

RESIDENTIAL ELECTRICAL LOAD CALCULATIONS

| 1 | General lighting | _____ sq. ft. of house X 3 va | = _____ va | | 220.12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----|---|---|---------------------------------------|-------------|------------------------------|-----|--------------|-------|-----|-----------|-------|-----|------------|-------|----------------------------|-----------|--------|-----|----------|-------|-----|-----------------|-------|-----|----------------|-------|-----|-------------|-------|-----|-------------|-------|-----|--------------|-------|-----|-------------|-------|-----|--------------|-------|-----|-------------|-------|---|----------|--------|
| 2 | Small appliance branch circuits for kitchen. <i>Min. of two</i> | _____ X 1500 va (<i>Min. of two</i>) # of circuits | = _____ va | | 220.52(A) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Laundry Branch circuits. <i>Min. of one</i> | _____ X 1500 va (<i>Min. of one</i>) # of circuits | = _____ va | | 220.52(B) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | Subtotal of 1, 2, 3 | | = _____ va | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | Demand factors First 3000 @ 100% 3001-120,000 @ 35% >120,000 @ 25% | _____ 3000 @ 100% _____ @ 35% _____ @ 25% | = 3000 va = _____ va = _____ va | _____ va | 220.42 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | Electric Clothes dryer Nameplate or 5kW, whichever is larger | _____ x _____ # of units Larger of Nameplate or 5kW | | _____ va | 220.54 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | Electric cooking equipment | Electric Range Nameplate _____ kW Wall Mount Oven Nameplate _____ kW Electric Cooktop Nameplate _____ kW Other _____ kW | See Table 220.55 to figure amount | _____ va | 220.55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | Largest of fixed electric space heat | Fixed Electric Space Heat #1 _____ w Fixed Electric Space Heat #2 _____ w Fixed Electric Space Heat #3 _____ w | Subtotal _____ w | | 220.51 220.60 424.3(b) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | A/C loads. Non-coincident loads | A/C #1 _____ MCA @ 208-240 v A/C # 2 _____ MCA @ 208-240 v A/C #3 _____ MCA @ 208-240 v | Subtotal _____ va | _____ va | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Heat pumps | Heat pump nameplate _____ va/watts + strip or heat resistance _____ | Subtotal _____ va | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | Appliances load | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">Qty</th> <th style="width: 40%;">Description</th> <th style="width: 10%;">Va /watts</th> </tr> </thead> <tbody> <tr><td>___</td><td>Water heater</td><td>_____</td></tr> <tr><td>___</td><td>Microwave</td><td>_____</td></tr> <tr><td>___</td><td>Dishwasher</td><td>_____</td></tr> <tr><td>___</td><td>Compactor</td><td>_____</td></tr> <tr><td>___</td><td>Disposer</td><td>_____</td></tr> <tr><td>___</td><td>Central Furnace</td><td>_____</td></tr> <tr><td>___</td><td>Central vacuum</td><td>_____</td></tr> <tr><td>___</td><td>Paddle fans</td><td>_____</td></tr> <tr><td>___</td><td>Range hoods</td><td>_____</td></tr> <tr><td>___</td><td>Steam shower</td><td>_____</td></tr> <tr><td>___</td><td>Spa/hot tub</td><td>_____</td></tr> <tr><td>___</td><td>Water heater</td><td>_____</td></tr> <tr><td>___</td><td>Other _____</td><td>_____</td></tr> </tbody> </table> | Qty | Description | Va /watts | ___ | Water heater | _____ | ___ | Microwave | _____ | ___ | Dishwasher | _____ | ___ | Compactor | _____ | ___ | Disposer | _____ | ___ | Central Furnace | _____ | ___ | Central vacuum | _____ | ___ | Paddle fans | _____ | ___ | Range hoods | _____ | ___ | Steam shower | _____ | ___ | Spa/hot tub | _____ | ___ | Water heater | _____ | ___ | Other _____ | _____ | Subtotal _____ va 3 or less appliances enter subtotal at 100% in next column OR More than 3 appliances enter subtotal @ 75% in next column Subtotal x 75% = _____ | _____ va | 220.53 |
| Qty | Description | Va /watts | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ___ | Water heater | _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ___ | Microwave | _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ___ | Dishwasher | _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ___ | Compactor | _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ___ | Disposer | _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ___ | Central Furnace | _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ___ | Central vacuum | _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ___ | Paddle fans | _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ___ | Range hoods | _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ___ | Steam shower | _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ___ | Spa/hot tub | _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ___ | Water heater | _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ___ | Other _____ | _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | Motor Loads | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">Qty</th> <th style="width: 40%;">Description</th> <th style="width: 10%;">Va</th> </tr> </thead> <tbody> <tr><td>___</td><td>_____</td><td>_____</td></tr> <tr><td>___</td><td>_____</td><td>_____</td></tr> <tr><td>___</td><td>_____</td><td>_____</td></tr> </tbody> </table> | Qty | Description | Va | ___ | _____ | _____ | ___ | _____ | _____ | ___ | _____ | _____ | Calculated Based on 220.50 | _____ va | 220.50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Qty | Description | Va | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ___ | _____ | _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ___ | _____ | _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ___ | _____ | _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | 25% of Largest Motor Loads | Refer to lines 8-11 above _____ va x 25% | | _____ va | 430.24 424.3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| | | | | | |
|----|-----------------------|------------------------------|------|--------------------|-----|
| 12 | TOTAL VOLT AMPS _____ | DIVIDED BY 240 VOLTS = _____ | AMPS | SERVICE SIZE _____ | AMP |
|----|-----------------------|------------------------------|------|--------------------|-----|

INSTRUCTIONS FOR RESIDENTIAL ELECTRICAL LOAD CALCULATIONS

1. Enter the total square footage of all floor space (including unfinished basements suitable for finishing) and multiply by 3.
2. A minimum of two small appliance branch circuits are required.
3. A minimum of one laundry circuit is required.
4. Enter total of lines 1-3.
5. Use total amount on line #4 to calculate this section. Adjust using demand factors.
6. Insert the nameplate rating on the dryer or 5 kW (whichever is larger). To convert kW to watts, multiply by 1000.
7. List cooking appliances (electric ranges, wall-mounted ovens, counter-mounted cooking units, and other household cooking appliances in excess of 1-3/4 kW (1,750 watts). Use Table 220.55 (see attached) to insert the cooking demand load on line #12.
8. Use this table to list baseboard heaters, electric wall heaters, floor heating cables, etc. List wattage, and enter the subtotal for the table. List Air conditioners: Enter the minimum circuit amps (MCA) from the manufacturer's specifications or unit nameplate based on the nominal line-line system voltage. Enter the subtotal for this table. List heat pumps, + heat pump compressor and supplemental strip heaters (supplemental heat resistance) where operating at the same time. Enter this subtotal. (If the heat pump sequence is used, additional information may be required to calculate)
9. Appliances: Air cleaner, central furnace, central vacuum, dishwasher, microwave, paddle fans, range hood, spa/hot tub, steam shower, trash compactor, water heater, wine cooler, other. Enter the quantity, the description, and the number of va (watts). If more than three appliances, enter the subtotal multiplied by 75%, and enter the result. If there are three or less appliances enter the amount without an adjustment.
10. List sump pump, ejector pump, garbage disposal, garage door opener, hydromassage tub, pool pump, other. Enter the quantity and the volt amps.
11. Enter 25% of largest motor loads (*often* the air-conditioner from line 8).
12. Add lines 5, 6, 7, 8, 9, 10 & 11 and enter amount here. Divide amount by 240 (for 1 phase 3 wire, 120/240 volts) and enter amount. This is the minimum service size required. Enter the service size to be installed..

Table 220.55 Demand Factors and Loads for Household Electric Ranges, Wall-Mounted Ovens, Counter-Mounted Cooking Units, and Other Household Cooking Appliances over 1¼ kW Rating (Column C to be used in all cases except as otherwise permitted in Note 3.)

| Number of Appliances | Demand Factor (%) (See Notes) | | |
|----------------------|--------------------------------------|--|---|
| | Column A (Less than 3½ kW Rating) | Column B (3½ kW through 8¾ kW Rating) | Column C Maximum Demand (kW) (See Notes) (Not over 12 kW Rating) |
| 1 | 80 | 80 | 8 |
| 2 | 75 | 65 | 11 |
| 3 | 70 | 55 | 14 |
| 4 | 66 | 50 | 17 |
| 5 | 62 | 45 | 20 |
| 6 | 59 | 43 | 21 |
| 7 | 56 | 40 | 22 |
| 8 | 53 | 36 | 23 |
| 9 | 51 | 35 | 24 |
| 10 | 49 | 34 | 25 |
| 11 | 47 | 32 | 26 |
| 12 | 45 | 32 | 27 |
| 13 | 43 | 32 | 28 |
| 14 | 41 | 32 | 29 |
| 15 | 40 | 32 | 30 |
| 16 | 39 | 28 | 31 |
| 17 | 38 | 28 | 32 |
| 18 | 37 | 28 | 33 |
| 19 | 36 | 28 | 34 |
| 20 | 35 | 28 | 35 |
| 21 | 34 | 26 | 36 |
| 22 | 33 | 26 | 37 |
| 23 | 32 | 26 | 38 |
| 24 | 31 | 26 | 39 |
| 25 | 30 | 26 | 40 |
| 26-30 | 30 | 24 | 15 kW + 1 kW for each range |
| 31-40 | 30 | 22 | |
| 41-50 | 30 | 20 | 25 kW + ¾ kW for each range |
| 51-60 | 30 | 18 | |
| 61 and over | 30 | 16 | |

Notes:

- Over 12 kW through 27 kW ranges all of same rating. For ranges individually rated more than 12 kW but not more than 27 kW, the maximum demand in Column C shall be increased 5 percent for each additional kilowatt of rating or major fraction thereof by which the rating of individual ranges exceeds 12 kW.
- Over 8¾ kW through 27 kW ranges of unequal ratings. For ranges individually rated more than 8¾ kW and of different ratings, but none exceeding 27 kW, an average value of rating shall be calculated by adding together the ratings of all ranges to obtain the total connected load (using 12 kW for any range rated less than 12 kW) and dividing by the total number of ranges. Then the maximum demand in Column C shall be increased 5 percent for each kilowatt or major fraction thereof by which this average value exceeds 12 kW.
- Over 1¼ kW through 8¾ kW. In lieu of the method provided in Column C, it shall be permissible to add the nameplate ratings of all household cooking appliances rated more than 1¼ kW but not more than 8¾ kW and multiply the sum by the demand factors specified in Column A or Column B for the given number of appliances. Where the rating of cooking appliances falls under both Column A and Column B, the demand factors for each column shall be applied to the appliances for that column, and the results added together.
- Branch-Circuit Load. It shall be permissible to calculate the branch-circuit load for one range in accordance with Table 220.55. The branch-circuit load for one wall-mounted oven or one counter-mounted cooking unit shall be the nameplate rating of the appliance. The branch-circuit load for a counter-mounted cooking unit and not more than two wall-mounted ovens, all supplied from a single branch circuit and located in the same room, shall be calculated by adding the nameplate rating of the individual appliances and treating this total as equivalent to one range.
- This table shall also apply to household cooking appliances rated over 1¼ kW and used in instructional programs.

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- This table shall also apply to household cooking appliances rated over 1¼ kW and used in instructional programs.