2O =$	34%		Ref_Out =	67.8	0.0	67.8	Inground Pool?	no		
19	$Ref\_Irr\_Area =$	2,348		Ref_Tot =	143.5	53.2	196.6	Irrigation?	no		
20	$Tot\_Ref\_Irr\_ratio =$	47.0%		Save_Tot =	0.0	0.0	0.0	Smart controller?	no		
21	$Net\_Lscape\_ratio =$	61.8%		H2O_in =	100	100	100	Use RICI?	no		
22	$Lot\ size\ (acres) =$	0.115		H2O_Out =	100	100	100	Zone flow rates	25.2	Sum of irrigation zone flow rates	
23				H2O_Tot =	100	100	100	Prof Audit?	no		
24				HERS$_{H2O}$ =	100	H2Osave* =	0	Static Pressure	90		
25	$Ref\ std\ sys\ pipe\ length =$	89.3		* Gallons per year		$save** =	$0	H2O Price	$3.90	$/CCF (1 CCF = 748.05 gallons)	
26	$Ref\ recirc\ sys\ loop\ length =$	158.6		** $ per year							

Calculation Spreadsheet

Outdoor Calculation Fields

	A	B	C	D	E	F	G	H	I	J	K
1					**Example Water Use Calculations**						
3	**User input fields are yellow**			**Water Use**	**Cold Wtr**	**Hot Wtr**	**Total Wtr**	**Home characteristics:**		**Drain Water Heat Recovery:**	
4	Location (pull down)	Castle Rock, CO		Shower_gpd	7.0	17.1	24.1	CFA	2400	Showers connected	all
5	Distribution system	std		KitchF_gpd	4.1	10.1	14.2	Nbr	3	Equal flow?	yes
6	HW pipe Insulation	none		LavF_gpd	1.8	4.5	6.4	Nfl	2	CSA 55.1 DWHR$_{eff}$	54.0%
7	Shower (gpm)	2.5		Waste_gpd	4.5	11.2	15.7	Bsmt	0	*Tmains =*	*55.9*
8	Kitch Faucet (gpm)	2.2		CW_gpd	20.6	3.9	24.5	**Appliances:**		*WHinTadj =*	*0.00*
9	Lav Faucet efficiency	std		DW_gpd		4.3	4.3	Dishwasher	std	*WHinT =*	*55.9*
10	Std sys pipe length	89		Toilets_gpd	21.9		21.9	Clothes washer	std		
11	Recirc sys loop length	159		Soft_gpd	0.0		0.0	WF	9.5		
12	Recirc sys branch length	10		Other_gpd	15.7	2.1	17.8	**Toilets:**			
13	Recirc pumpWatts	50		EP_gpd	0.0	0.0	0.0	gpf	1.6		
14	DW heat recovery?	no		Indoor_gpd	75.7	53.2	128.9	**Water Softener:**			
15				Outdoor_gpd	67.8	0.0	67.8	Softener	no		
16	Lot Area (ft2)	5,000		Total_gpd	143.5	53.2	196.6	gal/removed	5.0	gallons/1,000 grains removed	
17	Landscaped Area (ft2)	2,348		Ref_In =	75.7	53.2	128.9	**Outdoors:**			
18	*% Outdoor H2O =*	34%		Ref_Out =	67.8	0.0	67.8	Inground Pool?	no		
19	*Ref_Irr_Area =*	2,348		Ref_Tot =	143.5	53.2	196.6	Irrigation?	no		
20	*Tot_Ref_Irr_ratio =*	47.0%		Save_Tot =	0.0	0.0	0.0	Smart controller?	no		
21	*Net_Lscape_ratio =*	61.8%		H2O_in =	100	100	100	Use RICI?	no		
22	*Lot size (acres) =*	0.115		H2O_Out =	100	100	100	Zone flow rates	25.2	Sum of irrigation zone flow rates	
23				H2O_Tot =	100	100	100	Prof Audit?	no		
24				HERS$_{H2O}$ =	100	H2Osave* =	0	Static Pressure	90		
25	*Ref std sys pipe length =*	89.3		* Gallons per year		$save** =	$0	H2O Price	$3.90	$/CCF (1 CCF = 748.05 gallons)	
26	*Ref recirc sys loop length =*	158.6		** $ per year							

- Estimating Irrigation Impact. Only need: Lot area, landscaped area and "yes" for irrigation
- Smart controller and Professional Audit are optional
- Only enter zone flow rates when "yes" is selected for RICI (documentation provided)

WaterSense

WaterSense 2.0 Mandatory Requirements:

- Max. water pressure: 85 psi

- Hot water piping: Same as Reference Home

- Toilets: 1.28 gpf

- Kitchen Faucet: 2.2 gpm

- Showerhead: 2.0 gpm

- Lav Faucets: Low Flow

- Dishwasher: Same as Reference Home

- Clothes Washer: Same as Reference Home

- Water Softeners: Not installed

- Irrigation: Same as Reference Home

Rating WaterSense Requirements in HERS$_{H2O}$

Indoor Water Use
Target Score=70

Location	WaterSense Requirements	Energy Star Clothes Washer and Dishwasher	1.5 gpm Shower and Kitchen	Toilet @ 0.8 gpf	Eff. Hot Water Distribution	Best Available Clothes Washer & Dishwasher
Park City, UT	93	88	81	77	73	69
Phoenix, AZ	96	92	92	86	83	81
Tampa, FL	93	87	79	76	71	67
Denver, CO	94	89	83	80	76	73
Riverside, CA	95	90	84	84	78	75

Outdoor Water Use in HERS$_{H2O}$

Location	Irrigation = "YES"	Prof. Audit & Weather-based controller	20% Reduction in Irrigated Area	Use RICI (6 gpm all zone flow rates)
Park City, UT	77	68	62	56
Phoenix, AZ	86	73	63	55
Tampa, FL	75	67	61	56
Denver, CO	80	70	62	56
Riverside, CA	82	71	63	56

Impact of RICI and Irrigation on HERS H2O

- Total Lot Size: 5,000 sq. ft.

- Reference Irrigated Area: 2,348 sq. ft.

- Indoor set to WaterSense 2.0 Requirements.

Location	WaterSense 2.0 Requirements	Ref. Irr Area & 25% Flow Reduction (8.8 gpm all zones)	Ref. Irr Area & 50% Flow Reduction (5.9 gpm all zones)	Reduce Irrigated Area by 20% and Add Weather-based Controller
Park City, UT	93	89	84	75
Phoenix, AZ	96	89	80	68
Tampa, FL	93	90	85	77
Denver, CO	94	89	83	73
Riverside, CA	95	89	82	71

Thank you!

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RESNET.
RESIDENTIAL ENERGY SERVICES NETWORK

Setting the **Standards** for
Home Energy Efficiency