



AMPERAGE, WIRE AND FUSE SIZE DATA FOR ELECTRIC WATER HEATERS

The following provides amperage, wire and fuse size data for A. O. Smith residential, commercial, and electric pool heaters.

Electric water heater branch circuit wire and fuse sizing should be done by qualified persons in accordance with the National Electrical Code, local codes and utility company requirements. Branch circuit conductors and overcurrent protection device sizing is based on 125% of the full ampere load of the heater. The 125% requirement means that the branch circuit for fixed electric heating equipment cannot be loaded to more than 80% of the branch circuit rating. The deration to 80% will allow up to 6 conductors to be in a raceway or cable.

The amperage table is based on the available total element kilowatts of A. O. Smith electric pool and water heaters for various voltage, phase and connection combinations.

| Total Heater KW | Full Load Current in Amperes | | | | | | | | | Total Heater KW | Full Load Current in Amperes | | | |
|-----------------|------------------------------|-------|-------|-------|-------|-------------|-------|------|------|-----------------|------------------------------|-------|-------|-------|
| | Single Phase | | | | | Three Phase | | | | | Three Phase | | | |
| | 120V | 208V | 240V | 277V | 480V | 208V | 240V | 480V | 600V | | 208V | 240V | 480V | 600V |
| 1.5 | 12.5 | 7.2 | 6.3 | 5.4 | 3.1 | 4.2 | 3.6 | 1.8 | — | 240 | 666 | 577 | 289 | 231 |
| 2 | 16.7 | 9.6 | 8.3 | 7.2 | 4.2 | 5.6 | 4.8 | 2.4 | — | 270 | 750 | 650 | 325 | 260 |
| 2.5 | 20.8 | 12.0 | 10.4 | 9.0 | 5.2 | 6.9 | 6.0 | 3.0 | — | 300 | 832 | 722 | 361 | 289 |
| 3 | 25.0 | 14.4 | 12.5 | 10.8 | 6.3 | 8.3 | 7.2 | 3.6 | — | 330 | 916 | 794 | 397 | 318 |
| 4 | 33.3 | 19.2 | 16.7 | 14.4 | 8.3 | 11.1 | 9.6 | 4.8 | — | 360 | 999 | 866 | 433 | 346 |
| 4.5 | 37.5 | 21.6 | 18.8 | 16.2 | 9.4 | 12.5 | 10.8 | 5.4 | — | 390 | 1,083 | 938 | 469 | 375 |
| 5 | 41.7 | 24.0 | 20.8 | 18.1 | 10.4 | 13.9 | 12.0 | 6.0 | — | 420 | 1,166 | 1,010 | 505 | 404 |
| 5.5 | 45.8 | 26.4 | 22.9 | 19.9 | 11.5 | 15.3 | 13.2 | 6.6 | — | 450 | 1,249 | 1,083 | 542 | 433 |
| 6 | 50.0 | 28.8 | 25.0 | 21.7 | 12.5 | 16.7 | 14.4 | 7.2 | — | 480 | 1,332 | 1,155 | 578 | 462 |
| 9 | 75.0 | 43.3 | 37.5 | 32.5 | 18.8 | 25.0 | 21.7 | 10.8 | — | 510 | 1,416 | 1,227 | 613 | 491 |
| 11 | 91.7 | 52.9 | 45.8 | 39.7 | 22.9 | 30.5 | 26.5 | 13.2 | — | 540 | 1,499 | 1,299 | 650 | 520 |
| 12 | 100 | 57.7 | 50.0 | 43.3 | 25.0 | 33.3 | 28.9 | 14.4 | — | 570 | 1,582 | 1,371 | 686 | 548 |
| 13.5 | 112.5 | 64.9 | 56.3 | 48.7 | 28.1 | 37.5 | 32.5 | 16.2 | — | 600 | 1,664 | 1,443 | 722 | 577 |
| 15 | 125 | 72.1 | 62.5 | 54.2 | 31.3 | 41.6 | 36.1 | 18.0 | 15 | 630 | — | — | 758 | 606 |
| 16 | 133.3 | 76.6 | 66.7 | 57.7 | 33.4 | 44.3 | 38.5 | 19.3 | — | 660 | — | — | 794 | 635 |
| 18 | 150 | 86.5 | 75.0 | 65.0 | 37.5 | 50.0 | 43.3 | 21.7 | — | 690 | — | — | 830 | 664 |
| 20 | 166 | 96.2 | 83.3 | 72.2 | 41.7 | 55.5 | 48.1 | 24.1 | — | 720 | — | — | 866 | 693 |
| 24 | 200 | 115.4 | 100.0 | 86.6 | 50.0 | 66.6 | 57.7 | 28.9 | 23 | 810 | — | — | 974 | 779 |
| 27 | 225 | 129.8 | 112.5 | 97.5 | 56.3 | 74.9 | 65.0 | 32.5 | — | 900 | — | — | 1,083 | 866 |
| 30 | 250 | 144.2 | 125.0 | 108.3 | 62.5 | 83.3 | 72.2 | 36.1 | 29 | 990 | — | — | 1,191 | 953 |
| 32 | 266.6 | 153.2 | 133.3 | 115.5 | 66.8 | 88.6 | 76.9 | 38.5 | — | 1080 | — | — | 1,299 | 1,039 |
| 36 | 300 | 173.1 | 150.0 | 130.0 | 75.0 | 99.9 | 86.6 | 43.3 | 35 | 1170 | — | — | 1,408 | 1,126 |
| 40.5 | 337.5 | 194.7 | 168.8 | 146.2 | 84.4 | 112.4 | 97.4 | 48.7 | — | 1260 | — | — | 1,516 | 1,213 |
| 45 | 375 | 216.3 | 187.5 | 162.5 | 93.8 | 124.9 | 108.3 | 54.1 | 44 | 1350 | — | — | 1,624 | 1,300 |
| 48 | 400 | 230.8 | 200 | 173.2 | 100 | 133.2 | 115.4 | 57.5 | — | 1440 | — | — | 1,732 | 1,386 |
| 54 | 450 | 259.6 | 225 | 194.9 | 112.5 | 149.9 | 129.9 | 65.0 | — | 1530 | — | — | 1,841 | 1,473 |
| 60 | — | 288 | 256 | — | 125 | 167 | 145 | 72 | 58 | 1620 | — | — | 1,949 | 1,559 |
| 64 | — | 306.4 | 266.8 | — | 133.6 | 177.2 | 154 | 77.2 | — | 1800 | — | — | 2,170 | 1,732 |
| 72 | — | 346 | 300 | — | 150 | 199.6 | 173.2 | 86.4 | — | 1980 | — | — | 2,382 | 1,905 |
| 75 | — | 361 | 313 | — | — | 208 | 181 | 90 | 72 | 2040 | — | — | 2,454 | 1,963 |
| 90 | — | — | — | — | — | 250 | 217 | 109 | 87 | 2220 | — | — | 2,670 | 2,136 |
| 105 | — | — | — | — | — | 292 | 253 | 127 | 101 | 2250 | — | — | 2,707 | 2,165 |
| 120 | — | — | — | — | — | 333 | 289 | 145 | 115 | 2400 | — | — | 2,887 | 2,310 |
| 150 | — | — | — | — | — | 416 | 361 | 180 | 144 | 2640 | — | — | 3,175 | 2,540 |
| 180 | — | — | — | — | — | 499 | 433 | 217 | 173 | 2820 | — | — | 3,392 | 2,714 |
| 210 | — | — | — | — | — | 583 | 505 | 253 | 202 | 3000 | — | — | 3,608 | 2,887 |

IMPORTANT — Branch circuit wiring between the fused disconnect switch and the heater terminal block must be temperature rated as follows:

| Heater Models | Temperature Rating of Branch Circuit Wiring Which Connects to Heater Terminal Block |
|----------------------------------|---|
| DEL, DEN | 60°C (140°F) |
| DRE | 90°C (194°F) |
| DVE-52, 80 & 120 CMC, SU, DSE | 75°C (167°F) |
| DVE & DHE-150 | 75°C (167°F) |

AMPERAGE, WIRE AND FUSE
SIZE DATA FOR ELECTRIC
WATER HEATERS



This table of the copper conductor wire size from the National Electric Code is provided here as an aid to wire sizing.

TABLE 310-16. Allowable Ampacities of Insulated Conductors
Rated 0-2000 Volts, 60° to 90°C

Not More Than Three Conductors in Raceway or Cable or Earth
(Directly Buried), Based on Ambient Temperature of 30°C (86°F)

| Size AWG MCM | Temperature Rating of Conductor, See Table 310-13 | | | | | | | | Size AWG MCM |
|------------------------|---|---|-----------------|---|----------------------------------|--|-----------------|---|------------------------|
| | 60°C (140°F) | 75°C (167°F) | 85°C (185°F) | 90°C (194°F) | 60°C (140°F) | 75°C (167°F) | 85°C (185°F) | 90°C (194°F) | |
| | TYPES 1TW, 1UF | TYPES 1FEPW, 1RH, 1RHW, 1THW, 1THWN, 1XHHW, 1USE, 1ZW | TYPE V | TYPES TA, TBS, SA, AVB, SIS, 1FEP, 1FEPB, 1RHH, +THHN, 1XHHW* | TYPES 1TW, 1UF | TYPES 1RH, 1RHW, 1THW, 1THWN, 1XHHW, 1USE | TYPE V | TYPES TA, TBS, SA, AVB, SIS, 1RHH, 1THHN, 1XHHW* | |
| | COPPER | | | | ALUMINUM OR COPPER CLAD ALUMINUM | | | | |
| 18 | --- | --- | --- | 14 | --- | --- | --- | --- | --- |
| 16 | --- | --- | 18 | 18 | --- | --- | --- | --- | --- |
| 14 | 20† | 20† | 25 | 25† | --- | --- | --- | --- | --- |
| 12 | 25† | 25† | 30 | 30† | 20† | 20† | 25 | 25† | 12 |
| 10 | 30† | 35† | 40 | 40† | 25† | 30† | 30 | 35† | 10 |
| 8 | 40 | 50 | 55 | 55 | 30 | 40 | 40 | 45 | 8 |
| 6 | 55 | 65 | 70 | 75 | 40 | 50 | 55 | 60 | 6 |
| 4 | 70 | 85 | 95 | 95 | 55 | 65 | 75 | 75 | 4 |
| 3 | 85 | 100 | 110 | 110 | 65 | 75 | 85 | 85 | 3 |
| 2 | 95 | 115 | 125 | 130 | 75 | 90 | 100 | 100 | 2 |
| 1 | 110 | 130 | 145 | 150 | 85 | 100 | 110 | 115 | 1 |
| 0 | 125 | 150 | 165 | 170 | 100 | 120 | 130 | 135 | 0 |
| 00 | 145 | 175 | 190 | 195 | 115 | 135 | 145 | 150 | 00 |
| 000 | 165 | 200 | 215 | 225 | 130 | 155 | 170 | 175 | 000 |
| 0000 | 195 | 230 | 250 | 260 | 150 | 180 | 195 | 205 | 0000 |
| 250 | 215 | 255 | 275 | 290 | 170 | 205 | 220 | 230 | 250 |
| 300 | 240 | 285 | 310 | 320 | 190 | 230 | 250 | 255 | 300 |
| 350 | 260 | 310 | 340 | 350 | 210 | 250 | 270 | 280 | 350 |
| 400 | 280 | 335 | 365 | 380 | 225 | 270 | 295 | 305 | 400 |
| 500 | 320 | 380 | 415 | 430 | 260 | 310 | 335 | 350 | 500 |
| 600 | 355 | 420 | 460 | 475 | 285 | 340 | 370 | 385 | 600 |
| 700 | 385 | 460 | 500 | 520 | 310 | 375 | 405 | 420 | 700 |
| 750 | 400 | 475 | 515 | 535 | 320 | 385 | 420 | 435 | 750 |
| 800 | 410 | 490 | 535 | 555 | 330 | 395 | 430 | 450 | 800 |
| 900 | 435 | 520 | 565 | 585 | 355 | 425 | 465 | 480 | 900 |
| 1000 | 455 | 545 | 590 | 615 | 375 | 445 | 485 | 500 | 1000 |
| 1250 | 495 | 590 | 640 | 665 | 405 | 485 | 525 | 545 | 1250 |
| 1500 | 520 | 625 | 680 | 705 | 435 | 520 | 565 | 585 | 1500 |
| 1750 | 545 | 650 | 705 | 735 | 455 | 545 | 595 | 615 | 1750 |
| 2000 | 560 | 665 | 725 | 750 | 470 | 560 | 610 | 630 | 2000 |

AMPACITY CORRECTION FACTORS

| Ambient Temp. °C | For ambient temperatures other than 30°C (86°F), multiply the ampacities shown above by the appropriate factor shown below. | | | | | | | | Ambient Temp. °F |
|------------------|---|------|------|------|------|------|------|------|------------------|
| 21-25 | 1.08 | 1.05 | 1.04 | 1.04 | 1.08 | 1.05 | 1.04 | 1.04 | 70-77 |
| 26-30 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 79-86 |
| 31-35 | .91 | .94 | .95 | .96 | .91 | .94 | .95 | .96 | 88-95 |
| 36-40 | .82 | .88 | .90 | .91 | .82 | .88 | .90 | .91 | 97-104 |
| 41-45 | .71 | .82 | .85 | .87 | .71 | .82 | .85 | .87 | 106-113 |
| 46-50 | .58 | .75 | .80 | .82 | .58 | .75 | .80 | .82 | 115-122 |
| 51-55 | .41 | .67 | .74 | .76 | .41 | .67 | .74 | .76 | 124-131 |
| 56-60 | --- | .58 | .67 | .71 | --- | .58 | .67 | .71 | 133-140 |
| 61-70 | --- | .33 | .52 | .58 | --- | .33 | .52 | .58 | 142-158 |
| 71-80 | --- | --- | .30 | .41 | --- | --- | .30 | .41 | 160-176 |

† Unless otherwise specifically permitted elsewhere in this Code, the overcurrent protection for conductor types marked with an obelisk (†) shall not exceed 15 amperes for 14 AWG, 20 amperes for 12 AWG, and 30 amperes for 10 AWG copper; or 15 amperes for 12 AWG and 25 amperes for 10 AWG aluminum and copper-clad aluminum after any correction factors for ambient temperature and number of conductors have been applied.

* For dry and damp locations only. See 75°C column for wet locations.