STATEWIDE ALTERNATE METHOD
NO. 09-01

Use of Demand Factors

Calculating Electrical Vehicle Changing Equipment Services and Feeders

Building Codes Division
Department of Consumer and Business Services

Statewide Alternate Methods are approved by the division administrator in consultation with the appropriate advisory board. The advisory board's review includes technical and scientific facts of the proposed alternate method. In addition:

- *Building officials shall approve the use of any material, design or method of construction addressed in a statewide alternate method;*
- *The decision to use a statewide alternate method is at the discretion of the applicant; and*
- *Statewide alternate methods do not limit the authority of the building official to consider other proposed alternate methods encompassing the same subject matter.*

Code references: 2023 Oregon Electrical Specialty Code (OESC)—Article 625

Date(s): Approved and issued—Sept. 24, 2009
Last updated—Oct. 1, 2023

Subject: Approval of the use of a demand factor table for calculating electric vehicle charging equipment services and feeders

Background:

This alternate method allows electrical contractors to apply a demand factor to services and feeders that supply electrical vehicle charging stations. The OESC provides demand factor tables for the installation of similar equipment in mobile home parks, recreational vehicle parks, marinas and boatyards, and electrified truck parking spaces.

Discussion:

Under Oregon law, when the division considers making an alternate method ruling as a method of construction, it must consider "standards and interpretations published by the body that promulgates any nationally recognize model code adopted as a specialty code of this state." ORS 455.060.

Article 625 of the OESC states that electric vehicle charging loads are considered a continuous load. However, the OESC provides demand factor tables for installations of similar equipment. This article does not contain any provisions to apply a demand factor or consider load diversity for services and feeders that supply multiple charging stations. Studies performed while monitoring battery charging processes demonstrated that peak current draw did not exceed 50% of rated loads. The level of charging required for individual battery modules varied widely. For these reasons, application of a demand factor is justified by the technical substantiation.

Technical and Scientific Facts:

As approved by the Oregon State Electrical and Elevator Board, the following technical and scientific facts apply to the installation of services and feeders that supply electrical vehicle charging equipment:

1. Considering EV charging equipment "continuous loads" assumes that all charging equipment is likely to operate at full rated load for three hours or more.
2. Testing data shows that charging currents are substantially below the full rated load and that cycle times typically do not exceed three hours.
3. The provisions of this Statewide Alternate Method ruling bring the language of Article 625 into alignment with other similar Articles, 550, 551, 555, and 626.
4. A demand table is an appropriate method of accurately calculating loads on services and feeders.

Scope of Ruling:

This ruling addresses the installation of electrical equipment supplying electric vehicle charging equipment. The acceptability of using the demand factor table to calculate loads for electric vehicle charging stations as an alternative to assuming a continuous load is contingent on meeting the following conditions:

1. Except as otherwise provided for in this alternate method, the provisions of the OESC shall be applicable to all installations of electric vehicle charging equipment.
2. All provisions for enclosure integrity, conductor ampacity, and overcurrent protection in Chapters 1 through 4 are met.
3. Load calculations for services and feeders that supply electrical vehicle charging equipment shall be permitted to be modified as indicated in notes (1) and (2) to the following table:

Table 625.42 Demand Factors

Number of charging stations	Sum of charging station ratings (%)
1-4	100
5-8	90
9-14	80
15-30	70
31-40	60
41-plus	50

Notes:

1. Where multiple charging stations are contained in a single enclosure, the demand factors in table 625.42 shall be permitted for each service and/or feeder supplying the multiple charging stations.
2. Where charging stations consist of only level 2 electric vehicle connectors and the demand factor of Table 625.42 are applied, the demand factor specified in 220.61(B) shall also be permitted.

Conclusion:

After considering the technical and scientific approval by the Electrical and Elevator Board, the division rules that applying demand factors to the installation of electric vehicle charging supply systems are acceptable as a construction method, subject to stated limitations, and Alternate Method Ruling No. 09-01 is approved.

Contact:

Visit the division website to contact a building code specialist.