



Safety Codes Council

COUNCIL ORDER NO. 2024-05

BEFORE THE ADMINISTRATIVE TRIBUNAL OF THE ELECTRICAL SUB-COUNCIL

(the "Tribunal")

ON January 15, 2025

IN THE MATTER OF the *Safety Codes Act*, Revised Statutes of Alberta 2000, Chapter S-1 (the "Act");

AND IN THE MATTER OF the Order issued by Parkland County to C's Electrical Services Ltd on September 24, 2025;

UPON REVIEWING AND CONSIDERING the evidence named in **The Record**, including written submissions of the Appellant and Respondent; and **UPON HEARING** the testimony of the parties at the hearing;

IT IS HEREBY ORDERED THAT the Order is REVOKED.

Appearances, Preliminary, Evidentiary, or Procedural Matters:

1. The hearing for this matter was conducted by virtual means.
2. At the commencement of the hearing, the Coordinator of Appeals confirmed the subject of the appeal as the order issued by the Respondent to the Appellant on September 24, 2024, and confirmed the names of those in attendance:
 - a. Appearing for the Appellant, the Tribunal heard from: Clayton [REDACTED]
 - b. Appearing for the Respondent, the Tribunal heard from: Brady [REDACTED]
 - c. Facilitating the hearing on behalf of the Safety Codes Council: Jordyn Dryden.
3. The Coordinator of Appeals then introduced the Chair of the Tribunal (the "Chair"), Nicolas LeBlanc and turned the hearing over to them.
4. The Chair called the hearing to order and introduced the other Tribunal members: Adam Ghani, Clark Redden and David Myers.
5. The Appellant and Respondent confirmed there were no objections to any members of the Tribunal, and that the Safety Codes Council in general and the Tribunal in particular had jurisdiction to hear and decide the appeal. The Tribunal also confirmed they had jurisdiction to hear and decide this appeal.

6. The Chair then explained the process of the hearing and advised of the list of the written material before the Tribunal, consisting of the documents listed below in **The Record** (see paragraph 7). The Appellant and Respondent confirmed that there were no objections to any of the material submitted to the Tribunal.

The Record:

7. The Tribunal considered, or had available for reference, the following documentation:

<u>Item</u>	<u>Description</u>	<u>Date</u>
1.	Order issued by Parkland County to C's Electrical Services Ltd	September 3, 2024
2.	The Appellant's Brief	January 1, 2025
3.	The Respondent's Brief	December 24, 2024

Issue:

8. This appeal concerns whether the Installation complies with the CSA Electrical Utility Code (2021 Version) (the "Electrical Code") to ensure proper service capacity and safety.

Positions of the Parties:

Appellant

From the Appellant's submissions and testimony, the Appellant's position is summarized as follows:

9. It is the Appellant's position that the Installation is acceptable as Table 13 under the Electrical Code states that use of a service cable between 126 and 150 amps can be used on a 150 amp breaker.

Respondent

From the Respondent's submissions and testimony, the Respondent's position is summarized as follows:

10. It is the Respondent's position that the Installation does not meet the requirements under the Electrical Code and that Table 13 under the Electrical Code should not apply.

Summary of the Evidence Provided On Behalf of the Appellant:

Written Submissions on behalf of the Appellant:

11. The Installation is located on a shop on a residential property. The shop is described by the Appellant as being 1792 square feet and having its own electrical meter. The Appellant states that the Installation uses an armored electrical cable with three conductors, each with a wire gauge of 2 aught (a "3c2/0 ACWU Cable"), running from the power pole to a meter base approximately 100 feet from the power pole.¹ It also uses an armored electrical cable with

¹ The Record, page 9.

three conductors, each with a wire gauge of 3 aughts (a “3c3/0 ACWU Cable”) from the meter base to the power panel with a 150 amp main breaker.²

12. The Appellant submits that a 3c2/0 ACWU Cable is rated for 135 amps and the 3c3/0 ACWU Cable is rated for 155 amps.
13. The Appellant submits that under Table 13 of the Electrical Code, referenced by rule 14-104(1)(a) of the Electrical Code, states that a cable with a rating between 126 and 150 amps is permitted on a 150 amp overcurrent device, which is what is used in the installation.³
14. The size of the shop is equal to 166.5 square meters, which allows for 1670 watt load under the Electrical Code’s Table 14. The Appellant states there are no loads that will exceed 1500 watts.⁴
15. The Appellant also provided an article by the CSA Group titled “New edition of the Canadian Electrical Code will help improve electrical installations in many areas” dated November 6, 2023, in support of his position. The Appellant points specifically to a paragraph which states that the 2024 Electrical Code requires that where the ampacity of the conductors is less than the overcurrent device rating that the overcurrent device be marked with the maximum load.⁵

Evidence on behalf of Clayton [REDACTED]

16. During the Hearing, Mr. [REDACTED] stated that he believes the installation to be acceptable under the Electrical Code because of Table 13, which states he can use anything between 126-150 amps on a 150 amp breaker. He states that he disagrees with the Respondent’s position that the Installation must be rated for the breaker because Table 13 states that as long as the load is within 800 amps of the rating the installation is acceptable, and the Installation is within this range.
17. Mr. [REDACTED] stated that he installed the 150 amp breaker because his client requested 150 amps for his shop.
18. When asked by the Tribunal why he chose to use the 3c2/0 ACWU Cable as the cable for under the power pole and the 3c3/0 ACWU cable for the above ground portion from the meter base instead of using the same size cable for both, Mr. [REDACTED] stated that the 3c2/0 ACWU Cable was a less expensive cable that was still allowed under Table 13 and that choosing this cable would save the client money.
19. The Tribunal asked if, based on the distances included in the record, there was a voltage drop calculation done for the 3c2/0 ACWU Cable (meaning how much voltage would be lost given the distance 145 feet). The Appellant confirmed for the Tribunal that the cable is 145 feet in length. The calculation was provided to the Tribunal using a volt aught calculator, which calculated the voltage drop for a cable carrying 240 volts over a distance of 145 feet with a

² The Record, page 9.

³ The Record, page 9.

⁴ The Record, page 9.

⁵ The Record, page 15.

current of 120 amps. The result was a 1.78% voltage drop, which translates to a total loss of 4.28 volts. This means that after the voltage drop, the remaining voltage at the end of the cable would be 235.72 volts.

20. The Tribunal then clarified that the Appellant based their voltage drop calculation on 120 amps, which was 80% of the maximum allowable current. Given this, the Tribunal asked whether an occupancy calculation had been done to determine how much electrical load would be used in the space. The Appellant clarified that there was no additional load for the installation beyond the welding equipment included in the calculation, which was a 50 amp (9600 watt) welding receptacle, as the client did not request additional plugs for equipment. As such, only the existing setup was considered in the installation.

Summary of the Evidence Provided On Behalf of the Respondent:

Written Submissions made on behalf of the Respondent:

21. On May 2, 2024, an electrical permit was submitted by the Appellant to the Respondent for existing service cable from the pole transformer to the meter socket and for the installation of a new electrical panel in the shop. On May 10, 2024, the inspection of the Installation failed as the underground 3c2/0 ACWU Cable was not rated for the 150 amp breaker in the installed panel.⁶ The 3c2/0 ACWU Cable is rated for 135 amp service, and therefore is undersized for 150 amp service.⁷
22. On June 5, 2024, at a follow up inspection, it was found that the 150 amp breaker had been replaced with a 125 amp main breaker in the electrical panel. The inspection was passed as the deficiencies had been corrected through the installation of the 125 amp breaker.⁸
23. On August 27, 2024, a new electrical permit to replace the main breaker from 125 amps to 150 amps was issued. The permit includes using the existing cable of 3c2/0 ACWU from the utility pole to the meter base.⁹
24. On September 23, 2024, the Order was issued, requiring the 150 amp breaker to be replaced with a 125 amp breaker or to replace the 3c2/0 ACWU cable with “an appropriately sized cable from table 2 or 4 – 75 degree column for a 150 amp service” to ensure that the service cable is not overloaded.¹⁰
25. The Respondent submit that the 3c2/0 ACWU cable does not meet the requirements necessary to use Table D10B under the Electrical Code as the cable is above ground for a distance that exceeds the allowable distances under section 4-004(17).¹¹ Section 4-004(17) under the Electrical Code states that “Where the lower ampacity portion of a cable installation consisting of not more than four conductors in total does not exceed 10% of the circuit length or 3 meters,

⁶ The Record, page 18.

⁷ The Record, page 23.

⁸ The Record, page 24.

⁹ The Record, page 25.

¹⁰ The Record, page 26.

¹¹ The Record, page 19.

whichever is less, the higher ampacity shall be permitted.” The Respondent submits that the cable is above ground for approximately 10 meters.¹²

- 26.** The Respondent submits that the allowance for reduced conductor sizes in single dwellings and apartments was eliminated in the 2021 version of the Electrical Code and that the 150 amp service was not included in the table. The Respondent submits that section 14-000 has the scope of electrical circuits and apparatus installed, and that under this section a “circuit” is defined as the portion of the wiring installation between the final overcurrent device protecting the circuit and the outlet(s).” He also submits that under the 2021 Handbook that rule 14-104 is “not intended to find the smallest conductor that can be supplied for a given size of overcurrent device”.¹³
- 27.** Based on the above, the Respondent submit that section 14 is a general section, not a supplementary or amendatory to other sections of the Electrical Code. The Respondent submits that Table 13 should not be used as a work around to reduce the service cable size when the reduced cable size rules have been eliminated from section 4 in the 2021 version of the Electrical Code.¹⁴
- 28.** The Respondent submits that service equipment and conductors should not be considered an electrical circuit under section 14 as they do not form a completed path or terminate at the utilization equipment. The Respondent states that service conductors are separately defined and are not referenced in section 14, and therefore should not be considered an electrical circuit for the purposes of this section, as the service box overcurrent device is not a final overcurrent device.¹⁵
- 29.** The Respondent also submits that Table 13 is meant to accommodate a known or calculated static load that is not subject to change. The Respondent submits that the calculated load in a single dwelling should take into account the maximum additional loads that could be added by the required additional spaces in the panel board.¹⁶
- 30.** The Respondent also submits that the service conductor’s ampacity should be based on Tables 2 and 4 from the 75 degrees Celsius column using the amperage rating of the overcurrent device in the consumer box, and that section 8-104(1) should be the default rule that determines service conductor ampacity to ensure no overloading or overheating of the service conductors.¹⁷
- 31.** Finally, the Respondent submits that residential breakers are not usually marked and that using section 2-100(4) for the marking of a maximum continuous load, the breakers must be marked for operation at 80% or 100%.¹⁸

¹² The Record, page 19.

¹³ The Record, pages 19-20.

¹⁴ The Record, page 21.

¹⁵ The Record, page 21.

¹⁶ The Record, page 21.

¹⁷ The Record, page 21.

¹⁸ The Record, page 21.

Evidence on behalf of Brady [REDACTED]

32. Mr. [REDACTED] submit to the Tribunal that the issue with Table 13 is that it is being misused. He states that in the history of the Electrical Code, all allowances for reduced conductor size for single family dwellings had been removed from the 2021 Electrical Code and therefore there are no more allowances for reduced allowances in load calculations.
33. Additionally, Mr. [REDACTED] submit that having an undersized conductor on any breaker requires that the breaker have a marker for continuous use at only 80%, which is a rare occurrence in his experience.

Findings of Fact:

34. The facts of the Installation are not at issue. The interpretation and application of the Electrical Code is the point of disagreement. However, for ease of understanding, the Tribunal recognizes the following as facts.
35. The Installation comprises of a 3c2/0 ACWU Cable, approximately 145 feet in length, running from a power pole to a meter base, approximately 100 feet away, and a 3c3/0 ACWU Cable running from the meter base to power panel with a 150 amp breaker. The Installation is in a shop on a residential property approximately 1792 square feet, or 166.5 square meters.
36. Based on the distances provided to the Tribunal, there voltage at the end of the 3c2/0 ACWU cable is 235.72 volts after a 1.78% voltage drop.

Reasons for Decision:

37. On an appeal such as this, the powers of the Tribunal are set out in subsection 52(2) of the Act, the relevant excerpt is reproduced below:

52(2) The Council may by order (a) confirm, revoke or vary an order, suspension or cancellation appealed to it and as a term of its order may issue a written variance with respect to any thing, process or activity related to the subject-matter of the order if in its opinion the variance provides approximately equivalent or greater safety performance with respect to persons and property as that provided for by this act.
38. The decision on whether to confirm, revoke or vary the Order hinges on adherence to the process set out in the Electrical Code. The Electrical Code requirements must be applied systematically.
39. If the Electrical Code is applied systematically, section 4 is the starting point to get the capacity of the system. Section 4 applies to conductors for services, feeders, branch circuits, and photovoltaic circuits. The Installation is a service installation, which brings it within the scope of section 4.
40. Under section 4-004(2) sets out the maximum current that an aluminum conductor is permitted to carry. The installation uses 3c2/0 ACWU and therefore is governed by item (b), which

specifies the maximum current to be specified in Table 4. Under Table 4, an 2AWG has an allowable ampacity of 135 amperes at 75 degrees Celsius. This is the capacity of the installation.

- 41.** Once the capacity is known, the load of the installation needs to be determined, which is regulated under section 8 of the Electrical Code. Section 8 establishes the methodology for determining service loads, ensuring that adequate capacity and protection are provided for in installations. Under section 8-102(1)(b), the voltage drop from the supply side of the consumer's service shall not exceed 5% based on 80% of the overcurrent rating protecting the feeder. The voltage drop calculation for the Installation provided was a 1.8% drop, which is under the acceptable maximum for this type of installation.
- 42.** Under section 8-104, the maximum circuit loading is the lowest of either the overcurrent device or the ampacity of the conductor. In this installation, there is a 135 amp circuit and a 150 amp overcurrent. Therefore, the Installation has a rating of 135 amps. Under section 8-104(2), the calculated load shall not exceed the ampere rating of the circuit, therefore the total calculated load of the Installation cannot exceed 135 amps.
- 43.** Calculated load is based on the type of building occupancy. The calculated load for the Installation is determined by section 8-210, which is for "other types of occupancy", as the residential shop is not a single dwelling, apartment building, school, hospital, nor a hotel, motel, dormitory, or similar. The calculated load under section 8-210 is based on the watts per square metre required under Table 14. Table 14 sets out different types of occupancy, in which the residential shop would fall under a garage. A garage has a basic load calculation of 10 watts per square metre, plus 100% of the demand factor for insulated service conductors. The shop is 1792 square feet, which is equivalent to 166.48 square metres, giving the calculated load maximum of 1664.8 watts.
- 44.** Only now that the capacity and the load for the Installation are known, does section 14, "Protection and control" come into play. Section 14-000 "Scope" states that the section applies to the protection and control of electrical circuits and apparatus. A consumer service cable falls within the scope of an electrical circuit for the purposes of section 14. Rule 14-100(2) permits consumer's service conductors to be protected by an overcurrent device at the service equipment.
- 45.** As rule 14-100(2) states that the overcurrent in the panel protects the service conductors, rule 14-104 comes into play as it sets out the rating for overcurrent devices. Rule 14-104(1) requires the rating of the overcurrent device to not exceed the allowable ampacity of the conductors that they protect in circumstances set out in subsection (a), where the circuit breaker has a rating of the same value as the ampacity of the conductor is not available and that the maximum calculated load is in accordance with the rules of section 8. As discussed above, the maximum load calculation for the Installation does fall within the rules of section 8. If a circuit breaker with the same ampacity rating of the conductor is not available then the ratings or settings under Table 13 are permitted under the Electrical Code.
- 46.** Rule 14-104 also contains a reference to Appendix B, which states that Table 13 is useful in selecting the appropriate rating of overcurrent device when conductors are selected based on a calculated load.

- 47.** The Tribunal agrees with the Respondent that Table 13 cannot be used arbitrarily to find the smallest cable size. The Appellant explicitly stated that this was his approach, as he wanted to save his customer money, which is not the proper use of the table. However, despite the fact that the way the Appellant got to Table 13 was not correct, the Tribunal does not believe this means the Installation is incorrect. Had the Appellant followed the proper steps within the Electrical Code, the use of Table 13 is still an available option. Use of Table 13 is an exception to the standard installation requirements and still has two requirements that must be met to use the Table. For the Installation, the requirements under rule 14-104(1) an overcurrent matching the wire is not available and that the load is known or calculated from Section 8. The first requirement, an overcurrent matching the wire is not available, is met as the 135 amp breaker is not available. The Tribunal has heard that the installation will use either the 150 or the 125 amp breaker. The second requirement, the load is known or calculated from Section 8 is also met. The Tribunal heard from the Appellant that the load was calculated according to section 8, as discussed in paragraphs 42 to 44 above. Therefore, the Installation does meet the requirements for the use of Table 13.
- 48.** The Respondent brought up the point that the property owner may want to have future uses, which would increase the load, and that use of Table 13 should take into account the maximum load of future draws. The Tribunal disagrees. Service remains at 135 amps, and therefore the dispute over a 10 amp difference appears unwarranted. The Electrical Code does not account for future loads, as it is a snapshot in time, requiring a new calculation if additional loads are introduced later. The Electrical Code does not allow for speculation for the future except in the case of dwellings. The Installation is not in a dwelling, potential future draws cannot be a consideration in the current installation. If future loads are wanted in the future another load calculation will need to be done at that time to determine next steps.
- 49.** Regarding safety concerns, the primary issue with larger overcurrent protection is excessive heat buildup in conductors and terminations. Here, the conductor is rated for 90 degrees, and with 150 amps, it would reach that temperature. However, the terminations are rated only for 75 degrees. Despite this, an additional 15 amps on a termination rated for 4 ought or larger is not expected to create a significant temperature increase. Thus, no immediate safety concerns are identified.
- 50.** The Tribunal agrees that the Respondent was doing his due diligence. If a customer asks for 150 amp service, the proper approach is to go from Section 4 to Section 8 which would result in the use of a 150 amp cable. Getting to Table 13 is not possible if the Appellant had followed the proper process as set out in the Electrical Code. In this way, the Tribunal agrees with the Respondent.
- 51.** Despite that agreement, the Tribunal disagrees that the use of Table 13 makes the Installation unsafe. What it does do is provide 135 amp service to a customer that asked for 150 amp service.
- 52.** Since the installation does not present an identifiable safety issue and follows the Electrical Code's provisions, the Tribunal has determined that it is permissible. However, proper labeling should be implemented. Future electricians must be able to accurately assess the service capacity. Therefore, labelling should be added as a best practice, aligning with the anticipated

2024 Electrical Code requirements.

- 53.** The Installation is acceptable under the Electrical Code. While the Appellant’s approach to Table 13 was incorrect, the Installation itself does meet required conditions. A label should be added to clarify the actual service capacity and prevent future misinterpretations by electricians.

Signed at the City of Edmonton)
in the Province of Alberta)
this 13th day of March, 2025)

Nicolas LeBlanc
Chair, Electrical Sub-Council
Administrative Tribunal

