A Guide to Electric Water Heaters for Retrofits and New Construction

Introduction

The purpose of this document is to provide electric choices to gas water heaters, from tiny tanks to water heaters for high rises. This list includes tankless water heaters one might use in commercial bathrooms, small resistance storage tanks (e.g. under a tiny house kitchen sink), heat pump water heaters with integrated tanks (common in new homes), heat pump water heaters using remote tanks (helpful for retrofits), larger water heater for whole-house hydronic HVAC, and the largest commercial water heaters you might find in cafeterias, restaurants, hotels and apartment buildings.

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Voltage Required: 120V

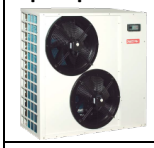
The below electric resistance water heaters are best used where hot water is needed in small amounts, such as hand washing in commercial bathrooms, or a 120sf tiny house that has no room for a 50-gallon heat pump. Electric resistance uses 3-5x more energy than a heat pump doing the same heating, but sometimes they are the only water heaters right-sized to the water demand. They might also be helpful when there is no 220V electricity available—the 2-10-gallon tanks on the market use 120V, while anything larger uses 240V for more heating capability.

Model	Picture	Water Heater Type	Tank Cap. (gal)	Heat Cap.	Power (KW or BTU)	Max Amp	COP or EF	Refrigerant Type	Dimension
Stiebel Eltron DHC 3-1		Tankless Water Heater	0.32 gal		3.0 kW	25 A	98%	Heat Element	36.0 cm x 77 / 20.0 cm x 41 /8˝ / 10.4 cm
Bosch Tronic 3000T Mini-Tank Series ES8 Series ES4 Series ES2.5			7 gal 4 gal 2.7 gal	1440 Watts		12 A	98%		17½" x 17½" x 14½" 13¾" x 13¾" x 13½" 13¾" x 13¾" x 10¾"
Stiebel Eltron Mini™ 2-1 120 Volt (110 V)		Point of Use Tankless Water Heater	0.21 GPM			15	98%		
Stiebel Eltron SHC-2.5 SHC-4 SHC-6		Mini-Tank Point-of-Use Water Heater	2.65 gal 4 gal 6 gal	1.8 KW/ 50 - 60 Hz 15 AMPS		11.3	98%		18.7H x 11W x 10.6" 19.75H x 12.6W x 12.5D" 20 1/2"H x15 1/8"Wx15"D

Voltage Required: 240V

The below water heaters all rely upon heat pumps—no resistance models are shown due to their inefficiency and near-prohibition against installation in California. These heat pump (aka compressor) water heaters rely on 30-80 gallons of water storage, and collect 3-5 units of heat for every one unit of electricity powering the air source heat pump. Some have a 4000 BTU compressor integrated on top of the tank, others use a 12,000-36,000 BTU separate compressor outside that produces more BTUs and at a higher efficiency. There is a heat pump water heater for every application, including supplying hot water for hydronic space heating as well as domestic hot water, and for every location. Even a tank buried deep in a house can be plumbed with hot water produced by a remote compressor, or given air via duct kits provided by the manufacturers.

Model	Picture	Water Heater Type	Tank Cap. (gal)	Heat Cap.	Power (KW or BTU)	Max Amp	(COP) or EF	Refrigerant	Dimension
Stiebel Eltron ACC300 Accelera 300 Electric Water Heater		Hybrid Heat Pump Water Heater	80		Single Phase / 220-240V / 60 Hz 2.15 KW 15 AMPS	15 Amps	EF 3.39		75 1/4" H x 26" Dia (191.3 x 66 cm)
Stiebel Eltron Accelera 220 E Heat Pump Water Heater		Hybrid Heat Pump Water Heater	58		Single Phase / 220-240V / 60 Hz 2.15 KW 15 AMPS*	15 Amps	EF 3.05		60 13/16" H x 27 3/16" Dia (154.5 x 69 cm)
Sanden CO2 GAUS-160QTA SAN-43SSAQA GAUS-315EQTD SAN-83SSSAQA		Heat Pump Water Heater	43 43 83 83	15,400 BTU/HR	208/230v - 1P - 60Hz 15 Amps	7.7 Amps	EF 3.09 (5) 3.84 (5)	CO2 R744	47.25”H:22.5”D 38.13”H:24.5”D 58.63”H: 26.75”D 68.88”H:24.5”D
VKIN Split-System Water Heater		Heat Pump Only Water Heater	30 40 65 80	8600 BTU/HR	Single phase/ 230 V/ 60 Hz 1250 W 3.37	2.06-5.72 Amp Models	COP 3.24-3.9		WH:31.2”21.5”H x 9.8”D
Rheem Prestige PROPH50 PROPH65 PROPH80 T2 RH350 D		Hybrid Heat Pump Water Heater	50 65 80	240 V		15 Amp and 30 Amp models	UEF 3.55 3.70 3.70		61" H - 22-1/4" D 64" H - 24-1/4" D 74" H - 24-1/4" D
Rheem Performance Platinum XE50 XE65 XE80		Hybrid Heat Pump Water Heater	50 65 80	240 V		15 Amp and 30 Amp models	UEF 3.55 3.70 3.70		61" H - 22-1/4" D 64" H - 24-1/4" D 74" H - 24-1/4" D
A.O. Smith Voltex Hybrid HPTU-50N HPTU-66N HPTU-80N		Hybrid Heat Pump Water Heater	50 66 80	0.490kW	208/240 V 60 Hz	30 Amps	EF 3.61 3.44 3.27	R134a	63''H-22''W 61'' H - 27'' W 69'' H - 27'' W
PHNIX PASHW008-200LD (E) PASHW008-300LD (E)		Hybrid Electric H Water Heater with Solar thermal heating	50 80	140°F	1.5kW (Lower Element) 2.0-0.55 kW (Heat Pump)		EF 3.0 EF 3.2	Heating Element	69.5”,43.75”, D:22” 74”,47.62”, D:25”

Company	Model	Type	Voltage	Refrigerant	Heating Capacity (MBH)	Cooling Capacity (MBH)	Hot Water Flow	OP Temp Range	COP
AERMEC ANK 	030	Heat Pump Air/Water Outdoor installation (a)with storage	208/230	R134A	37.7	37.7	6.0/8.4	44.6-113F	3.4
	045				52.0	52.0	8.0/11.5	44.6-113F	3.63
	050				57.6	57.6	9.5/12.8	44.6-113F	3.73
CHILLTRIX 	CX34	Ultra-Efficient CX34 Chiller Heat Pump HPWH with Solar	115v 50/60Hz (220v 50/60Hz)	R 410a	8.6	8.6	7.6	-20~50	3.92
PHNIX 	010B	HPWH	220-240	R134A	13.0	13.0	66.62	-7 - 45	4.18
	015B				19.6	19.6	99.92	-7 - 45	4.18
	020B				23.2	23.2	118.24	-7 - 45	4.12
	030				32.4	32.4	163.21	-15 - 45	4.0
	050S		380-415		58.7	58.7	308.10	-15 - 45	4.53
Spacepak 	Solstice Extreme		208/230	R134A		48	10-14	42-140	4
	Solstice SE					44/34	7-12	36-125	4
SunPump 	VRHA-12DC 80G	**WH TYPE:** Solar Heating (mounted on the roof, walls, or parking garages) **Inovative SP#** Charges thermal battery tank (2.47 W/gal/ deg. diff)	2 panels	liquid 1/4, gas 3/8	11.9				
	VRHA-18DC 80G		3 panels	liquid 1/4, gas 1/2	17.1				
	VRHA-24DC 80G		4 panels	liquid 3/8, gas 3/8	23.9				
	VRHA-36DC 80G		6 panels	liquid 3/8, gas 5/8	34.1				
	VRHA-48DC 80G		8 panels	liquid 1/2, gas 3/4	47.8				

Large Building Applications: 240V-480V

Apartment buildings, hotels and large commercial facilities usually heat water in a central plant and plumb it throughout the building. These large heat pumps range from 10 tons to 260 tons (1 ton = 12,000 BTU/Hr) and like any central system they require careful design of the pumps, heat exchangers and storage tanks. Designs that don't return cooled water to the compressors can lead to over compression, so a best practice is to reduce BTU production and increase storage to meet peaks.

The range of operating temperatures is important—each product has a different maximum output temperature, between 120F and 180F, and a minimum operating temperature between 5F and 45F before it switches off the heat pump and uses resistance. A resistance element at 2-4x the energy of a heat pump.

Company	Model	Type	Voltage	Power (W)	Refrigerant	Heating/ Cooling (tons)/ (MBH)	Flow (GPM)	Temperature Range	OP Temp Range	COP
AERMEC NRK 	0200 0280	HPWH	230 3P 460 575	12.1 17.1	R410A	12.0/12.3 17.0/12.0	31.6 44.3	53.6/44.6 105/113		3.49 3.49
	0300 0330			20.0 22.5		19.8/12.4 22.3/12.1	51.7 57.5	53.6/44.6 105/113		3.48 3.48
	0350 0500 0550 0600			25.5 30 35 40		25.0/11.8 29.6/12.1 33.8/12.0 39.0/11.7	68.3 80.0 91.0 102.2	53.6/44.6 105/113		3.45 3.44 3.43 3.43
	0650 0700			45 50		44.4/12.0 49.8/11.6	117.6 130.6	53.6/44.6 105/113		3.42 3.38
AERMEC NRP 	0280E	Heat Pump Air/Water Outdoor installation (a)with storage	208/230		R134A	184.01/12.02	40.3			3.13
	0300E					213.4/14.12	47.6			3.14
	0330E					242.8/16.09	54.7			3.14
	0350E					305.0/20.09	69.4			3.27
	0500A					328.5/21.34	72.9			3.10
	0550A					381.8/24.83	89.0			3.06
	0600A					479.8/32.61	109.0			3.02
	0650A					536.8/36.28	123.5			3.07
	0700A					591.1/39.91	137.6			3.06
	0750A					660.8/44.89	151.2			3.05
Colmac HPW Single circuit 	HPW2	HPWH	208/230		R134A	37/29	1		140-160F	4.8/3.8
	HPW4					73/60	2.1		140-160F	5.9/4.9
	HPW7					119/97	3.4		140-160F	5.3/4.3
	HPW9					135/109	3.9		140-160F	5.1/4.1
	HPW12					219/178	6.3		140-160F	5.5/4.5
	HPW15					289/233	8.3		140-160F	5.2/4.2
Colmac HPWH Multi Circuit 	HPW8M	HPWH	208/230		R134A	149/121	1		140-160F	5.9/4.9
	HPW24M					438/357	2.1		140-160F	5.5/4.5
	HPW30M					578/467	3.4		140-160F	5.2/4.2
	HPW36M					657/536	3.9		140-160F	5.5/4.5
	HPW60M					1000/800	6.3		140-160F	5.2/4.2
	HPW8M					149/121	1		140-160F	5.9/4.9
	HPW24M					438/357	2.1		140-160F	5.5/4.5
Mayekawa unimo "Eco Cute" 	unimo A/W	HPWH	480 VAV 3p	165 AMPS	R744 (CO_2)	273.0	8.7			
	HE-HWAW-2HTCAWW					296.2				