

Task Title: Calculating 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:** Electricians calculate the service size for homes and other buildings. They take into consideration the size of the home and the minimum legal service size.

**Competency:** A: Find and Use Information

B: Communicate Ideas and Information

C: Understand and Use Numbers

D: Use Digital Technology

**Task Groups:** A1: Read continuous text

A2: Interpret documents

B2: Write continuous text

C3: Use measures

**Level Indicators:**

* A1.1: Read brief texts to locate specific details
* A1.2: Read texts to locate and connect ideas and information
* A2.2: Interpret simple documents to locate and connect information
* B2.1: Write brief texts to convey simple ideas and factual information
* B2.2: Write texts to explain and describe information and ideas
* C3.1: Measure and make simple comparisons and calculations
* C3.2: Use measures to make one-step calculations
* D.1: Perform simple digital tasks according to a set procedure

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

**Materials Required:** Pencil or digital device, Calculator

# Learner Information

Electricians calculate the 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:**

**a) Plugs, light switches and furnaces are considered loads.** True False 

**b) Service size is measured in amperes.**

 True False 

**c) The basic load for a small house is watts.** 

**Task 2: Amperes (amps) = Watts (Total)/Volts**

**a) Calculate the total amps required for the following service:**

**- Basic load = 5,000 watts**

**- Range (stove) = 6,000 watts**

**- Dryer = 1,000 watts**

**The service is 240 volts.**

Answer:



**b) The area of this house is 84 m2. Use the Service Size table (partial) below to determine the minimum legal service size for this house. 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:



**Information for Task 3:**

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 3: a) A house has a living room, a dining room and a den. The den has 4 receptacles, the living room has 4 and the dining room has 3. Calculate the number of lights, plugs and switches required for the three rooms.**

Answer:



**Task 3b) Can the 3 rooms be put on one circuit? Explain your answer.**

Answer:



# Answers

**Task 1:** a)**False**

b)**True**

c)**5,000**

**Task 2:** a) Amperes (amps) = Watts (Total)/Volts

 Calculate the total watts.

Total watts = 5,000 + 6,000 + 1,000

Total watts = 12,000

Amperes (amps) = Watts (Total)/Volts

Amperes (amps) = 12,000/240

**Amperes (amps) = 50**

b)84 m2 is more than 80 m2 but less than 90m2.

**The minimum legal service size is 100 amps.**

**Task 3:** a) 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**

b)**The maximum number of outlets on a circuit is 12. Light switches do not count.**

 **17 – 3 (light switches) = 14**

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

Teacher Note: this answer must be based on the answer the learner gave in 3, a) …if that number was different than 17 then base the result on the number they use.

# Performance Descriptors 1

| Levels | Performance Descriptors | Needs Work | Completes task with support from practitioner | Completes task independently |
| --- | --- | --- | --- | --- |
| A1.1 | Reads short texts to locate a single piece of information |  |  |  |
| 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 |  |  |  |
| A2.2 | Performs limited searches using one or two search criteria |  |  |  |
|  | Extracts information from tables and forms |  |  |  |
|  | Uses layout to locate information |  |  |  |
|  | Makes connections between parts of documents |  |  |  |
|  | Makes low-level inferences |  |  |  |
| B2.1 | Writes simple texts to request, remind or inform |  |  |  |
|  | Conveys simple ideas and factual information |  |  |  |
|  | Uses sentence structure, upper and lower case and basic punctuation |  |  |  |
| B2.2 | Performs limited searches using one or two search criteria |  |  |  |
|  | Extracts information from tables and forms |  |  |  |
|  | Uses layout to locate information |  |  |  |
|  | Makes connections between parts of documents |  |  |  |
|  | Makes low-level inferences |  |  |  |
| C3.1 | Adds and subtracts whole number measurements |  |  |  |
|  | Recognizes values in number and word format |  |  |  |
| 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) |  |  |  |
| D.1 | Follows simple prompts |  |  |  |
|  | Follows apparent steps to complete tasks |  |  |  |
|  | Interprets brief text and icons |  |  |  |
|  | Locates specific functions and information |  |  |  |

#

# Performance Descriptors 2

This task: Was successfully completed Needs to be tried again

Learner Comments:

Instructor (print):

