



# RESIDENTIAL ELECTRICAL LOAD ESTIMATING

INSTRUCTIONS: Review the electrical loads in the table below and check all that exist in the home (be sure to include the proposed Level 2 EVCE and/or Photovoltaic System). Fill in the corresponding wattage for each item checked, and then add up all the checked items to determine total wattage used. Wattages shown are rough estimates: for a more precise analysis use actual values based on nameplate ratings or consult with an electrical professional.

NOTE: *This form is a voluntary compliance alternative* and you may wish to hire a qualified individual or company to perform a thorough evaluation of your electrical service capacity in lieu of this methodology. Use of this electrical load calculation worksheet is at the user's risk and carries no implied guarantee of accuracy. Users of this form are advised to seek professional assistance in determining the electrical capacity of a service panel.

Check All Applicable	Description of Load	Volt-Amps on Nameplate Rating	(Watts) Volt-Amps Used
<b>General Lighting/Power Load</b>			
Required	Total Square footage of building times 3	3 volt-amps/sf	
Required	Kitchen Small Appliance Branch Circuits (min. 2)	1,500 volt-amps/circuit	
Required	Laundry Circuit (min. 1)	1,500 Volt-Amps	
<b>Appliances and Equipment Except Air Conditioner(s)</b>			
	Microwave	1,400 watts	
	Trash Compactor	1,000 watts	
	Dishwasher	1,500 watts	
	Disposal	1,000 watts	
	Electric Oven	2,000 watts	
	Electric Range	5,000 watts	
	Induction Range	10,000 watts	
	Electric Clothes Dryer	4,000 watts	
	Electric Clothes Washer	500 watts	
	Electric Tankless Water Heater	15,000 watts	
	Electric Water Heater	4,000 watts	
	Electric Heat Pump Water Heater	550 watts	
Required on new homes	Electric Vehicle Supply Equipment (EVSE)	7,000 watts	
	Evaporative Cooler	500 watts	
	Pool or Spa	2,000 watts	
	Other:		
	Other:		
	Other:		

Sub-Total Volt-Amps Used (add up V-A used for everything checked)			
			-10,000 V-A
		Subtotal (A)	
			x .40
		Subtotal (B)	
			+10,000 V-A
		Subtotal (C)	
Heating and Air-Conditioning (Include the largest of the following):			+
1. Air conditioning and cooling (100% of nameplate (NP) rating) =			
2. Heat pump without supplemental heating (100% NP Rating) =			
3. Heat pump with supplemental electric heat (100% NP plus 65%) =			
4. Electrical space heating , 4 separate units (65% NP rating) =			
5. Electrical space heating > 4 separate units (40% NP rating) =			
6. Electrical thermal storage and other 100% NP rating =			
Total Current Demand (Volt-Amps) =			
Divided by 240 Volts =			Amps
40 Amp back-feed protection for future Photovoltaic System (Solar Panels)			+ 40 Amps
Total Amps Required for Service Conductors and Panel =			
Rating of Existing/Proposed Electrical Service or Subpanel (Amps)=			
Panel Upgrade Required? (circle one)			Yes / No

### Single Family Dwelling Load Calculation – Step-by-Step Example (Optional Method)

CEC 220.82

Given:

Square foot area of home – 1700 square feet (sf)

1.5 kW (1,500 watts) dishwasher

10 kW range

15 kW central heat

4 kW water heater

29 amp, 240 volt air conditioning

4 kW clothes dryer

Instructions:

Step 1: Multiply the sf area by 3 volt-amperes (VA) per sf 1700 sf X 3 VA = 5,100 VA

Step 2: Add 1,500 VA for each 2-wire, 20-amp small appliance branch circuit and the laundry circuit

1,500 VA X 3 = 4,500 VA

Step 3: Add in the appliance loads at nameplate value or given on table (whichever is greater). Range 10,000 VA, Water heater 4,000 VA, Clothes dryer 4,000 VA, Dishwasher 1,500 VA

Step 4: Add all appliance loads together: 5,100+ 4,500 + 10,000 + 4,000 + 4,000 + 1,500 = 29,100 VA

Step 5: Subtract 10,000 VA from the total VA (this will be added back in later) 29,100 – 10,000 = 19,100 VA

Step 6: Multiply the remainder (19,100 VA) times 40%.  $19,100 \times .40 = 7,640$  VA

Step 7: Add the 10,000 VA value from step 5 and the 7,640 VA from step 6 together to find the general load.  $10,000 + 7,640 = 17,640$  VA

Step 8: Compare the heating load to the AC load and take the larger of the two loads AC load at 100% =  $29 \text{ amps} \times 240 \text{ volts} = 6,960$  VA, Heat load at 65% =  $15,000 \text{ VA} \times .65 = 9,750$  VA (largest load)

Step 9: Add the general load to the largest of the AC or heating load. General load (17,640 VA) + Heating load (9,750 VA) = Total load (27,390 VA)

Step 10: Divide the total load in VA by the voltage  $27,390 / 240 = 114$  amps

Step 11: Add 40 amps for future Photovoltaic System (Roof Solar Panels).

$114 \text{ amps} + 40 \text{ amps} = 154 \text{ amps. (min. panel capacity)}$