

Issue to be Decided

[2] Did the Appellant install an electrical service of sufficient size in this particular home?

Relevant Legislation

[3] *British Columbia Electrical Code (Code)*

2-100 Marking of equipment

(1) Each piece of electrical equipment shall bear those of the following markings necessary to identify the equipment and ensure that it is suitable for the particular installation: . . .

[4] 8 - 200 Single Dwellings

(1) The minimum ampacity of service or feeder conductor supplying a single dwelling shall be based on the greater of (a) or (b):

(a) . . .

(v) an . . . electric water heater for steamers, swimming pools, hot tubs or spas with a demand factor of 100%; plus

(vi) any loads provided for in addition to those outlined in Items (1) to (4) at 25% of the rating of each load with a rating in excess of 1500 w if an electric range has been provided for, or 100% rating of each load with a rating in excess of 1500w up to a total of 6000 w, plus 25% of the load in excess of 6000 w if an electric range has not been provided for; . . .

Alleged Non-Compliances

[5] 8-104-5-a Maximum circuit loading (see Appendix B)

(a) 80% of the rating of the circuit where the ampacity of the conductors is based on Column 2, 3, or 4 of Table 2 or 4;

[6] 8-200-1 Single dwellings (see Appendix B)

(1) The minimum ampacity of service or feeder conductors supplying a single dwelling shall be based on the greater of item (a) or (b);

[7] PROVIDE SERVICE CALCULATION

8-200-1 Single dwellings (see Appendix B)

(1) The minimum ampacity of service or feeder conductors supplying a single dwelling shall be based on the greater of item (a) or (b);

[8] HOT TUB FLA 48.5 AMPS - 2 P 50 AMP GFCI

8-104-5 Maximum circuit loading (see Appendix B)

(5) Where a service box, fusible switch, circuit breaker, or panelboard is marked for continuous operation at 80% of the ampere rating of its overcurrent devices, the continuous load as determined from the calculated load shall not exceed;

Facts

[9] Electrical permit 4072188 was issued to the Appellant to change the main panel in an existing house. The homeowners also hired the Appellant to install a hot tub. The homeowners provided the hot tub. The hot tub was a factory built unit.

[10] There were three labels on this unit. On the exterior was a label that provided the following information: "240VAC, 60Hz, 50A".

[11] Inside a panel, beside the point where the wires connecting the electrical service from the house to the hot tub are installed, was a label with the following information:

Pump	14 FLA
Blower	8A
Ozone	3A
Light	12 VAC
Heater	23A
Circ.Pump	0.5 A
Input	240 VAC 60Hz 37A

[12] On the heater was a label that provided the following information: "240 V 4.0 KW".

[13] In determining the ampacity for the house, the contractor calculated the hot tub heater at 100% of 37A and 25% of each of the other components as listed on the interior label. He installed an electrical service based upon this calculation.

[14] The inspector held that the ampacity calculation must be based on the exterior label that said 50A. A Certificate of Electrical Inspection stating several deficiencies was issued on January 27, 2010. The relevant deficiencies relate to rules 8-200-1 and 8-104-5.

[15] The contractor applied to the Provincial Electrical Safety Manager for a review of the inspector's decision. In a letter dated March 19, 2010, the Provincial Electrical Safety Manager confirmed the decision of the Safety Officer's decision. He explained his decision as follows:

[16] "The nameplate on the unit installed under the subject permit has a rated voltage of 240VAC and a rated current of 50 amperes. No other current or load ratings have been provided by the manufacturer and in the absence of this nameplate information, the entire load of the spa or hot tube is calculated as heating load. It is not acceptable to provide information from individual components. The manufacturer has built equipment as an entire assembly, and has provided nameplate information on that assembly, and that information may not directly correspond to the individual component information.

[17] For some equipment, such as field assembled spas, the manufacturer provides nameplate ratings for the heating equipment independently of the balance of the equipment. In this circumstance, only the heating equipment would be assessed per subrule (vi). If an equipment nameplate supplied by the hot tub manufacturer provides a separate rating for the heating element, than this would be considered acceptable for use in the demand calculation."

[18] In his oral testimony the Provincial Safety Manager provided additional explanation for this rationale. He said that in Canada, manufacturers of assembled goods must comply with CSA standards. These standards distinguish between the standards for individual components and the standard for the completed assembly. The standards for a completed assembly may or may not require CSA approved components. Components do not always have labels. Even when individual components are labeled, the CSA standard may allow the component to be used in a manner that varies from the label on the component. That is because good engineering

design may allow a component to operate at a level different from that on the label. If not fully knowledgeable about the engineering design, it is not possible to use individual component data to modify or vary from nameplate information for the overall assembly. On any finished assembly, it is the external nameplate attached by the assembly manufacturer that is the critical information on installation.

[19] On this particular assembly, the exterior label states 50 amps. This is the only load value for the spa as a whole. In the absence of any other information from the manufacturer, the Safety Authority utilizes this number because they cannot rely on the label on any individual component. This number is calculated at 100% because it is the safest value to use.

[20] The interior label is a component label for the electronic controller for the spa. It is approved for use in an assembly, not on its own. This label is only for the manufacturer's use; someone who would be using this component in a future assembly. The list only shows the maximum capacity of the parts that could be run off the controller. It does not indicate what was actually installed in the assembly.

[21] The Appellant's evidence is that in 2005 he specifically asked the Provincial Safety Manager of the day how to calculate the load for a hot tub. He received a written response on July 18, 2005, that stated: ". . . Only the 'heater' is added at 100%. The handbook includes an example calculation for this."

[22] The handbook is produced by the Canadian Standards Association. The handbook shows the calculation for the hot tub heater at 100% of 240 volts or 4000 watts, exactly the same as the label on this hot tub heater.

[23] The Appellant argues that the information provided by a manufacturer on the exterior nameplate is solely to provide information as to what is required to safely connect the hot tube to any service. In this case, the nameplate showed the required breaker size as 50 amps. This means the hot tub will run safely on a 50 amp breaker, which they installed.

[24] The nameplate is not intended to provide demand information. The Code provides the formulas for the calculation of demand. These formulas vary depending on

where the hot tub is installed - single family dwelling, multi-family dwelling, hotel, hospital, etc. A manufacturer does not know where its unit will be installed; it only knows what is required to safely connect the unit.

[25] The Appellant disagrees with the Respondent's argument that sometimes components are engineered to run at levels higher than the prescribed maximum. He says that electrically there is no difference between a field assembled unit and a factory assembled unit; the only difference is the physical location and proximity of parts.

[26] The power source for the entire hot tub is connected to the controller. All of the components for the hot tub are wired into the controller. The maximum capacity of the controller, as indicated on the label "Input 240 VAC 60 Hz 37A" is 37 amps. He says that the maximum capacity for the controller is 37 amps. If you use more than 37 amps, the unit will "fry".

[27] Both parties agree that virtually all, if not all, hot tubs installed in single family dwellings are factory assembled units. However, the Code continues to refer to "hot tub heaters".

[28] The Respondent suggests that this wording is an anachronism dating back from a time when more residential hot tubs were assembled on site. The Appellant points out that the Code is revised every four years and the wording has remained the same for the past four Code books.

[29] In its written submission the Respondent argues that the Code specifically refers to the water heater because that component makes up the majority of the overall load (amps) for factory built hot tubs. The Appellant argues that the Code refers to water heaters because they are often energized for long periods of time.

[30] After the appeal was commenced, the Respondent obtained information from the manufacturer about the breakdown between the heater and the other components. This information revealed that the exterior nameplate was inaccurate in that it specified a 50 amp load when it should have been a 40 amp load and a 50 amp breaker.

[31] According to the testimony of the Provincial Safety Officer, the manufacturer also stated that the ampacity for the heater was 14 amps and they would accept this figure. He also testified that if the contractor had submitted this information to them, the calculation may have resulted in no requirement to increase the service to the house.

[32] The witness for the Respondent stated that while the Appellant's calculation appears reasonable, they have not verified it. He noted that no "red flags" were raised when he looked it over.

[33] According to the witness, the only issue is not how the load is calculated but which number is used in the calculation.

Analysis

[34] The Respondent's position depends on the assertion that, when included in a properly engineered assembly, CSA standards allow components to operate at a level greater than the level indicated on the component nameplate. The Appellant disputes this assertion.

[35] Section 53 of the *Safety Standards Act* provides that each appeal to the Safety Standards Appeal Board is a new hearing. On an appeal, like any other hearing, the onus is on each party to prove the facts on which they want the Board to rely.

[36] In this case, there were two witnesses. The witness for the Respondent is a professional engineer; the Appellant, who testified on his own behalf, is an electrician. Although no evidence was offered on the professional training and experience of either individual, I am prepared to assume that they are both competent practitioners of their respective professions. However, both witnesses are parties to this proceeding.

[37] There was no independent witness or evidence on CSA standards as they relate to manufactured or field assembled units to support the Respondent's statements on this issue. I do not have sufficient evidence before me to hold that electricians and safety inspectors cannot rely on the information contained on the nameplates of individual components.

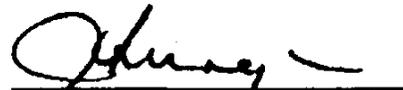
[38] The evidence I do have before me shows that:

- virtually all hot tubs installed in single dwellings are manufactured units;
- despite regular review and revision the Electrical Code provisions with respect to single dwellings continue to distinguish between hot tub heaters and the other components of a hot tub;
- the sample calculation provided by the CSA in its handbook shows the hot tub calculated at 4.0 KW;
- the nameplate on this particular hot tub said 4.0 KW;
- all of the hot tub components are wired into the controller as is the power source for the hot tub; and,
- the nameplate on the controller stated that the maximum input for the controller was 37 amps.

[39] I find that the Appellant followed the information provided by the Electrical Code and the CAS Handbook to the letter. Accordingly, I allow the appeal in full. The decision of the Provincial Safety Manager dated March 19, 2010 is reversed.

[40] Each party will bear their own costs.

Signed by:



J.L. Kernaghan