



TECHNICAL SERVICE DEPARTMENT
Technical Service Bulletin
1-800-432-8373



Heating Element Properties - Voltage, Amps and Ohms; Recovery; Circuit Breaker
Please check all local electrical codes before installing or changing wiring on electric water heaters.

Voltage, Amps and Ohms

Wattage Rating of Heating Element	120 Volts		208 Volts		240 Volts		277 Volts		480 Volts	
	Amps	Ohms	Amps	Ohms	Amps	Ohms	Amps	Ohms	Amps	Ohms
600	5.0	24.0	2.9	72.1	2.5	96.0	2.2	127.8	1.3	384.0
750	6.3	19.2	3.6	57.7	3.1	76.8	2.7	102.3	1.6	307.2
1000	8.3	14.4	4.8	43.3	4.2	57.6	3.6	76.7	2.1	230.4
1250	10.5	11.5	6.0	34.6	5.2	46.1	4.5	61.4	2.6	184.3
1500	12.5	9.6	7.2	28.8	6.3	38.4	5.4	51.2	3.1	153.6
2000	16.7	7.2	9.6	21.6	8.3	28.8	7.2	38.4	4.2	115.2
2500	20.8	5.8	12.0	17.3	10.4	23.0	9.0	30.7	5.2	92.2
3000	25.0	4.8	14.4	14.4	12.5	19.2	10.8	25.6	6.3	76.8
3500	--	--	16.8	12.4	14.6	16.5	12.6	21.9	7.3	65.8
3800	--	--	18.3	11.4	15.8	15.2	--	--	--	--
4000	--	--	19.2	10.8	16.7	14.4	14.4	19.2	8.3	57.6
4500	--	--	21.6	9.6	18.8	12.8	16.2	17.1	9.4	51.2
5000	--	--	24.0	8.7	20.8	11.5	18.1	15.3	10.4	46.1
5500	--	--	26.4	7.9	22.9	10.5	19.9	14.0	11.5	41.9
6000	--	--	28.8	7.2	25.0	9.6	21.7	12.8	12.5	38.4

Recovery in Gallons per Hour

Heating Element Wattage	Temperature Rise - Degrees Fahrenheit										
	40°	50°	60°	70°	80°	90°	100°	110°	120°	130°	140°
2000	21	17	14	12	10	9	8	8	7	6	6
2500	26	21	17	15	13	12	10	10	9	8	7
3000	31	25	21	18	16	14	12	11	10	10	9
3500	36	29	24	21	18	16	15	13	12	11	10
3800	39	31	26	22	20	17	16	14	13	12	11
4000	41	33	28	24	21	18	17	15	14	13	12
4500	47	37	31	27	23	21	19	17	16	14	13
5000	52	41	34	30	26	23	21	19	17	16	15
5500	57	46	38	33	28	25	23	21	19	18	16
6000	62	49	41	35	31	27	25	22	21	19	18
9000	92	74	61	53	46	41	37	34	31	28	26
12,000	123	98	82	70	61	55	49	45	41	38	35



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Circuit Breaker and Wire Size

Total Water Heater Wattage	Phase	Recommended Over Current Protection (Fuse or Circuit Breaker) Amperage Rating				Copper Wire Size – AWG Based on N.E.C. Table 310-16 (75°C.)			
		208V	240V	277V	480V	208V	240V	277V	480V
3000	1	20	20	15	15	12	12	14	14
	3	20	20	---	15	12	12	--	14
3800	1	25	20	---	---	10	10	---	---
	---	---	---	---	---	---	---	---	---
4000	1	25	25	20	15	10	10	12	14
	3	25	25	---	15	10	10	---	14
4500	1	30	25	25	15	10	10	10	14
	3	30	25	---	15	10	10	---	14
5000	1	30	30	25	15	10	10	10	14
	3	30	30	---	15	10	10	---	14
5500	1	35	30	25	15	8	10	10	14
	3	35	30	---	15	8	10	---	14
6000	1	40	35	30	20	8	8	10	12
	3	3	530	---	15	8	10	---	14
8000	1	50	45	40	25	8	8	8	10
	3	45	40	---	20	8	8	---	12
9000	1	---	50	45	25	---	8	8	10
	3	50	45	---	25	8	8	---	10
10,000	1	---	---	50	30	---	---	8	10
	3	---	50	---	25	---	8	---	10
11,000	1	---	---	50	30	---	---	8	10
	3	---	50	---	25	---	8	---	10
12,000	1	---	---	---	35	---	---	---	8
	3	---	---	---	30	---	---	---	10



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Special 120-Volt Applications

Heating Element Wattage	Recovery in Gallons per Hour	Recommended Over Current Protection (Fuse or Circuit Breaker) Amperage Rating	Copper Wire Size – AWG Based on N.E.C. Table 310-16 (75°C.)
		120V	120V
1500*	7.75	20	12
1700	8.8	20	12
2000	10.3	25	10
2500	12.9	30	10
3000	15.5	35	8

* Less; than 1500 watts may be wired 14 gauge with 15 amp protection. Check local electrical codes.

The 4500 Watt Standard

Wattage Rating of Heating Element	120 Volts		208 Volts		240 Volts		277 Volts		480 Volts	
	Amps	Ohms	Amps	Ohms	Amps	Ohms	Amps	Ohms	Amps	Ohms
4500	--	--	21.6	9.6	18.8	12.8	16.2	17.1	9.4	51.2

Temperature Rise - Degrees Fahrenheit

	40°	50°	60°	70°	80°	90°	100°	110°	120°	130°	140°
4500	47	37	31	27	23	21	19	17	16	14	13

Total Water Heater Wattage	Phase	Recommended Over Current Protection (Fuse or Circuit Breaker) Amperage Rating				Copper Wire Size – AWG Based on N.E.C. Table 310-16 (75°C.)			
		208V	240V	277V	480V	208V	240V	277V	480V
4500	1	30	25	25	15	10	10	10	14
	3	30	25	---	15	10	10	---	14