# Code Amendment Proposal Application

**Department of Consumer & Business Services**
**Building Codes Division**
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**Read the entire code amendment proposal application before completing this form. Please complete all parts before submitting your proposal and refer to the provided checklist.**

## APPLICANT INFORMATION

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|---|---|---|
| Name: David Calabrese | | Date: 08/26/2022 |
| Representing (if applicable): Daikin US Corporation | | Work phone: (202) 383-8741 |
| Mailing address: 601 13th Street, NW, Suite 200 | | Cell phone: (347) 515-4132 |
| City: Washington | State: DC | Zip: 20005 |
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## PROPOSAL INFORMATION

Specialty code: Residential Specialty Code

Code section(s): N1105.4.4.1

Briefly explain the subject of your proposal: To ensure supplementary electric resistance heat for heat pumps operates only when it is necessary.

## INSTRUCTIONS AND CHECKLIST

Fill in all the information above and submit this page, signed and dated, with the required supplementary information for Parts I, II, III, and IV described on page 2 of this application. This application may be submitted by mail to the mailing address above, or by email to BCD.PTSPtech@oregon.gov.

**Summary checklist for the applicant:**

- ☒ **Part I** Code amendment language is attached in the proper format.
- ☒ **Part II** Amendment proposal requirements for amending the code have been reviewed.
- ☒ **Part III** Amendment proposal criteria questions have been answered and are attached.
- ☒ **Part IV** If applicable, additional ORSC energy efficiency amendment proposal information is attached.

**Note:** One application is required for each code section you are proposing to amend. If this proposal requires changes in other sections of the code for alignment, include those changes as part of this application.

## APPLICANT SIGNATURE

Signature: David Calabrese Date: 08/26/2022

***Copyright notice**: By signing this Code Amendment Proposal Application, I understand and acknowledge that the work contained in this application is original, or if not original, I have the right to copy the work. By signing this work, I understand that any rights I may have in this work, including any form of derivative works and compilations, are assigned to the Department of Consumer and Business Services Building Codes Division. I also understand that I do not retain or acquire any rights once this work is used in a Department of Consumer and Business Services Building Codes Division publication.*

**Modified proposal submitted by the proponent Sept. 13, 2022**

**Daikin Code Amendment Proposal to the 2023 Oregon Residential Specialty**

**Code Section:** Chapter 11 Section N1105 HEATING, VENTILATING and AIR-CONDTIONING SYSTEM

**Part I: Code Amendment Language**

You must provide exact language for your code proposal. Failure to provide language will invalidate the application. Include all code sections that require changes and use the following format to show additions and deletions from the code — strikethrough for deleted text and underline and bold for new text. Note: Where applicable, the proposed code language should show how the existing Oregon amendments will integrate with the base model code or if the proposal is rescinding an existing Oregon amendment. Any modification to the new model code should note or reflect any current Oregon amendments related to this language.

Daikin's response:

N1105.4.**1.3** Heat pump controls. ~~**All heat pump system thermostats shall be capable of manual setback and limiting the use of supplemental heat during warm-up periods.**~~ **Heat pumps having supplementary electric-resistance heat shall have controls that**~~**, except during defrost, prevent supplemental heat operation when the heat pump compressor can meet the heating load.**~~ **are configured to limit supplemental heat operation to only those times when one of the following applies:**

1. **The vapor compression cycle cannot provide the necessary heating energy to satisfy the thermostat setting.**
2. **The heat pump is operating in defrost mode.**
3. **The vapor compression cycle malfunctions.**
4. **The thermostat malfunctions.**

~~N1105.4.4.1.1. Outdoor Thermostat Required**.** An outdoor thermostat or factory installed temperature sensor with electronic controls shall be used to lock out supplemental heat based on outdoor air temperature. The lock-out temperature shall be set at 4°F (40°C). There shall be no compressor lock-out temperature.~~

**Part II: Code Amendment Proposal Requirements**

Generally, proposals should only suggest amending the technical and scientific matters within the scope of the specialty code. Administrative matters are adopted and amended to align with statutes and rules governing the state building code. Those administrative matters not regulated by a specialty code, include, but are not limited to:

- Licensing or certification requirements, or other qualifications and standards for businesses or workers;
- Structure or equipment maintenance requirements;
- Matters that conflict with federal or state law; and,
- Matters that conflict with other specialty codes or publications adopted by the division.

Dakin's response: This proposal will not impact anything but ensuring contractors to properly set the operation of heat pump supplementary heat. Not only that this setting requirements do not mandate contractors to obtain additional knowledge or training or to purchase additional devices but also do not

any administrative matters. Therefore, we ensure that our proposal is enforceable by the specialty code for which we are proposing an amendment.

**Part III: Code Amendment Proposal Criteria**

**Proposal**

1. Describe the concept and purpose of this proposal.

Daikin's response:

The use of electric resistance heaters as backup heating devices can significantly increase winter energy consumption, and air source heat pumps can effectively provide heating without such devices including the cold climate regions in the United States. Also, Daikin has observed that it is common for heat pumps to be installed with electric resistance heaters configured to operate in conditions where sufficient heating capacity is available from the heat pump alone. This results in reducing the operation hours of heat pumps and increasing the operation hours of electric resistance heaters. Such setting of heat pump systems will fail to yield expected reduction of GHG emissions and result in higher energy consumption and longer peak demand events. Therefore, Daikin proposes to revise N1105.4.1.3, which defines the use of electric resistance heaters as supplementary heat for heat pumps, to prevent such practice.

2. What problem in the existing Oregon code or national model code is this proposal solving? How does this amendment address the issue? If you have evidence demonstrating the problem, submit that information.

   Helpful information

   a) If this proposal corrects any unforeseen or probable outcomes resulting from the application of a code section, explain how.
   b) If this proposal corrects inadequate application by a code section to a method, material or design, explain how.
   c) If this proposal eliminates conflicting, obsolete, or duplicative code provisions or standards between Oregon-adopted codes, statutes or regulations, explain why.
   d) If this proposal is for a fire or life safety matter, or is it otherwise needed to protect the health, safety, welfare, comfort and security of occupants and the public, explain why.
   e) If this proposal is necessary to address unique geographic or climatic conditions within Oregon, explain why.
   f) If there are alternatives to this proposal that solve the problem, explain why this proposal is the best or a necessary solution.
   g) If this proposal provides for the use of unique or emerging technologies, or promotes advances in construction methods, devices, materials and techniques, explain how.
   h) If this proposal meets any energy conservation or indoor air quality requirements, explain how.
   i) If this proposal involves the adoption of an electrical or plumbing building product, note if the appropriate advisory board approved the product.

Daikin's response:

The 2021 version of Oregon Residential Specialty Code N1105.4.1.3 defines electric supplementary heat needs to be controlled to prevent it from performing during warm-up periods. However as mentioned above, to fully utilize the energy and carbon performance of heat pumps, it should be turned on only when heat pumps cannot provide sufficient heat on their own to minimize energy consumption. The existing text does not fully address the issue.

Lockout temperature should vary depending on the types of heat pumps that are installed as, for instance, cold-climate heat pumps are able to provide sufficient heat at lower ambient temperature than others. So Daikin believes that whether or not the vapor compression cycle given the weather condition can provide sufficient heat or not should be the switch-point instead of defining a fixed lockout temperature. This definition is further strengthened by specifying the situations when heat pumps are not able to provide sufficient to satisfy the thermostat setting separately from the weather condition. They include when heat pumps operating in defrost mode, when vapor compression cycle malfunctions occur, and when thermostat malfunctions occur.

3. Has this been proposed at the national model code level? If so, explain when it was proposed, what happened, and why it was not adopted. Provide all associated national model code hearing information and background.

Daikin's response:
This code change proposal was submitted to the IECC Committee on October 12 2021. Then the IECC HVAC Subcommittee approved the proposal on May 16 2021 followed by the IECC Committee's approval on May 26 2022 as mentioned earlier.

**Implementation and fiscal impact**

1. Explain how the proposed provisions would be enforced? Are additional inspections or permits required? Describe any necessary equipment, training, tests or special certifications.

Daikin's response:
This proposal focuses on the use of the switchover temperature controls, which is unrelated to inspections or permits. Therefore, the provisions would be enforced without any additional inspections or permits required.

2. What is the fiscal impact of this proposal? Provide a cost benefit analysis and include the resources or methods you used to determine the fiscal impact.

   Helpful information

   a) If this proposal adds to the cost of construction, explain how the added cost contributes to the health and safety of occupants, or is necessary to conserve scarce resources.
   b) If there are any other adverse fiscal impacts or cost savings passed on to the general public, the construction industry, local and state governments, and small businesses, an interested person must describe the added or reduced cost of a proposed code amendment, and describe the adverse fiscal impact or cost savings in relation to the current Oregon specialty code.
   c) If this proposal will affect the cost of development of a detached single-family dwelling, please indicate the cost. For the purposes of illustrating the change on the cost, please use a 6,000-square-foot parcel and the construction of a 1,200-square-foot detached single-family

dwelling on that parcel. The information on the cost must be sufficient to assist the division in preparing a housing cost impact statement.

Daikin's response:
The code change proposal will neither increase nor decrease the cost of construction. Requiring the use of the switchover temperature controls will not increase nor decrease the cost of construction - however, it will result in energy savings and lower utilities costs for the end-user.

**Impacted stakeholders and other specialty codes**

1. It is important that proposals be shared with stakeholders that will be impacted by them. Was this proposal developed with people or organizations likely to be affected by it? Has it been reviewed or shared with people or organizations likely to be affected by it? If so, who, and if not, why not?

Daikin's response:
This proposal, which is equivalent to what Daikin submitted to the IECC Committee, was developed through a series of review processes with AHRI and participating OEMs. Daikin revised the proposal based on their comments and ensured that they all agreed with the proposed efficiency measurements before it was reviewed and voted by the Committee.

2. Does this proposal impact other specialty codes or statewide programs?

Daikin's response:
No, it does not impact other specialty codes or statewide programs.

**Part IV: ORSC Energy Efficiency Additional Code Amendment Proposal Criteria**

1. Modeled estimated energy savings
   - This code change proposal requires proper use of supplementary electric resistance heat to optimize the energy performance of heat pumps by limiting the use of the supplementary heat only when necessary. However, energy modeling is not capable of capturing such energy savings.

2. Increased construction costs
   As mentioned above, the code change proposal will neither increase nor decrease the cost of construction. Requiring the use of the switchover temperature controls will not increase nor decrease the cost of construction. Hence, energy modeling for the proposed setting will have identical inputs as the base cases.