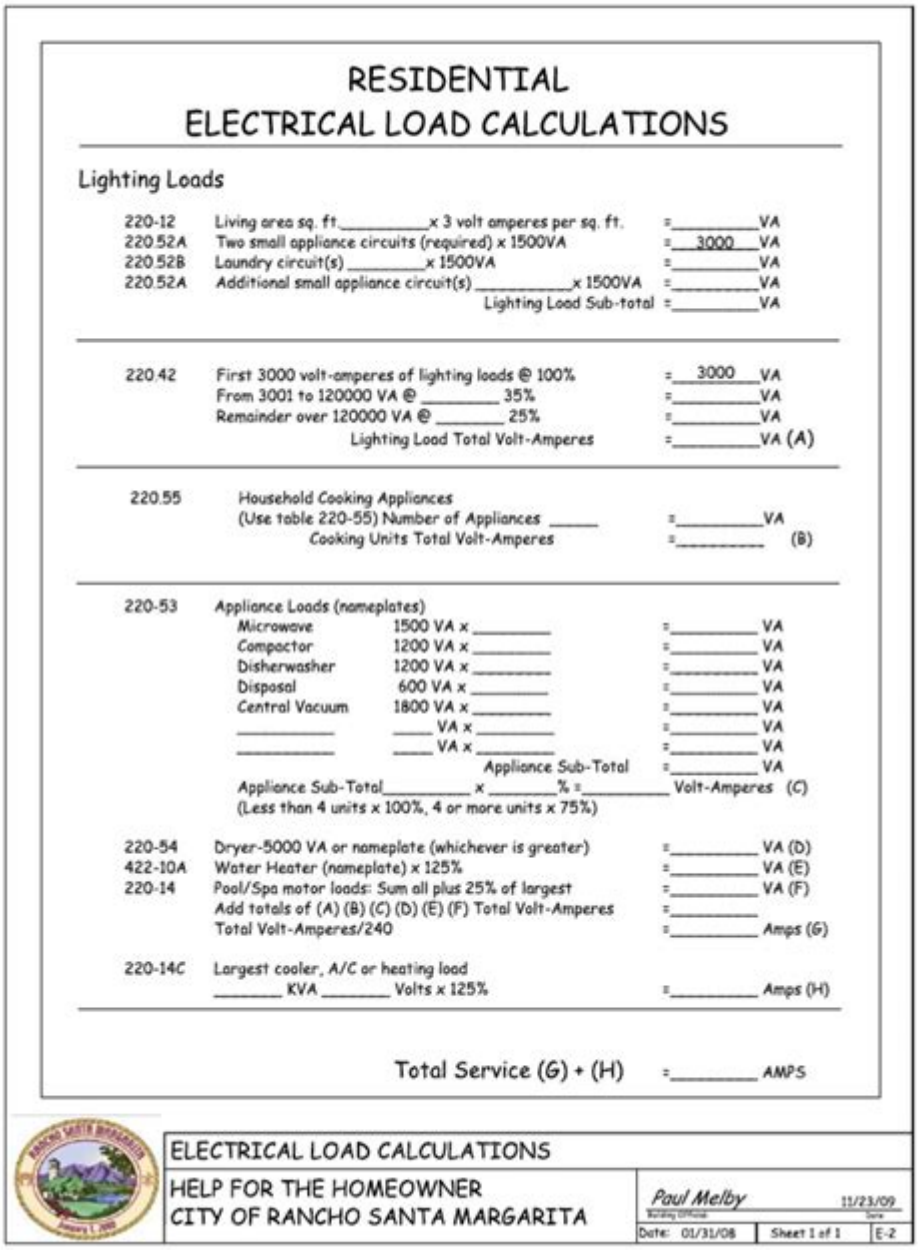
Commercial Electrical Load Calculation Worksheet



RESIDENTIAL
ELECTRICAL LOAD CALCULATIONS

Lighting Loads

220-12	Living area sq. ft._____x 3 volt amperes per sq. ft.	=_____VA
220.52A	Two small appliance circuits (required) x 1500VA	=__3000__VA
220.52B	Laundry circuit(s) _____x 1500VA	=_____VA
220.52A	Additional small appliance circuit(s) _____x 1500VA	=_____VA
	Lighting Load Sub-total	=_____VA
220.42	First 3000 volt-amperes of lighting loads @ 100%	=__3000__VA
	From 3001 to 120000 VA @ _____ 35%	=_____VA
	Remainder over 120000 VA @ _____ 25%	=_____VA
	Lighting Load Total Volt-Amperes	=_____VA (A)
220.55	Household Cooking Appliances	
	(Use table 220-55) Number of Appliances _____	=_____VA
	Cooking Units Total Volt-Amperes	=_____ (B)
220-53	Appliance Loads (nameplates)	
	Microwave 1500 VA x _____	=_____VA
	Compactor 1200 VA x _____	=_____VA
	Dishwasher 1200 VA x _____	=_____VA
	Disposal 600 VA x _____	=_____VA
	Central Vacuum 1800 VA x _____	=_____VA
	_____ ____ VA x _____	=_____VA
	_____ ____ VA x _____	=_____VA
	Appliance Sub-Total	=_____VA
	Appliance Sub-Total_____ x _____% =_____ Volt-Amperes (C)	
	(Less than 4 units x 100%, 4 or more units x 75%)	
220-54	Dryer-5000 VA or nameplate (whichever is greater)	=_____VA (D)
422-10A	Water Heater (nameplate) x 125%	=_____VA (E)
220-14	Pool/Spa motor loads: Sum all plus 25% of largest	=_____VA (F)
	Add totals of (A) (B) (C) (D) (E) (F) Total Volt-Amperes	=_____
	Total Volt-Amperes/240	=_____Amps (G)
220-14C	Largest cooler, A/C or heating load	
	_____KVA _____Volts x 125%	=_____Amps (H)

Total Service (G) + (H) =_____AMPS

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HELP FOR THE HOMEOWNER
CITY OF RANCHO SANTA MARGARITA
Paul Melby 11/23/09
Date: 01/31/08 | Sheet 1 of 1 | E-2

Commercial electrical load calculation worksheet is an essential tool for electrical engineers, contractors, and facility managers in the planning and design of electrical systems for commercial buildings. Accurately calculating electrical loads is crucial for ensuring that the electrical system can handle the demand without risking overloads or failures. This article will delve into the importance of a commercial electrical load calculation worksheet, the factors to consider during the calculation, and how to effectively use this tool for your projects.

Understanding Electrical Load Calculation

Electrical load calculation is the process of determining the total electrical demand that a building or

facility will require. This includes all lighting, equipment, appliances, and systems that consume electricity. Understanding these loads is vital for selecting the right electrical service, circuit breakers, transformers, and other equipment.

Types of Loads

When performing a commercial electrical load calculation, it's important to identify and categorize the types of loads involved. These can typically be divided into three main categories:

1. Lighting Loads: This includes all types of lighting fixtures, both indoor and outdoor, and their respective wattages.
2. Receptacle Loads: These are the loads from outlets and plugs, catering to equipment like computers, printers, and other office machinery.
3. Special Equipment Loads: This category covers specialized equipment such as HVAC systems, refrigeration units, and industrial machinery, which often have unique power requirements.

The Importance of a Commercial Electrical Load Calculation Worksheet

A commercial electrical load calculation worksheet is critical for several reasons:

- Safety: Proper load calculations help prevent overloads that can lead to electrical fires or system failures.
- Compliance: Many local codes and regulations require accurate load calculations for permitting and inspection purposes.
- Efficiency: By understanding the load requirements, engineers can design more efficient electrical systems that minimize energy waste.
- Cost Savings: An accurately sized electrical system can save money by reducing unnecessary capital expenses on oversized equipment.

Components of a Commercial Electrical Load Calculation Worksheet

A well-structured commercial electrical load calculation worksheet typically includes the following components:

1. Building Information

- Building Name and Address: Identification details of the commercial property.
- Type of Occupancy: Different types of businesses may have varying load requirements (e.g., retail, office, manufacturing).

2. Load Calculations

This section breaks down the load calculations into specific categories. It should include:

- Lighting Load Calculation: Total wattage of all lighting fixtures.

- Receptacle Load Calculation: Total watts for all outlets based on expected usage.
- Special Equipment Load Calculation: Detailed wattage for each piece of specialized equipment.

3. Demand Factors

Demand factors are used to account for the fact that not all equipment will be used at the same time. Common demand factors include:

- Diversity Factor: Reflects the probability of simultaneous use.
- Load Factor: Compares the average load over a specific period to the maximum load.

4. Total Load Calculation

This section summarizes the total load by adding up the different categories of loads while applying any relevant demand factors.

5. Service Size Calculation

After determining the total load, you can calculate the required service size, which involves:

- Selecting the appropriate circuit breaker size to handle the calculated load.
- Choosing the correct transformer size, if necessary, based on the load.

How to Use a Commercial Electrical Load Calculation Worksheet

Using a commercial electrical load calculation worksheet can seem daunting, but following a structured approach can simplify the process. Here's a step-by-step guide:

Step 1: Gather Data

Collect all necessary information regarding the building, including:

- Floor plans
- Equipment specifications
- Lighting fixtures and their wattages

Step 2: Input Data into the Worksheet

Begin filling in the worksheet with the gathered data, categorizing the information into lighting, receptacles, and special equipment loads.

Step 3: Calculate Individual Loads

For each category, calculate the individual loads based on wattage and quantity. For example:

- For lighting, multiply the number of fixtures by their wattage.
- For receptacles, estimate the number of outlets and average wattage usage.

Step 4: Apply Demand Factors

Incorporate demand factors to account for the likelihood of simultaneous usage. Use industry-standard factors or consult local codes for guidance.

Step 5: Sum Total Loads

Add up all loads, applying the demand factors where necessary, to find the total electrical load for the building.

Step 6: Determine Service Size

Based on the total load, calculate the appropriate service size, ensuring compliance with local electrical codes.

Common Mistakes to Avoid

While using a commercial electrical load calculation worksheet, it's important to be aware of common pitfalls:

- Underestimating Loads: Failing to account for all equipment can lead to insufficient power supply.
- Neglecting Future Expansion: Consider potential future loads when calculating to avoid needing upgrades later.
- Ignoring Local Codes: Always ensure compliance with local building and electrical codes to avoid penalties.

Conclusion

In conclusion, a commercial electrical load calculation worksheet is an invaluable tool for anyone involved in commercial electrical system design. By understanding the various components and following a systematic approach, you can ensure that your electrical systems are safe, efficient, and compliant with regulations. Proper load calculations not only protect the investment in electrical infrastructure but also contribute to the overall functionality and safety of commercial buildings.

Frequently Asked Questions

What is a commercial electrical load calculation worksheet?

A commercial electrical load calculation worksheet is a document used by electricians and engineers to estimate the total electrical load for a commercial building. It helps in determining the size of electrical service, panel, and conductors needed to meet the building's energy demands.

Why is it important to perform a load calculation for commercial buildings?

Performing a load calculation is crucial to ensure that the electrical system can safely handle the maximum expected load. It helps prevent overloading circuits, reduces the risk of electrical fires, and ensures compliance with local codes and regulations.

What factors are considered in a commercial electrical load calculation?

Factors include the type of occupancy, lighting requirements, HVAC systems, equipment loads, and any future expansions. Each of these elements contributes to the overall demand that the electrical system must support.

How often should a commercial electrical load calculation be updated?

A commercial electrical load calculation should be updated whenever there are significant changes to the electrical load, such as new equipment installations, renovations, or changes in occupancy. Regular reviews can also be beneficial to ensure ongoing compliance and safety.

Are there any software tools available for commercial electrical load calculations?

Yes, there are several software tools available that can assist with commercial electrical load calculations. These tools often provide templates and automated calculations to streamline the process, ensuring accuracy and efficiency in determining electrical loads.

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