

Task Title: Calculating Electrical Service Size

# OALCF Cover Sheet – Practitioner Copy

**Learner Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Date Started (m/d/yyyy):\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Date Completed (m/d/yyyy): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Successful Completion:**  Yes No

|  |  |  |
| --- | --- | --- |
| **Goal Path:** | Employment | Apprenticeship |
| Secondary School | Post Secondary | Independence |

**Task Description:** Read to answer questions about electrical service, and calculate the electrical service size for homes and other buildings.

**Main Competency/Task Group/Level Indicator:**

* Find and Use Information/Read continuous text/A1.2
* Find and Use Information/Interpret documents/A2.1
* Understand and Use Numbers/Use measures/C3.2

**Performance Descriptors:** See chart on last page

**Materials Required:**

* Pencil/paper and/or digital device
* Calculator

# Learner Information

Electricians calculate the electrical service size for homes. Service size is the amount of electricity (measured in amperes (amps)) that a house requires. The electricity enters the house through a fuse or breaker panel; the panel is rated for the service size calculated (e.g. 60, 100, 120, 150, 200 amps).

Electricians take into consideration the size of the home, the number of plugs, lights and appliances requiring electricity and the minimum legal service size. They also read the Canadian Electrical Code to determine maximum items/load on a circuit.

Service size is based on 2 factors: calculated load and minimum service size.

The calculated load is the sum of all the loads. A load is anything (a resistor) powered by electricity such as plugs, lights, stoves, dryers and furnaces; light switches are not included in the calculation. Minimum lights, switches and plugs are listed in the Canadian Electrical Code and are based on the room type and size as well as the square meters of the house. The basic load for a house (up to 90 m2) is 5,000 watts; other resistors (such as a stove) are added to this to determine the total wattage.

The minimum service size is based on the square meters of the house. It is legal (and sometimes preferred) to have a larger service size than required (so more items requiring electricity can be added later) but it is illegal to install a smaller service size than required.

# Work Sheet

**Task 1: What is service size, and what is it measured in?**

Answer:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Task 2: List four examples of a load.**

Answer:

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Task 3: What is the basic load for a house measuring 90 m2 or smaller?**

Answer:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Task 4:** **If Amperes (amps) = Total Watts/Volts, calculate the total amps required for the following service:**

* **Basic load = 5,000 watts**
* **Range (stove) = 6,000 watts**
* **Dryer = 1,000 watts**
* **Service = 240 volts**

Answer:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Task 5: Use the Service Size table (partial) below to determine the minimum legal service size for a house that is 84 m2. Write your answer in a full sentence below.**

|  |  |  |
| --- | --- | --- |
| Sq. Meters | Minimum Service Size (amps) | Include basement dimensions in calculation |
| Less than 80 | 60 | No |
| 80 - 90 | 100 | No |
| 90 - 180 | 120 | Yes (75%) |

Answer:

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Scan the Electrical Rules below.

* Rule 12–4,000: A maximum of 12 outlets may be connected to a circuit. These may be plugs (excluding special ones in the kitchen or for appliances such as a refrigerator) or lights or any combination. It is better to have a circuit contain both lights and plugs. Light switches do not count as part of the 12. It is encouraged that 10 (or even 8) plugs or lights be on any circuit but 12 is the legal maximum.

Count a single or duplex receptacle (plug) as one outlet.

* Rule 2-316 and 30-502: The Electrical Code requires at least one light, controlled by a switch for the dining room, den and living room.
* Rule 26-712(a)(c) requires that a receptacle (plug) be no further than 1.8 m from an appliance (e.g. lamp, television).

**Task 6: A house has a living room, a dining room and a den. Both the living room and the den have 4 receptacles, and the dining room has 3 receptacles.**

1. **Using the information provided in the “Electrical Rules”, calculate the number of lights, plugs and switches required for the three rooms.**

Answer:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. **Can the three rooms be put on one circuit? Explain your answer.**

Answer:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Answers

**Task 1: What is service size, and what is it measured in?**

Answer: Service size is the amount of electricity that a house requires. It is measured in amperes (amps).

**Task 2: List four examples of a load.**

Answer:Any four of the following: plugs, lights, stoves, dryers and furnaces **Task 3: What is the basic load for a house measuring 90 m2  or smaller?**

Answer:5,000 watts

**Task 4:** **If Amperes (amps) = Total Watts/Volts, calculate the total amps required for the following service:**

* **Basic load = 5,000 watts**
* **Range (stove) = 6,000 watts**
* **Dryer = 1,000 watts**
* **Service = 240 volts**

Answer: Total watts = 5,000 + 6,000 + 1,000 = 12,000 watts

Amps = Total Watts/Volts

Amps = 12,000/240

Total Amps = 50

**Task 5: Use the Service Size table (partial) below to determine the minimum legal service size for a house that is 84 m2. Write your answer in a full sentence below.**

|  |  |  |
| --- | --- | --- |
| Sq. Meters | Minimum Service Size (amps) | Include basement dimensions in calculation |
| Less than 80 | 60 | No |
| 80 - 90 | 100 | No |
| 90 - 180 | 120 | Yes (75%) |

Answer: The minimum legal service size is 100 amps. (Logic: 84 m2 is more than 80 m2 but less than 90m2. )

Scan the Electrical Rules below.

Rule 12–4,000: A maximum of 12 outlets may be connected to a circuit. These may be plugs (excluding special ones in the kitchen or for appliances such as a refrigerator) or lights or any combination. It is better to have a circuit contain both lights and plugs. Light switches do not count as part of the 12. It is encouraged that 10 (or even 8) plugs or lights be on any circuit but 12 is the legal maximum.

Count a single or duplex receptacle (plug) as one outlet.

Rule 2-316 and 30-502: The Electrical Code requires at least one light, controlled by a switch for the dining room, den and living room.

Rule 26-712(a)(c) requires that a receptacle (plug) be no further than 1.8 m from an appliance (e.g. lamp, television).

**Task 6: A house has a living room, a dining room and a den. Both the living room and the den have 4 receptacles, and the dining room has 3.**

1. **Using the information provided in the “Electrical Rules”, calculate the number of lights, plugs and switches required for the three rooms.**

Answer: Add the receptacles of the 3 rooms - 4 + 4 + 3 = **11**

Each room must have a light and a switch.

The three rooms will have 3 lights and 3 switches.

Add the lights, switches and receptacles.

**3 + 3 + 11 = 17**

1. **Can the three rooms be put on one circuit? Explain your answer.**

Answer: The maximum number of outlets on a circuit is 12. Light switches do not count. Therefore, 17 – 3 (light switches) = 14

The 3 rooms cannot be on the same circuit because there are more than 12 outlets.

*NOTE -* *This answer must be based on the answer the learner gave in Task 6 a) …if that number was different than 17 then base the result for 6 b) on the number they use.*

# Performance Descriptors

| Levels | Performance Descriptors | Needs Work | Completes task with support from practitioner | Completes task independently |
| --- | --- | --- | --- | --- |
| A1.2 | Scans text to locate information |  |  |  |
|  | Locates multiple pieces of information in simple texts, makes low-level inferences |  |  |  |
|  | Makes connections between sentences and between paragraphs in a single text |  |  |  |
|  | Reads more complex texts to locate a single piece of information |  |  |  |
|  | Follows the main events of descriptive, narrative and informational texts |  |  |  |
|  | Obtains information from detailed reading |  |  |  |
| A2.1 | Scans to locate specific details |  |  |  |
| C3.2 | Calculates using numbers expressed as whole numbers, fractions, decimals, percentages and integers |  |  |  |
|  | Understands and uses formulas for finding the perimeter, area and volume of simple, common shapes |  |  |  |
|  | Chooses and performs required operation(s); may make inferences to identify required operation(s) |  |  |  |
|  | Selects appropriate steps to solutions |  |  |  |
|  | Interprets, represents and converts measures using whole numbers, decimals, percentages, ratios and simple, common fractions (e.g. ½, ¼) |  |  |  |
|  | Uses strategies to check accuracy (e.g. estimating, using a calculator, repeating a calculation, using the reverse operation) |  |  |  |

This task: Was successfully completed Needs to be tried again

Learner Comments:

Instructor (print): Learner (print):

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