



TITLE 24, PART 6 | **2025 CODE CYCLE**

Reduced Air Leakage - Vestibules

Codes and Standards Enhancement (CASE) Proposal
Nonresidential | Envelope

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Vestibules –

Background

- Code Change Proposal
- Context and History

Proposal Summary

The proposed code change would establish a **new mandatory vestibule requirement with continuous air barriers in nonresidential buildings with high-traffic main entrances** (shopping malls, healthcare facilities, hotels, etc.). This is also applicable for additions with main entrances.

We also propose changing the title of Section 120.7 from **MANDATORY INSULATION REQUIREMENTS** to **MANDATORY THERMAL ENVELOPE REQUIREMENTS**

Construction Type	Type of Change	Section(s) of Code Updated	Software Updates Required
New Construction	Mandatory	120.7(e) new section*	Minimum
Addition	Mandatory	141.0	Minimum

- The requirement shall meet one of the following
 - The proposed enclosed vestibule, with all doors opening into and out of the vestibule equipped with self-closing devices
 - A revolving door or doors opening into a vestibule or directly into the conditioned space
 - A combination of (a) and (b)

IECC: Doors that have an air curtain with a velocity of not less than 6.56 feet per second (2 m/s) at the floor that have been tested in accordance with ANSI/AMCA 220 and installed in accordance with the manufacturer’s instructions.

Context and History

For over a decade, ASHRAE has required vestibules as part of building entrances, with some exceptions. Vestibules have also been required by the IECC since at least 2006.

Industry Standards	Building/Space Exceptions by Area	Section(s) of Code
ASHRAE 90.1-2022	<ul style="list-style-type: none"> ASHRAE CZ 1&2: Not required ASHRAE CZ 3: conditioned area <10,000 ft² and < 4 stories ASHRAE CZ 0, 4-8: <1000 ft² ASHRAE CZ 0,3-4: Self-closing doors with an air curtain unit ASHRAE CZ 5-8: Self-closing doors in buildings 15 stories or less that have an air curtain unit 	5.4.3.4 Air Curtain Sections: 6.4.3.9 & 10.4.5
IECC 2021	<ul style="list-style-type: none"> IECC CZ 0-2 – Not required Doors that open directly from a space less than <3000 ft² area Doors with an air curtain unit 	C402.5.9; Air Curtain Section: C408.2.3

Context and History

- There are no mandatory requirements for vestibules in Title 24, Part 6
ASHRAE has required vestibules as part of building entrances for over a decade, with exceptions.
IECC has also required vestibules since 2006.
- Global warming and a potential increase in wildfires in California call for a tighter building envelope to prevent bad air infiltration.
Global warming is likely to cause an increase in temperature of more than 2 degrees Fahrenheit by 2040
Researchers predict significant growth in the number of wildfires in California, affecting both outdoor and indoor air quality



Vestibules –

Market Overview

- Current Market Conditions
- Market Trends
- Potential Market Barriers and Solutions

Market Overview and Analysis

In typical high-trafficked buildings and healthcare facilities, architects tend to add vestibules and/or air barriers in the entrance lobby as a common practice. Vestibules typically include fenestration materials which are already available in the market.

Current Market

- Vestibules are well-known in the market and are common in high-traffic buildings where cost-effective.
- There are no existing incentive programs or utility programs to encourage the usage of vestibules.

Market Trends

- Increase in use of air barriers in main entrances since the early 2000s, due to codes and regulations requiring their use in larger buildings.

Do you agree with this description?
What else should be known?

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In typical high-trafficked buildings and healthcare facilities Architects tends to add the vestibules and/or air barriers in the entrance lobby as a common practice. As Vestibules are made of fenestration materials like exterior doors; and air curtains are made of a small heater and a fan; these are already available in the market.

Current Market

Currently building design community is already in practice of designing and adding some forms of air barriers (i.e. exterior and interior vestibules, circulating and non-circulating air curtains etc.) in the desired places.

It is not common to add vestibule or air barriers in every building and it is not cost-effective. To encourage the addition of vestibule in the design and help reduce the first cost, there are no incentive programs or utility programs available for air barrier or vestibules.

Market Trends

Ever since ASHARE 90.1, IECC, IgCC have the requirement (that states that primary entrance doors to spaces that are 3,000 square feet or larger must include vestibules), adding design of some form of air barriers in the main entrances been on the uprise post 2000s.

Market Overview and Analysis

Market Barriers

- **Cost.** Installation of vestibules can incur additional costs to building construction, which may be perceived as a barrier for some developers.
- **Space.** Dedicated space for a vestibule can be difficult to justify in prime real estate situations.
- **Hidden benefits.** The benefits of having cleaner air are invisible and often considered non-tangible. Cutting down on infiltration, vestibules help limit heat transfer, reduce energy usage, create a barrier to outdoor air pollution, and provide greater creature comfort to occupants.

**Do you agree with
this description?
What else should be
known?**



Vestibules –

Technical Considerations

- Technical Considerations
- Potential Barriers and Solutions

Technical Barriers

Technical Barriers and Potential Solutions

- **Justification of cost** – The results of this measure's cost benefit analysis should demonstrate that a vestibule is cost-effective, making the decision to add one acceptable to a real estate owner.
- **Air pressure** – A vestibule helps to maintain positive air pressure in a building by reducing sudden drops of air pressure from a busy entrance.

**Do you agree with
this description?
What else should we
know?**

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IBC Section 1010.3.1.1 Egress component. A revolving door used as a component of a means of egress shall comply with Section 101.3.1 and the following three conditions:

1. Revolving doors shall not be given credit for more than 50 percent of the minimum width or required capacity.

Vestibules –

Energy and Cost Impacts

Methodology and Assumptions

- Energy Savings Methodology
- Cost Impacts Methodology & Results
 - Incremental costs
 - Energy cost savings



Methodology for Energy Impacts Analysis

- Include calculations for new construction and additions
- Energy savings analysis will be based on methodologies used in the US DOE 2010 report “Energy Saving Impact of ASHRAE 90.1 Vestibule Requirements” published by Pacific Northwest National Laboratory (PNNL). The energy modeling parameters will be adjusted for California prototype energy models and climate zones.



The PNNL study estimated air infiltration as a function of both **door opening rate** (as determined by occupancy and building type) as well as **door opening size** (determined by building type). The energy impacts analysis will use the same assumptions as they apply to the corresponding California building prototypes.

Methodology for Energy Impacts Analysis, cont'd

- Impacts will be characterized as the differences between **Baseline runs** (no vestibules) and **Proposed runs** (with vestibules).
 - All other systems will be identically modeled in the baseline and design building
- We will use survey and interview information collected from manufacturers, installers, developers, other code agencies, representatives from professional organizations, and designers. This will help to understand the current window installations and how compliance is achieved

Assumptions for Standard and Proposed Designs



Standard Design

- Minimally compliant with 2022 Code for all building systems meets the prescriptive code requirements



Proposed Design

- All are identical to the Standard design model except for the infiltration rate and schedule.
- This infiltration rate and the schedule will vary based on the prototype buildings

Incremental Per Vestibule Cost

Over 30 Year Period of Analysis

Incremental First Cost		Incremental Maintenance Cost	
Construction cost of materials	\$5,000-15,000	Equipment replacement	N/A
Labor	\$1,000-5,000	Annual maintenance	N/A
Commissioning	N/A		
Total	\$6,000-20,000	Total	\$0

Cost data came from:

- Contractors' websites
- Generic estimation

We seek verification on these estimated costs.

Total maximum possible incremental cost over 30-year period of analysis:
\$20,000

Incremental costs in this presentation are estimates. A detailed cost analysis will be completed later, which will include factors such as Labor Cost indices from across California and standard inflation rates.

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Important to include what is included in equipment, etc.

Incremental Cost Information

- How we collected costs of base case technology and proposed technology
 Should not be focus – just highlight sources of information we used to find out what we know currently.
 Interviews with manufacturers, distributors or contractors
What was included in the costs
- Costs were found to be ...
- Note what we need from stakeholders. What specifically are we looking for/what specific feedback do we need? Note and recommend stakeholders reach out to discuss outside of this meeting.

Prompts for discussion:

- What components of costs did we leave out?

- Do you find these costs to be reasonable?
 - willingness to discuss individually

Poll Request # 1

- **Measure Name:** NR Reduced Air Leakage – Vestibules
- **Type of Poll:** Multiple choice (multiple answers)
- **Question:** Do the presented cost estimates seem reasonable for a vestibule in a nonresidential building?
- **Answers:** Estimate is very low, Estimate is a little low, Estimate is pretty close, Estimate is a little high, Estimate is very high
- **Placement:** after slide 17 (Incremental Cost)
- **Broadcast results to attendees as they respond:** Yes
- **Make poll public during presentation:** Yes

Are market actors missing?

Here is the cost calc file; there is also the PPI values in the construction industry in the pdf.

<https://energysolutiononline.sharepoint.com/teams/extranet/2025-t24/SitePages/Nonresidential.aspx>

Vestibules –

Statewide Energy Impacts

Methodology and Assumptions





Vestibules –

Compliance and Enforcement

- Design
- Permit Application
- Construction
- Inspection
- Revisions to Compliance Software

Compliance and Verification Process



1. Design Phase

- Discussion with Owner regarding Vestibule requirement
- Incorporate all appropriate design considerations (ADA, HVAC, etc)



2. Permit Application Phase

- Ensure mandatory Vestibules are included in review
- Confirm Vestibule is properly designed and documented



3. Construction Phase

- Construct the Vestibule according to construction documents
- Complete the NRCI to cover vestibules

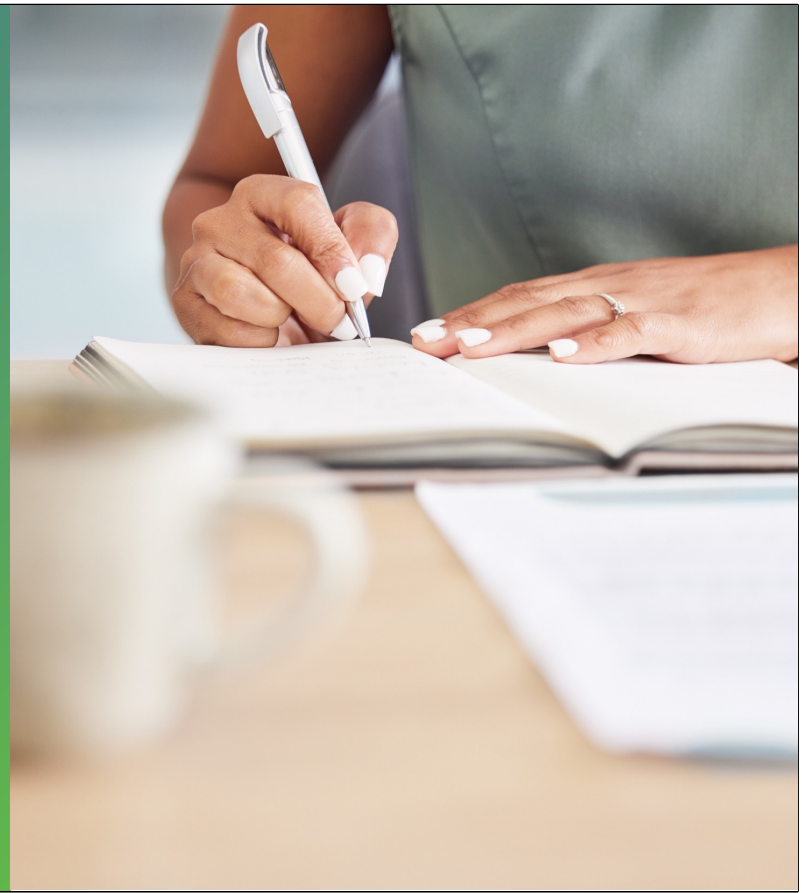


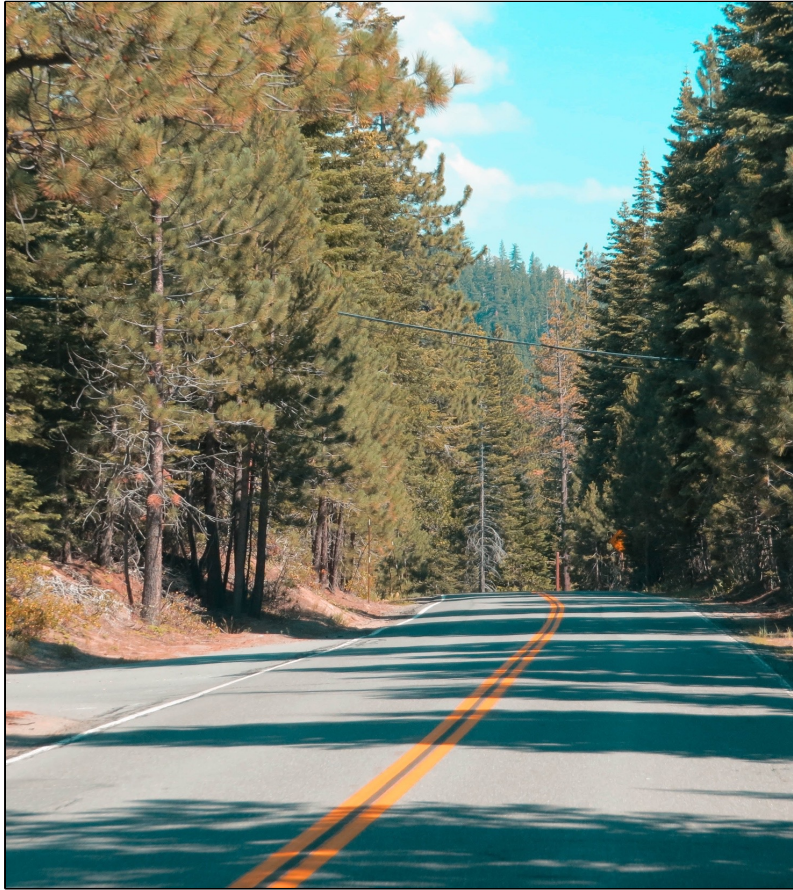
4. Inspection Phase

- Verify that components are properly installed

Review of Code Language Markup

- Draft Code Change Language





Discussion and Next Steps

We want to hear from you!

- Provide **any last comments or feedback** on this presentation now verbally or over the chat
- More information on pre-rulemaking for the 2025 Energy Code at <https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/2025-building-energy-efficiency>

Comments on this measure are due by February 28, 2023. Please send comments to info@title24stakeholders.com and copy CASE Authors (see contact info on following slide).

Coordination Team
presentation included
info for CASE Authors
stakeholders

Coordination Team
stakeholder meeting
deadlines

**Thank
You**

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