



Board of Building Standards

CODE COMMITTEE MEETING AGENDA

DATE: MAY 11, 2023
TIME: 10:00 AM
LOCATION: TRAINING ROOM 3, 6606 TUSSING ROAD, REYNOLDSBURG, OHIO, 43068
[Click here to join the meeting](#)

Call to Order

Approval of Minutes

[MIN-1](#) March 30, 2023 Code Committee Meeting Minutes

Petitions

- [P-1](#) Petition #23-02 - OBC Section 427 (Section 429 in 2024 OBC) Privacy Pods/Booths - Charles Moore of Framery Acoustics
- [P-2](#) Petition #23-03 - OBC Ch 19 & 35 Add ACI 440.11 for structural concrete - Kerry Sutton of American Concrete Institute
- [P-3](#) Petition #23-05 - OBC Ch 13 Add ACI/TMS 122.1 to IECC & ASHRAE 90.1 for thermal bridging - Kerry Sutton of American Concrete Institute

Recommendations of the Residential Construction Advisory Committee

- [R-1](#) Petition #23-04 - RCO 311.7.1 Two handrails - Robert Kramer
- [R-2](#) 2019 RCO Proposed Amendments Stakeholder Comments & 2023 NEC

Old Business

- [OB-1](#) Review of E-notification comments for AG 100 (OBC, OMC, OPC)

New Business

Adjourn

File Attachments for Item:

MIN-1 March 30, 2023 Code Committee Meeting Minutes

OHIO BOARD OF BUILDING STANDARDS
CODE COMMITTEE MINUTES
March 30, 2023

The Code Committee met on March 30, 2023 with the following members present: Ms. Cromwell, Mr. Denk, Mr. Miller, Mr. Pavlis, Mr. Samuelson, and Mr. Stanbery. Board Chairman, Tim Galvin, was also present.

The following staff members were present: Regina Hanshaw, Debbie Ohler, Rob Johnson, Jay Richards, and Laura Borso

Guests present: Dave Collins and a student from the University of Dayton

Guests present via Teams: Kerry Sutton, Marsha VanGeem, Charles Huber, and Josh Harmon

CALL TO ORDER

The meeting was called to order by Mr. Denk at 1:06 P.M.

APPROVAL OF MINUTES

Mr. Stanbery made the motion to approve the minutes of the Code Committee meeting held on February 16, 2023. Mr. Miller seconded the motion. The motion passed unanimously.

PETITIONS

Petition #23-02 - OBC Section 427 (Section 429 in 2024 OBC) Privacy Pods/Booths - Charles Moore of Framery Acoustics

After discussion, Mr. Miller made the motion to table this item and asked staff to modify the proposed language to work in Ohio. Mr. Pavlis seconded the motion. The motion passed unanimously.

Petition #23-03 - OBC Ch 19 & 35 Add ACI 440.11 for structural concrete - Kerry Sutton of American Concrete Institute

After discussion, Mr. Pavlis made the motion to table this item to allow committee members and staff time to review the proposed standards. Mr. Miller seconded the motion. The motion passed unanimously.

Petition #23-04 - RCO 311.7.1 Two handrails - Robert Kramer

Mr. Pavlis made the motion to refer this petition to the RCAC for recommendation. Mr. Stanbery seconded the motion. The motion passed unanimously.

Petition #23-05 - OBC Ch 13 Add ACI/TMS 122.1 to IECC & ASHRAE 90.1 for thermal bridging - Kerry Sutton of American Concrete Institute

After discussion, Mr. Pavlis made the motion to table this item to allow committee members and staff time to review the proposed standards. Mr. Stanbery seconded the motion. The motion passed unanimously.

RECOMMENDATIONS OF THE RESIDENTIAL CONSTRUCTION ADVISORY COMMITTEE

No items for consideration

OLD BUSINESS

OBC, OMC, OPC & RCO draft rules – Stakeholder comment review

Staff presented the spreadsheet of stakeholder comments received on the 2021 I-code based Ohio draft rule packages to the committee. The committee reviewed the comments and made decisions about whether to make modifications to the rules as a result of the comments received. Staff was asked to research and provide additional background information to the committee on the parking garage ventilation and sprinkler issue, the double-fire wall penetration issue, and the IEBC Chapter 5 and Chapter 8 retroactive provisions. Staff will provide that information to the committee for further review.

Ms. Hanshaw mentioned that the next step in the rule development process is the E-notification process and tomorrow staff will request that the Board make that motion to move the draft rules to the next step.

NEW BUSINESS

No items for consideration

ADJOURN

Mr. Stanbery made the motion to adjourn at 4:36 P.M. Mr. Samuelson seconded the motion. The motion passed unanimously.

File Attachments for Item:

P-1 Petition #23-02 - OBC Section 427 (Section 429 in 2024 OBC) Privacy Pods/Booths - Charles Moore of Framery Acoustics



CRITERIA FOR SUBMITTING RULE CHANGES TO THE BOARD OF BUILDING STANDARDS

The Ohio Board of Building Standards processes all petitions for changes to the rules of the Board of Building Standards (Building, Mechanical, Plumbing, Boiler, Elevator, or Residential Codes) pursuant to ORC Chapter 119.

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The application must include the following:

- (1) The date the application is prepared;
- (2) The rule number or section that is proposed for amendment, adoption, or annulment;
- (3) The rule numbers of all other rules that will be affected by the matter proposed;
- (4) The name, address, contact information, affiliation of the applicant, and of any representative;
- (5) The provisions that are proposed for adoption, amendment, or annulment;
- (6) The reason and technical justification for the proposed change;
- (7) All text to be eliminated shall be shown deleted by means of strikethrough, e.g., ~~matter to be eliminated~~;
- (8) All proposed new text to be inserted into a rule shall be shown as underlined, e.g., proposed new matter; and
- (9) One copy of the completed application and attachments.
- (10) An estimate of the increase or decrease in cost that would occur with the adoption of the proposed code change.

When the Secretary of the Board of Building Standards receives a completed application for an adoption, amendment, or annulment of rules of the Board, the Secretary will promptly deliver or mail a copy of the application to each member of the Board.

After receiving an application for the adoption, amendment, or annulment of rules of the Board, the Board of Building Standards shall proceed under sections 3781.101 and 3781.12 of the Revised Code.

APPLICATION

FOR
RULE CHANGE



BOARD OF BUILDING STANDARDS

6606 Tussing Road, P.O. Box 4009
Reynoldsburg, Ohio 43068-9009
(614) 644-2613
bbs@ohio.gov

www.com.state.oh.us/dico/bbs/default.aspx

Pursuant to section 3781.12 of the Revised Code and rules adopted by the Board of Building Standards, application is herewith submitted to adopt, amend, or annul a rule adopted by the Board pursuant to section 3718.10 of the Revised Code.

For BBS use:	
Petition #:	23-02
Date Recv'd:	March 14, 2023

Submitter: Charles H. Moore Framery Acoustics
(Contact Name) (Organization/Company)

Address: 44 W. Zane Ave.
(Include Room Number, Suite, etc.)

Salt Lake City UT 84103
(City) (State) (Zip)

Telephone Number: 801-386-2762 **Fax Number:** _____

Date: 3/13/2023 **E-mail Address:** charles.moore@framery.fi

Code Section: 427 (new section)

General Explanation of Proposed Change (attach additional sheets if necessary):

see attached sheet.

Explanation of Cost Impact of Proposed Code Change*: N/A, Not currently covered in Building Code
N/A, Not currently covered in Building Code
N/A, Not currently covered in Building Code

*Attach additional cost information as necessary to justify any statement of cost increase or cost decrease.

Information on Submittal (attach additional sheets if necessary):	
1. Sponsor:	Framery Acoustics, Inc. <small>Organization sponsoring or requesting the rule change (if any)</small>
2. Rule Title:	Section 427, Privacy Pods / Booths <small>Title of rule change</small>
3. Purpose/ Objective:	This proposal provides a means for building officials to approve these installations and allow the use of these prefabricated structures. This proposal treats Privacy Pod/booths, as products that can be installed in a building, and not as building construction, while not losing applicable code requirements. The proposal covers: Section 427.1 places limitations on the size of Privacy Pod/booths that are more appropriate for listed products. Privacy Pod/booths that exceed these size limitations will not fall under Section 427, and will be addressed with other building code requirements, including internal wirings, lighting, and other construction. Section 427.2 - The UL 962 listing covers the fabrication and safety of the modular room. UL 962 includes <small>Technical justification for the proposed rule change</small>
4. Formatted Rule Language (Using Strike-out for Deleted Text and Underline for Added Text)	<u>SECTION 427</u> <u>PRIVACY PODS / BOOTHS</u> <u>427.1 General.</u> <u>Definition:</u> <u>Privacy Pod/Booth: 100 square feet (9.3 m²) or less in floor area and 8ft (2438mm) or less in height.</u> <u>Privacy Pods exceeding these dimensions shall comply with all applicable requirements in this code.</u> <u>427.2 Listing.</u> <u>Privacy pod/booths shall be listed and labeled in accordance with UL 962 and installed in accordance with the listing and the manufacturer's instructions. Privacy pod/booths shall be marked with the following ratings:</u> <small>Use strike-out for deleted text and underline for added text</small>
5. Notes:	<ol style="list-style-type: none"> 1. To encourage uniformity among states using model codes, it is recommended that the submitter first submit any code change directly to ICC and participate in the national model code development process. 2. Please provide a copy of application and documentation. 3. Use a separate form for each code change proposal.

Ohio Building Code - Application for Rule Change
Charles H. Moore
Framery Acoustics
3/13/2023

Acoustic Privacy Pod/Booths are becoming more popular. These are a necessary addition to most open office environments. They provide a space for a person to take a phone call, video call, or a quiet space to concentrate on a given task or assignment.

This proposal provides a means for building officials to approve these installations and allow the use of these prefabricated structures. This proposal treats Privacy Pod/booths, as products that can be installed in a building, and not as building construction, while not losing applicable code requirements. The proposal covers: Section 427.1 places limitations on the size of Privacy Pod/booths that are more appropriate for listed products. Privacy Pod/booths that exceed these size limitations will not fall under Section 427, and will be addressed with other building code requirements, including internal wirings, lighting, and other construction. Section 427.2 - The UL 962 listing covers the fabrication and safety of the modular room. UL 962 includes requirements for insulation, finish materials, internal wiring, lighting, ventilation, and other construction features. Markings are to be provided on the listed products to document the Chapter 8 and 26 ratings, such as the ASTM E84 (UL 723) flame spread and smoke developed indexes. This makes it easy to determine their suitability for use in the specific areas of the building. Section 427.3 allows the building official to approve the installation locations, to make sure the means of egress is not compromised and other code requirements are not adversely impacted. Section 427.4 addresses potential tripping hazards, and is based on Section 3.1.3, Item D in ICC ES AC519, "Enclosed Booths for Installation Inside New and Existing Buildings".

2022 OHIO BUILDING CODE

Add new definition as follows:

Privacy Pod/Privacy Booth. An occupiable prefabricated structure, consisting of walls and a ceiling, with or without an integrated floor, designed and intended for use as an office or privacy space, which may include integral electrical wiring, ventilation, and furnishings

SECTION 427 **PRIVACY PODS / BOOTHS**

427.1 General.

Definition:

Privacy Pod/Booth: 100 square feet (9.3 m²) or less in floor area and 8ft (2438mm) or less in height.

Privacy Pods exceeding these dimensions shall comply with all applicable requirements in this code.

427.2 Listing.

Privacy pod/booths shall be listed and labeled in accordance with UL 962 and installed in accordance with the listing and the manufacturer's instructions.

427.3 Locations.

Privacy pod/booths shall only be installed in approved locations and shall not obstruct required means of egress.

427.4 Elevation change.

Privacy pod/booths with integral floors shall be permitted to have an elevation change measured from the finished floor that is a maximum of 5 inches (127 mm) higher than the floor of the existing structure outside the modular booth.

427.5 Fire suppression.

Sleep pods shall be installed in rooms or spaces equipped with an automatic sprinkler system in accordance with Section 903.3.1.1. Installation of booths must not interfere with clearances of existing sprinkler heads.

Exceptions:

1. Booth installations that meet the requirements of Section 9.2.10, NFPA 13, 2022 Edition and the following:

a. _____ Where multiple booths are proposed, the booths are separated by a distance of 18 inches from one another.

b. _____ The clearance between the top of the booth(s) and ceiling sprinklers is a minimum of 18 inches.

c. _____ Per Section 9.2.10.2 of NFPA 2022 Edition, the area of any booth does not exceed 24 square feet. The area is to be the interior area of the booth, excluding the area of the enclosing walls.

2. _____ Booth installations where the top of the booth has louvers that open automatically on the activation of the fire alarm or with the loss of power.

3. _____ Where the booth has an applicable testing report accompanied by full-scale fire testing report showing that ceiling sprinklers control a fire originating from inside the booth, as allowed by ICC-ES Acceptance Criteria 519 section 6.8 D.

429.5.1 Smoke detection.

An automatic smoke detection system complying with Section 907 shall be provided in the rooms or spaces in which the privacy pod/booth's are located. The system shall activate the occupant notification system in accordance with Section 907.5.

429.5.2 Smoke alarms.

Audibility requirements of NFPA 72 and IFC 907.5.2.1 apply to the privacy pod/booth's. If these requirements are not met, an alarm should be placed inside the pod.

G101-21

Proposed Change as Submitted

Proponents: Jonathan Roberts, representing UL LLC (jonathan.roberts@ul.com)

2021 International Building Code

Add new definition as follows:

MODULAR ROOM. An occupiable prefabricated structure, consisting of walls and a ceiling, with or without an integrated floor, designed and intended for use as an office or privacy space, which may include integral electrical wiring, ventilation, and furnishings.

SLEEP POD. A modular room that is designed and used for sleeping purposes.

Add new text as follows:

SECTION 429 **MODULAR ROOMS AND SLEEP PODS**

429.1 General.

Modular rooms and sleep pods shall comply with Sections 429.2 through 429.5.5 and other applicable requirements in the code. Modular rooms and sleep pods shall comply with one of the following:

1. Modular rooms 100 square feet (9.3 m²) or less in floor area and 8 feet (2438 mm) or less in height.
2. Sleep pods 36 square feet (3.3 m²) or less in floor area, 8 feet (2438 mm) or less in height and 4 feet (1219 mm) or less in width.

Modular rooms and sleep pods exceeding these dimensions shall comply with all applicable requirements in this code.

429.2 Listing.

Modular rooms and sleep pods shall be listed and labeled in accordance with UL 962 and installed in accordance with the listing and the manufacturer's instructions. Modular rooms and sleep pods shall be marked with the following ratings:

1. Wall and ceiling interior finish ratings as established in accordance with Chapter 8.
2. Plastic material ratings as established in accordance with Chapter 26.

429.3 Locations.

Modular rooms and sleep pods shall only be installed in approved locations and shall not obstruct required means of egress.

429.4 Elevation change.

Modular rooms and sleep pods with integral floors shall be permitted to have an elevation change measured from the finished floor that is a maximum of 5 inches (127 mm) higher than the floor of the existing structure outside the modular booth provided a sign is installed on each side of the door warning about the elevation change, and a distinctive marking stripe is installed across the threshold having a width of not less than 1 inch (25 mm) but not more than 2 inches (51 mm).

429.5 Sleep pods.

The installation of sleep pods shall comply with Sections 429.5.1 through 429.5.5.

429.5.1 Locations.

Where approved, sleep pods shall be permitted to be installed in all occupancies. Individual sleep pods exceeding the dimensions in Section 429.1 shall be treated as sleeping units and shall only be installed in locations in which sleeping units are allowed.

429.5.2 Multiple sleep pod installations.

The installation of more than one sleep pod in a room or space shall comply with the following:

1. The area in which sleep pods are installed shall not exceed 10 percent of the building area of the story in which they are located.
2. A maximum of four sleep pods can be located adjacent to each other, and each group of sleep pods shall be separated from other groups by a minimum of 10 feet (3048 mm).
3. Stacking of sleep pods shall only be done in accordance with the manufacturer's instructions and the listing.

Exception:

Installations exceeding these limitations shall be permitted based on an approved risk assessment of the installation.

429.5.3 Fire suppression.

Sleep pods shall be installed in rooms or spaces equipped with an automatic sprinkler system in accordance with Section 903.3.1.1.

429.5.4 Smoke detection.

An automatic smoke detection system complying with Section 907 shall be provided in the rooms or spaces in which sleep pods are located. The system shall activate the occupant notification system in accordance with Section 907.5.

429.5.5 Smoke alarms.

Smoke alarms shall be provided in sleep pods in accordance with Section 907.2.11. Where multiple sleep pods are located in the same room or space, the smoke alarms shall be interconnected in such a manner that the activation of one alarm will activate alarms in all of the sleep pods in the group that is installed in accordance with Section 429.5.2.

Reason: Modular rooms and sleep pods are becoming increasingly popular, and are showing up in a variety of different occupancies. This proposal provides a means for building officials to approve these installations and allow the use of these prefabricated structures.

This proposal treats modular rooms and sleep pods, such as those shown in the attached pictures, as products that can be installed in a building, and not as building construction, while not losing applicable code requirements. The proposal covers:

Section 429.1 places limitations on the size of modular rooms and sleep pods that are more appropriate for listed products. Modular rooms and sleep pods that exceed these size limitations will not fall under Section 429, and will be addressed with other building code requirements, including internal wirings, lighting, and other construction.

Section 429.2 - The UL 962 listing covers the fabrication and safety of the modular room. UL 962 includes requirements for insulation, finish materials, internal wiring, lighting, ventilation, and other construction features. Markings are to be provided on the listed products to document the Chapter 8 and 26 ratings, such as the ASTM E84 (UL 723) flame spread and smoke developed indexes. This makes it easy to determine their suitability for use in the specific areas of the building.

Section 429.3 allows the building official to approve the installation locations, to make sure the means of egress is not compromised and other code requirements are not adversely impacted.

Section 429.4 addresses potential tripping hazards, and is based on Section 3.1.3, Item D in ICC ES AC519, "Enclosed Booths for Installation Inside New and Existing Buildings".

Section 429.5 includes additional requirements that are applicable to sleep pods, a type of modular room that are showing up in occupancies such as airports and office buildings. The proposal provides protection for these products by requiring the room or space in which they are installed to be provided with fire suppression and fire detection, smoke alarms in the units, and addresses multiple sleep pod installations.

These come in a variety of forms. For some examples see these links:

- <https://www.sleepinginairports.net/blog/airport-sleeping-pods.htm>
- <https://www.aviationpros.com/airports/press-release/12339876/dubai-airports-airport-sleep-lounge-sleep-n-fly-opens-at-dxb>
- <https://www.flightcentre.com.au/travel-news/destinations/airport-sleeping-options>
- <https://www.pinterest.com/pin/340584790540317201/>
- <https://dickinsonstatenews.com/dickinson-state-is-making-life-a-little-easier-for-parents-of-young-children/>

Cost Impact: The code change proposal will increase the cost of construction
The cost of these construction will increase since these products are not currently regulated.

G101-21

Public Hearing Results

This proposal includes the following errata

Chapter 35:

UL 962 -2014 Includes all amendments and changes through Revision Page(s) , January 12, 2021 - UL Standard for Safety Household and Commercial Furnishings

Review of the standard is as follows:

Appears to be written in enforceable language. Does not appear to require proprietary materials or agencies. Promulgation by a consensus process

stated in preface

Committee Action:

Disapproved

Committee Reason: This proposal was disapproved. The referenced standard, UL962, was not provided to the committee. What is required for risk assessment? It is not clear if modular rooms and sleep pods were considered rooms or furniture. The 5 inch step up permitted is an issue for accessibility requirements. If the sleep pods are stacked, there is an egress issue that is not currently addressed. There was concern that these would be permitted in all occupancies. Criteria is needed for what would be an approved location. The installation limits in Section 429.5.2 is unclear and does not address modular rooms, only sleep pods. There is a concern about seismic anchorage if the sleep pods are stacked. There is a concern about fire alarm notification in the enclosed sleep pods and modular rooms. Do these need to be sprinklered? (Vote: 13-0)

G101-21

Individual Consideration Agenda

Public Comment 1:

IBC: 429.1, 429.4, 429.5, 429.5.1, 429.5.2, 429.5.3, 429.5.4, 429.5.5, [F] 903.3.3 (IFC: 903.3.3), UL Chapter 35

Proponents: Jonathan Roberts, representing UL LLC (jonathan.roberts@ul.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

MODULAR ROOM . An occupiable prefabricated structure , consisting of walls and a ceiling, with or without an integrated floor. It is typically intended for use as an indoor privacy space, and may include integral electrical wiring, ventilation, and furnishings.

SLEEP POD . A modular room that is designed and used for sleeping purposes.

SECTION 429 MODULAR ROOMS AND SLEEP PODS

429.1 General . Modular rooms and sleep pods installed in indoor locations shall comply with Sections 429.2 through ~~429.5~~ ~~429.5.5~~ and other applicable requirements in the code. Modular rooms and sleep pods shall ~~comply with one of the following:~~ not exceed the following dimensions:

1. Modular rooms 100 square feet (9.3 m²) or less in floor area and 8 feet (2438 mm) or less in height.
2. Sleep pods 36 square feet (3.3 m²) or less in floor area, 8 feet (2438 mm) or less in height and 4 feet (1219 mm) or less in width.

~~Modular rooms and sleep pods exceeding these dimensions shall comply with all applicable requirements in this code.~~

Exceptions:

1. Precast concrete construction in accordance with Chapter 17 and Chapter 19 shall not be required to comply with this section.
2. Modular rooms constructed under an off-site or modular construction program approved by the Building Official shall not be required to comply with this section.

429.2 Listing . Modular rooms and sleep pods shall be listed and labeled in accordance with UL 962 and installed in accordance with the listing and the manufacturer's instructions. Modular rooms and sleep pods shall be marked with the following ratings:

1. Wall and ceiling interior finish ratings as established in accordance with Chapter 8.
2. Plastic material ratings as established in accordance with Chapter 26.

429.3 Locations . Modular rooms and sleep pods shall only be installed in approved locations and shall not obstruct required means of egress.

~~**429.4 Elevation change .** Modular rooms and sleep pods with integral floors shall be permitted to have an elevation change measured from the finished floor that is a maximum of 5 inches (127 mm) higher than the floor of the existing structure outside the modular booth provided a sign is installed on each side of the door warning about the elevation change, and a distinctive marking stripe is installed across the threshold having a width of not less than 1 inch (25 mm) but not more than 2 inches (51 mm).~~

~~**429.5 Sleep pods .** The installation of sleep pods shall comply with Sections 429.5.1 through 429.5.5.~~

~~429.5.1 Locations . Where approved, sleep pods shall be permitted to be installed in all occupancies. Individual sleep pods exceeding the dimensions in Section 429.1 shall be treated as sleeping units and shall only be installed in locations in which sleeping units are allowed.~~

~~429.5.2 Multiple sleep pod installations . The installation of more than one sleep pod in a room or space shall comply with the following:~~

- ~~1. The area in which sleep pods are installed shall not exceed 10 percent of the building area of the story in which they are located.~~
- ~~2. A maximum of four sleep pods can be located adjacent to each other, and each group of sleep pods shall be separated from other groups by a minimum of 10 feet (3048 mm).~~
- ~~3. Stacking of sleep pods shall only be done in accordance with the manufacturer's instructions and the listing.~~

Exception:-

~~Installations exceeding these limitations shall be permitted based on an approved risk assessment of the installation.~~

~~429.5.3 Fire suppression . Sleep pods shall be installed in rooms or spaces equipped with an automatic sprinkler system in accordance with Section 903.3.1.1.~~

~~429.5.4 Smoke detection . An automatic smoke detection system complying with Section 907 shall be provided in the rooms or spaces in which sleep pods are located. The system shall activate the occupant notification system in accordance with Section 907.5.~~

~~429.4 Fire alarm notification . Where modular rooms or sleep pods are provided in areas with occupant notification systems, the required audible and visible signal shall be extended into the interior of these units in accordance with Section 907.5.~~

~~429.5 429.5.5 Smoke alarms . Smoke alarms shall be provided in sleep pods in accordance with Section 907.2.11. Where multiple sleep pods are located in the same room or space, the smoke alarms shall be interconnected in such a manner that the activation of one alarm will activate alarms in all of the sleep pods in the room or space group that is installed in accordance with Section 429.5.2.~~

Exception: Smoke alarms are not required where smoke detection systems complying with Section 907.4 provide alarm notification in the sleep pods.

[F] 903.3.3 Obstructed locations . Automatic sprinklers shall be installed with regard to obstructions that will delay activation or obstruct the water distribution pattern and shall be in accordance with the applicable automatic sprinkler system standard that is being used. Automatic sprinklers shall be installed in or under covered kiosks, displays, booths, concession stands, modular rooms, sleep pods, or equipment that exceeds 4 feet (1219 mm) in width. Not less than a 3-foot (914 mm) clearance shall be maintained between automatic sprinklers and the top of piles of combustible fibers.

Exception: Kitchen equipment under exhaust hoods protected with a fire-extinguishing system in accordance with Section 904.

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062

UL 962 - 2014

Household and Commercial Furnishings - with Revisions through 2020

Commenter's Reason: At the committee action hearings there was strong support for the concept of covering modular rooms and sleep pods, but concerns with how the original proposal was crafted. This public comment addressed the major concerns raised including the following:

1. Clarified that the requirements do not cover precast concrete construction in accordance with Chapter 17 and Chapter 19, including units used in detention facilities.
2. Clarified that the requirements do not cover off-site or modular construction where the program is approved by the Building Official.
3. Deleted the confusing reference to elevation change for door sills.
4. Deleted criteria for the percentage of floor area that can be devoted for sleep pod installation.
5. Removed occupancy criteria for acceptable sleep pod installation. The 429.3 criteria allows the building official to evaluate and approve the intended locations.
6. Removed the criteria for sleep pods to only be provided in rooms containing automatic sprinklers.
7. Removed unnecessary criteria related to the maximum number and stacking of sleep pods. Existing Code requirements address these concerns.
8. Clarified that where alarm notification is provided in the room or area in which the units are installed, that it shall extend into the privacy room and sleep pod, since the sound insulation in these units would typically obstruct the notification.
9. Added references to modular rooms and sleep pods to the Section 903.3.3 obstructed location section.
10. Added the referenced standard that was provided to the committee, UL 962, into Chapter 35.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction. Since modular rooms and sleep pods are not currently covered by the Code the public comment could increase the cost to install these products in a building.

File Attachments for Item:

P-2 Petition #23-03 - OBC Ch 19 & 35 Add ACI 440.11 for structural concrete - Kerry Sutton of American Concrete Institute



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- (4) The name, address, contact information, affiliation of the applicant, and of any representative;
- (5) The provisions that are proposed for adoption, amendment, or annulment;
- (6) The reason and technical justification for the proposed change;
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When the Secretary of the Board of Building Standards receives a completed application for an adoption, amendment, or annulment of rules of the Board, the Secretary will promptly deliver or mail a copy of the application to each member of the Board.

After receiving an application for the adoption, amendment, or annulment of rules of the Board, the Board of Building Standards shall proceed under sections 3781.101 and 3781.12 of the Revised Code.

APPLICATION

FOR
RULE CHANGE



BOARD OF BUILDING STANDARDS

6606 Tussing Road, P.O. Box 4009
Reynoldsburg, Ohio 43068-9009
(614) 644-2613
bbs@ohio.gov

www.com.state.oh.us/dico/bbs/default.aspx

Pursuant to section 3781.12 of the Revised Code and rules adopted by the Board of Building Standards, application is herewith submitted to adopt, amend, or annul a rule adopted by the Board pursuant to section 3718.10 of the Revised Code.

For BBS use:	
Petition #:	# 23-03
Date Recv'd:	March 21, 2023

Submitter:	<u>Kerry Sutton, PE</u>	<u>American Concrete Institute</u>
	<small>(Contact Name)</small>	<small>(Organization/Company)</small>
Address:	<u>38800 Country Club Drive</u>	
	<small>(Include Room Number, Suite, etc.)</small>	
	<u>Farmington Hills</u>	<u>Michigan 48331</u>
	<small>(City)</small>	<small>(State)</small> <small>(Zip)</small>
Telephone Number:	<u>734-673-2195</u>	Fax Number: <u>248-848-3161</u>
Date:	<u>03-15-2023</u>	E-mail Address: <u>kerry.sutton@concrete.org</u>

Code Section: New Section to amend the 2021 IBC: 1901.2.1 Structural concrete with GFRP reinforcement.

General Explanation of Proposed Change (attach additional sheets if necessary):

See attached Background and rationale.

Explanation of Cost Impact of Proposed Code Change*: The proposal will not increase or decrease the cost of construction.

The proposal will not increase or decrease the cost of construction.
The proposal will not increase or decrease the cost of construction.

*Attach additional cost information as necessary to justify any statement of cost increase or cost decrease.

ATTACHMENT

2021 IBC Option for ACI 440.11

Chapter 19 – Concrete

Section – 1901 General

1901.2 Plain and reinforced concrete. Structural concrete shall be designed and constructed in accordance with the requirements of this chapter and ACI 318 as amended in Section 1905 of this code. Except for the provisions of Sections 1904 and 1907, the design and construction of slabs on grade shall not be governed by this chapter unless they transmit vertical *loads* or lateral forces from other parts of the structure to the soil.

Add new text as follows:

1901.2.1 Structural concrete with GFRP reinforcement. *Cast-in-place structural concrete internally reinforced with glass fiber reinforced polymer (GFRP) reinforcement conforming to ASTM D7957 and designed in accordance with ACI CODE 440.11 shall be permitted where fire resistance ratings are not required and only for structures assigned to Seismic Design Category A.*

Add new standard(s) as follows:

ACI		American Concrete Institute 38800 Country Club Drive Farmington Hills, MI 48331
Standard reference number	Title	Referenced in code section number
<u>440.11-22</u>	<u>ACI CODE-440.11-22: Structural Concrete Buildings Reinforced Internally with Glass Fiber Reinforced Polymer (GFRP) Bars – Code Requirements</u>	<u>1901.2.1</u>

ASTM		ASTM International 100 Barr Harbor Drive, PO Box C700 West Conshohocken, PA 19428
Standard reference number	Title	Referenced in code section number
<u>D7957/D7957M-17 Reinforcement</u>	<u>Standard Specification for Solid Round Glass Fiber Reinforced Polymer Bars for Concrete</u>	<u>1901.2.1</u>

Background and rationale - This proposal adds a new referenced standard: ACI CODE 440.11-22: Structural Concrete Buildings Reinforced Internally with Glass Fiber Reinforced Polymer (GFRP) Bars – Code Requirements. The addition of this new standard allows the design and construction of cast-in-place reinforced concrete using non-metallic reinforcement bars. While the design and construct requirements contained in the standard are limited to use in structures assigned to Seismic Design Category A and structural elements not part of seismic force-resisting systems in SDC B and C, for simplicity this proposal limits the use to structures assigned to SDC A. ACI Committee 440 developed this standard to provide for public health and safety by establishing minimum requirements for strength, stability, serviceability, durability, and integrity of GFRP reinforced concrete structures.

The standard not only provides a means of establishing minimum requirements for the design and construction of GFRP reinforced concrete, but for acceptance of design and construction of GFRP reinforced concrete structures by the building officials or their designated representatives.

Due to the performance of other types of FRP reinforcement and the lack of research and testing of other types, the standard only applies to reinforced concrete structures designed and constructed with GFRP manufactured in accordance with ASTM D7957 Standard Specification for Solid Round Glass Fiber Reinforced Polymer Bars for Concrete

GFRP reinforced concrete is especially beneficial for satisfying a demand for improved resistance to corrosion in highly corrosive environments, such as reinforced concrete exposed to water and de-icing salts.

This standard establishes minimum requirements for GFRP reinforced concrete in a similar fashion as ACI CODE 318 Building Code Requirements for Structural Concrete establishes minimum requirements for structural concrete reinforced with steel reinforcement. A separate standard is needed, as GFRP reinforcement behaves differently than steel reinforcement. Results of the ICC Online Governmental Consensus Voting show approval of the inclusion of ACI CODE 440.11 in the 2024 International Building Code.

Currently GFRP is accepted for use to reinforce highway bridge decks. Acceptance is primarily in areas where deicing salts are used on the roads and cause severe corrosion to conventional steel reinforcement. This proposed change provides minimum requirements for other applications where GFRP reinforced concrete is being considered, such as parking garages, water tanks, marine structures and structures supporting MRI machines. Design reasons to use GFRP bars in structures are: resistance to corrosion in the presence of chloride ions, lack of interference with electromagnetic fields, and low thermal conductivity. The use of GFRP reinforcement is accepted by the State of Ohio Department of Transportation and its use is specified in the January 1, 2023 online version of the **ODOT Construction and Materials Specification**.

Cost Impact: The code change proposal will not increase or decrease the cost of construction. This proposal adds alternative materials for the design and construction of reinforced structural concrete in Seismic Design Category A and does not preclude the use of conventional reinforced concrete. Thus, there is no cost impact.

S174-22

IBC: 1901.2, 1901.2.1 (New), ACI Chapter 35 (New), ASTM Chapter 35 (New)

Proposed Change as Submitted

Proponents: Stephen Szoke, representing American Concrete Institute (steve.szoke@concrete.org); Jerzy Zemajtis, representing NEx, An ACI Center of Excellence for Nonmetallic Building Materials (jerzy.zemajtis@nonmetallic.org); John Busel, representing American Composites Manufacturers Association (jbusel@acmanet.org); Scott Campbell, representing NRMCA (scampbell@nrmca.org); Doug Gremel, representing Owens Corning Infrastructure Solutions (douglas.gremel@owenscorning.com); Carl Larosche, representing ACI (clarosche@wje.com); William O'Donnell, representing DeSimone Consulting Engineers (william.odonnell@de-simone.com); Matthew D'Ambrosia, representing MJ2 Consulting (matt@mj2consulting.com); Keith Kesner, representing CVM (kkesner3006@gmail.com); antonio de luca, representing Thornton Tomasetti

2021 International Building Code

1901.2 Plain and reinforced concrete. Structural concrete shall be designed and constructed in accordance with the requirements of this chapter and ACI 318 as amended in Section 1905 of this code. Except for the provisions of Sections 1904 and 1907, the design and construction of slabs on grade shall not be governed by this chapter unless they transmit vertical loads or lateral forces from other parts of the structure to the soil.

Add new text as follows:

1901.2.1 Structural concrete with GFRP reinforcement. Cast-in-place structural concrete internally reinforced with glass fiber reinforced polymer (GFRP) reinforcement conforming to ASTM D7957 and designed in accordance with ACI CODE 440 shall be permitted only for structures assigned to Seismic Design Category A.

Add new standard(s) as follows:

ACI

American Concrete Institute
38800 Country Club Drive
Farmington Hills, MI 48331-3439

CODE 440-22

Structural Concrete Buildings Reinforced Internally with Fiber Reinforced Polymer (FRP) Bars – Code Requirements

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

D7957/D7957M-17

Standard Specification for Solid Round Glass Fiber Reinforced Polymer Bars for Concrete Reinforcement

Reason: This proposal adds a new referenced standard: ACI CODE 440-22: Structural Concrete Buildings Reinforced Internally with Fiber Reinforced Polymer (FRP) Bars – Code Requirements.

The addition of this new standard allows the design and construction of cast-in-place reinforced concrete using non-metallic reinforcement bars. Currently the design and construct requirements contained in the standard are limited to use in Seismic Design Category A. ACI Committee 440 developed this standard to provide for public health and safety by establishing minimum requirements for strength, stability, serviceability, durability, and integrity of GFRP reinforced concrete structures.

The standard not only provides a means of establishing minimum requirements for the design and construction of GFRP reinforced concrete, but for acceptance of design and construction of GFRP reinforced concrete structures by the building officials or their designated representatives.

The standard applies to GFRP reinforced concrete structures designed and constructed under the requirements of the general building code.

GFRP reinforced concrete is especially beneficial for satisfying a demand for improved resistance to corrosion in highly corrosive environments, such as reinforced concrete exposed to salt water, salt air, or de-icing salts.

This standard establishes minimum requirements for GFRP reinforced concrete in a similar fashion as ACI 318 Building Code Requirements for Structural Concrete establishes minimum requirements for structural concrete reinforced with steel reinforcement. A separate standard is needed, as GFRP reinforcement behaves differently than steel reinforcement.

Currently GFRP is accepted for use to reinforce highway bridge decks. Acceptance is primarily in areas where deicing salts are used on the roads and cause severe corrosion to conventional steel reinforcement. This proposed change provides minimum requirements for other applications where GFRP reinforced concrete is being considered, such as marine and coastal structures, parking garages, water tanks, and structures supporting MRI machines. Design reasons to use GFRP bars in structures are: resistance to corrosion in the presence of chloride ions, lack of interference with electromagnetic fields, and low thermal conductivity.

Currently the standard prohibits the use concrete internally reinforced with GFRP for applications where fire resistance ratings are required. Chapter 6 of the International Building code cites applications for floors, roofs, walls, partitions and primary and secondary structural frames where a fire resistance ratings are not required.

The code requirements may be viewed at: <https://www.concrete.org/publications/standards/upcomingstandards.aspx>

Cost Impact: The code change proposal will not increase or decrease the cost of construction. This proposal adds alternative materials for the design and construction of reinforced structural concrete in Seismic Design Category A and does not preclude the use of conventional reinforced concrete. Thus there is no cost impact.

Staff Analysis: A review of the standard proposed for inclusion in the code, ACI CODE 440-22 Structural Concrete Buildings Reinforced Internally with Fiber Reinforced Polymer (FRP) Bars – Code Requirements, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

A review of the standard proposed for inclusion in the code, ASTM D7957/D7957M-17 Standard Specification for Solid Round Glass Fiber Reinforced Polymer Bars for Concrete Reinforcement, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

S174-22

Public Hearing Results

Committee Action:

Disapproved

Committee Reason: Disapproved as the proposed new standard, ACI Code 440-22, is not complete and was submitted in draft format only. The committee commented that testimony indicated the final version of the standard, ACI Code 440-22, may have substantive changes related to fire resistance of FRP. (Vote: 14-0)

S174-22

Individual Consideration Agenda

Public Comment 1:

IBC: 1901.2.1, ACI Chapter 35

Proponents: Stephen Szoke, representing American Concrete Institute (steve.szoke@concrete.org); John Busel, representing American Composites Manufacturers Association (jbusel@acmanet.org); Doug Gremel, representing Owens Corning Infrastructure Solutions (douglas.gremel@owenscorning.com); Keith Kesner, representing CVM (kkesner3006@gmail.com); Antonio Nanni, representing University of Miami (nanni@miami.edu); William O'Donnell, representing DeSimone Consulting Engineers (william.odonnell@de-simone.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1901.2.1 Structural concrete with GFRP reinforcement. Cast-in-place structural concrete internally reinforced with glass fiber reinforced polymer (GFRP) reinforcement conforming to ASTM D7957 and designed in accordance with ACI CODE 440.11 shall be permitted where fire resistance ratings are not required and only for structures assigned to Seismic Design Category A.

ACI

American Concrete Institute
38800 Country Club Drive
Farmington Hills, MI 48331-3439

CODE 440.11-22

Structural Concrete Buildings Reinforced Internally with Fiber Reinforced Polymer (FRP) Bars – Code Requirements

Commenter's Reason: The committee voted for disapproval for two reasons: 1) the ACI CODE 440.11 Structural Concrete Buildings Reinforced Internally with Fiber Reinforced Polymer (FRP) Bars - Code Requirements was in public review draft and 2) there was concern about application where fire resistance ratings are required. ACI CODE 440.11-22 has been completed and the revised designation is reflected in this public comment. Further, this public comment adds clear language precluding design of structural concrete in accordance with ACI CODE 440.11 where

fire resistance ratings are required. This public comment addresses both concerns expressed by the committee. There are many applications where the use of GFRP reinforcement in concrete can enhance durability and long term life safety.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. This proposal as modified with public comment provides an additional option for the design and construction of reinforced structural concrete.

Staff Analysis: In accordance with Section 3.6.3.1.1 of ICC Council Policy 28, the new referenced standard ACI Code 440-22, must be completed and readily available prior to the Public Comment Hearing in order for this public comment to be considered.

Public Comment# 3212

File Attachments for Item:

P-3 Petition #23-05 - OBC Ch 13 Add ACI/TMS 122.1 to IECC & ASHRAE 90.1 for thermal bridging - Kerry Sutton of American Concrete Institute



CRITERIA FOR SUBMITTING RULE CHANGES TO THE BOARD OF BUILDING STANDARDS

The Ohio Board of Building Standards processes all petitions for changes to the rules of the Board of Building Standards (Building, Mechanical, Plumbing, Boiler, Elevator, or Residential Codes) pursuant to ORC Chapter 119.

When anyone desires to petition the Board of Building Standards to adopt, amend, or annul a provision of rules of the Board, they must complete an application and provide supporting information submitted to the Secretary of the Board of Building Standards.

The application must include the following:

- (1) The date the application is prepared;
- (2) The rule number or section that is proposed for amendment, adoption, or annulment;
- (3) The rule numbers of all other rules that will be affected by the matter proposed;
- (4) The name, address, contact information, affiliation of the applicant, and of any representative;
- (5) The provisions that are proposed for adoption, amendment, or annulment;
- (6) The reason and technical justification for the proposed change;
- (7) All text to be eliminated shall be shown deleted by means of strikethrough, e.g., ~~matter to be eliminated~~;
- (8) All proposed new text to be inserted into a rule shall be shown as underlined, e.g., proposed new matter; and
- (9) One copy of the completed application and attachments.
- (10) An estimate of the increase or decrease in cost that would occur with the adoption of the proposed code change.

When the Secretary of the Board of Building Standards receives a completed application for an adoption, amendment, or annulment of rules of the Board, the Secretary will promptly deliver or mail a copy of the application to each member of the Board.

After receiving an application for the adoption, amendment, or annulment of rules of the Board, the Board of Building Standards shall proceed under sections 3781.101 and 3781.12 of the Revised Code.

APPLICATION FOR RULE CHANGE

BOARD OF BUILDING STANDARDS



6606 Tussing Road, P.O. Box 4009
 Reynoldsburg, Ohio 43068-9009
 (614) 644-2613
 bbs@ohio.gov

www.com.state.oh.us/dico/bbs/default.aspx

Pursuant to section 3781.12 of the Revised Code and rules adopted by the Board of Building Standards, application is herewith submitted to adopt, amend, or annul a rule adopted by the Board pursuant to section 3718.10 of the Revised Code.

For BBS use:	
Petition #:	23-05
Date Recv'd:	03/28/2023

Submitter: Kerry Sutton, PE American Concrete Institute
(Contact Name) (Organization/Company)

Address: 38800 Country Club Drive
(Include Room Number, Suite, etc.)

Farmington Hills MI 48331
(City) (State) (Zip)

Telephone Number: 734-673-2195 **Fax Number:** 248-848-3161

Date: 03-28-2023 **E-mail Address:** Kerry.Sutton@concrete.org

Code Section: 2021 IECC Section C402 Building Envelope Requirements (pg. C4-1) and ASHRAE 90.1 -2019

General Explanation of Proposed Change (attach additional sheets if necessary):
Please see attached explanation.

Explanation of Cost Impact of Proposed Code Change*: Use of this code will incur additional expenses in commercial building design and construction but will help mitigate thermal bridges.

Use of this code will incur additional expenses in commercial building design and construction but will help mitigate thermal bridges.

Use of this code will incur additional expenses in commercial building design and construction but will help mitigate thermal bridges.

*Attach additional cost information as necessary to justify any statement of cost increase or cost decrease.

ATTACHMENT

2021 IECC Option for ACI-TMS 122.1

CHAPTER 4 [CE] COMMERCIAL ENERGY EFFICIENCY

SECTION C402

BUILDING ENVELOPE REQUIREMENTS

Section C402.1 Add Item 5 to Section 402.1 as follows:

C402.1 General. *Building thermal envelope* assemblies for buildings that are intended to comply with the code on a prescriptive basis in accordance with the compliance path described in Item 1 of Section C401.2.1 shall comply with the following:

1. The opaque portions of the *building thermal envelope* shall comply with the specific insulation requirements of Section C402.2 and the thermal requirements of either *R*-value-based method of Section C402.1.3; the *U*-, *C*- and *F*- factor-based method of Section C402.1.4; or the component performance alternative of Section C402.1.5.
2. Roof solar reflectance and thermal emittance shall comply with Section C402.3.
3. Fenestration in building envelope assemblies shall comply with Section C402.4.
4. Air leaking of building envelope assemblies shall comply with Section C402.5.
5. Compliance with ACI/TMS 122.1 shall be permitted for mitigating the effects of thermal bridges in concrete or masonry buildings.

Alternatively, where buildings have a vertical fenestration area or skylight area exceeding that allowed in Section C402.4, the building and building thermal envelope shall comply with Item 2 of Section C401.1 or Section C403.11.

Walk-in coolers, walk-in freezers, refrigerated warehouse coolers and refrigerated warehouse freezers shall comply with Section C403.11.

Option for ACI-TMS 122.1 Thermal Bridging Amendment

AHSRAE 90.1-2019

Energy Standard for Buildings Except Low-rise Residential Buildings

Section 5.4 Add Section 5.4.1.1 as follows:

5.4 Mandatory Provisions

5.4.1 Insulation

Where insulation is required in section 5.5 or Section 5.6, it shall comply with the requirements found in section 5.8.1

5.4.1.1

Compliance with ACI/TMS 122.1 shall be permitted for mitigating the effects of thermal bridges in concrete or masonry assemblies.

Add new referenced standard to Chapter 6 [CE] of IECC and Section 5 of ASHRAE 90.1 as follows:

American Concrete Institute 38800 Country Club Drive Farmington Hills, MI 48331		
The Masonry Society 105 South Sunset Street, Suite Q Longmont, CO 80501		
<h1>ACI/TMS</h1>		
Standard reference number	Title	Referenced in code section number
<u>ACI-TMS Code 122.1-21</u>	<i><u>Thermal Bridge Mitigation for Buildings having Concrete and Masonry Walls and Masonry Veneer – Code Requirements and Commentary</u></i>	<u>C402.1</u>

Reason: This proposal to the IECC and ASHRAE 90.1 brings the ACI-TMS 122.1 code on thermal bridge mitigation requirements into the IECC and ASHRAE 90.1 as an alternate path. It includes requirements at slab edges, for parapets, and for shelf angles.

ACI-TMS CODE 122.1-21 is a code written by a joint committee of the American Concrete Institute and The Masonry Society. It is written using ACI's consensus process including a public comment period and numerous committee ballots at each stage of the process. ACI is an American National Standards Institute standards development organization. ACI and TMS are not trade associations, but professional societies. The professionals serving on ACI/TMS committees identified the need to have minimum requirements to mitigate thermal bridges that are unique to thermal mass construction and are easy to understand. The new standard reflects the professional leadership in advancing technology related to the thermal performance of concrete and masonry buildings by mitigating heat transfer through balconies, shelf angles, parapets, and other thermal anomalies penetrating insulation layers in the building envelope.

Benefits – This standard provides constructable options that are easy to understand and implement. The 2021 IECC or ASHRAE 90.1-2019 currently does not specifically address thermal bridge mitigation options for buildings having concrete or masonry walls or masonry veneer. The use of this standard provides the most benefit to those jurisdictions located in climate zones 5 through 7. Since the State of Ohio encompasses climate zone 5, adoption by reference of ACI-TMS CODE 122.1 would be beneficial in saving energy in commercial buildings across the State.

Additional benefits are:

- Assist the State of Ohio and its local jurisdictions in reaching goals for improved commercial building energy efficiency.
- Provide designers with a methodology for addressing thermal bridge mitigation for buildings having concrete and masonry veneer.
- Provides building code officials with a means to evaluate designs.

Financial Impact – Use of the code will incur additional expenses in commercial building design and construction but will help mitigate thermal bridges. More energy efficient commercial buildings will ultimately reduce energy costs, decrease greenhouse gas emission and reliance on fossil fuels, and manage energy demand.

CED1-93-22

Proponents: Martha VanGeem, representing Masonry Alliance for Codes and Standards (martha.vangeem@gmail.com); Cortney Fried, representing Brick Industry Association (cfried@bia.org); Scott Campbell, representing NRMCA (scampbell@nrmca.org); Stephen Szoke, representing American Concrete Institute (steve.szoke@concrete.org); Nicholas Lang, representing Masonry Alliance for Codes & Standards (nlang@ncma.org)

2024 International Energy Conservation Code [CE Project]

Revise as follows:

C103.2 Information on construction documents. Construction documents shall be drawn to scale on suitable material. Electronic media documents are permitted to be submitted where *approved* by the *code official*. Construction documents shall be of sufficient clarity to indicate the location, nature and extent of the work proposed, and show in sufficient detail pertinent data and features of the building, systems and equipment as herein governed. Details shall include, but are not limited to, the following as applicable:

1. Energy compliance path.
2. Insulation materials and their *R*-values.
3. Fenestration *U*-factors and solar heat gain coefficients (SHGCs).
4. Area-weighted *U*-factor and solar heat gain coefficient (SHGC) calculations.
5. Mechanical system design criteria.
6. Mechanical and service water-heating systems and equipment types, sizes and efficiencies.
7. Economizer description.
8. Equipment and system controls.
9. Fan motor horsepower (hp) and controls.
10. Duct sealing, duct and pipe insulation and location.
11. Lighting fixture schedule with wattage and control narrative.
12. Location of *daylight* zones on floor plans.
13. Air barrier and air sealing details, including the location of the air barrier.
14. Location of pathways for routing of raceways or cable from the on-site renewable energy system to the electrical distribution equipment.
- ~~15.~~ ~~Thermal bridges as identified in Section C402.6.~~
- ~~16.~~ ~~15.~~ Location reserved for inverters, metering equipment, ESS, and a pathway reserved for routing of raceways or conduit from the renewable energy system to the point of interconnection with the electrical service and the ESS.
- ~~17.~~ ~~16.~~ Location and layout of a designated area for ESS.
- ~~18.~~ ~~17.~~ Rated energy capacity and rated power capacity of the installed or planned ESS.

~~**GHI FACTOR (χ -FACTOR).** The heat loss factor for a single thermal bridge characterized as a point element of a building thermal envelope (Btu/h \times °F)(W/K).~~

~~**PSI FACTOR (ψ -FACTOR).** The heat loss factor per unit length of a thermal bridge characterized as a linear element of a building thermal envelope (Btu/h \times ft \times °F)(W/(m \times K)).~~

C402.1 General. *Building thermal envelope* assemblies for buildings that are intended to comply with the code on a prescriptive basis in accordance with the compliance path described in Item 1 of Section C401.2.1 shall comply with the following:

1. The opaque portions of the *building thermal envelope* shall comply with the specific insulation requirements of Section C402.2 and the thermal requirements of either the *U*-, *C*- and *F*-factor based method of Section C402.1.2; the *R*-value based method of C402.1.3; or the component performance alternative of Section C402.1.4. Where the total area of the through-wall penetrations of mechanical equipment is greater than 1 percent of the opaque above-grade wall area, the building thermal envelope shall comply with Section C402.1.2.4.
2. Wall solar reflectance and thermal emittance shall comply with Section C402.3.
3. Roof solar reflectance and thermal emittance shall comply with Section C402.4.
4. Fenestration in building envelope assemblies shall comply with Section C402.5.
5. Air leakage of the building thermal envelope shall comply with C402.6.
6. Walk-in coolers, walk-in freezers, refrigerated warehouse coolers and refrigerated warehouse freezers shall comply with Section C403.12.

7. Thermal bridges in above-grade walls shall comply with Section C402.7.

Alternatively, where buildings have a vertical fenestration area or skylight area exceeding that allowed in Section C402.5, the building and building thermal envelope shall comply with Item 2 of Section C401.2.1 or Section C401.2.2.

C402.1.4 Component performance alternative. Building envelope values and fenestration areas determined in accordance with Equation 4-1 shall be an alternative to compliance with the U -, F -, ψ -, χ -, and C -factors in Tables C402.1.2, C402.1.5, and C402.5 and the maximum allowable fenestration areas in Section C402.5.1. Fenestration shall meet the applicable SHGC requirements of Section C402.5.3.

$$A_P + B_P + C_P + T_P \leq A_T + B_T + C_T + T_T - V_F - V_S$$

A_P = Sum of the (area x U-factor) for each proposed building thermal envelope assembly, other than slab-on-grade or below-grade wall assemblies (Equation 4-1)

B_P = Sum of the (length x F-factor) for each proposed slab-on-grade edge condition

C_P = Sum of the (area x C-factor) for each proposed below-grade wall assembly

T_P = Sum of the (ψL_P) and (χN_P) values for each type of thermal bridge condition of the building thermal envelope as identified in Section G402.6 in the proposed building. For the purposes of this section, the (ψL_P) and (χN_P) values for thermal bridges caused by materials with a thermal conductivity less than or equal to 0.0 Btu-in/h-ft²-F shall be assigned as zero. For buildings or structures located in Climate Zones 0 through 3, the value of T_P shall be assigned as zero.

ψL_P = psi factor x length of the thermal bridge elements in the proposed building thermal envelope.

χN_P = chi factor x number of the thermal bridge point elements other than fasteners, ties, or brackets in the proposed building thermal envelope.

A_T = Sum of the (area x U-factor permitted by Tables C402.1.2 and C402.5) for each proposed building thermal envelope assembly, other than slab-on-grade or below-grade wall assemblies

B_T = Sum of the (length x F-factor permitted by Table C402.1.2) for each proposed slab-on-grade edge condition

C_T = Sum of the (area x C-factor permitted by Table C402.1.2) for each proposed below-grade wall assembly

T_T = Sum of the (ψL_T) and (χN_T) values for each type of thermal bridge condition in the proposed building thermal envelope as identified in Section G402.6 with values specified as "compliant" in Table G402.1.4. For the purposes of this section, the (ψL_T) and (χN_T) values for thermal bridges caused by materials with a thermal conductivity less than or equal to 0.0 Btu-in/h-ft²-F shall be assigned as zero. For buildings or structures located in Climate Zones 0 through 3, the value of T_T shall be assigned as zero.

ψL_T = (psi factor specified as "compliant" in Table G402.1.5) x length of the thermal bridge elements in the proposed building thermal envelope.

χN_T = (chi factor specified as "compliant" in Table G402.1.5) x number of the thermal bridge point elements other than fasteners, ties, or brackets in the proposed building thermal envelope.

P_F = Maximum vertical fenestration area allowable by Section C402.5.1, C402.5.1.1, or C402.5.1.2

Q_F = Proposed vertical fenestration area

R_F = $Q_F - P_F$, but not less than zero (excess vertical fenestration area)

S_F = Area-weighted average U-factor permitted by Table C402.5 of all vertical fenestration assemblies

T_F = Area-weighted average U-factor permitted by Table C402.1.2 of all exterior opaque wall assemblies

U_F = $S_F - T_F$ (excess U-factor for excess vertical fenestration area)

V_F = $R_F \times U_F$ (excess UxA due to excess vertical fenestration area)

P_S = Maximum skylight area allowable by Section C402.1.2

Q_S = Actual skylight area

R_S = $Q_S - P_S$, but not less than zero (excess skylight area)

S_S = Area-weighted average U-factor permitted by Table C402.5 of all skylights

T_S = Area-weighted average U-factor permitted by Table C402.1.2 of all opaque roof assemblies

U_S = $S_S - T_S$ (excess U-factor for excess skylight area)

V_S = $R_S \times U_S$ (excess UxA due to excess skylight area)

A proposed psi- or chi-factor for each thermal bridge shall comply with one of the following as applicable:

1. Where the proposed mitigation of a thermal bridge is compliant with the requirements of Section G402.6, the "compliant" values in Table G402.1.4 shall be used for the proposed psi- or chi-factors.
2. Where a thermal bridge is not mitigated in a manner at least equivalent to Section G402.6, the "non-compliant" values in Table G402.1.4 shall be used for the proposed psi- or chi-factors.
3. Where the proposed mitigation of a thermal bridge provides a psi- or chi-factor less than the "compliant" values in Table G402.1.4, the proposed psi- or chi-factor shall be determined by thermal analysis, testing, or other approved sources.

Staff note existing items removed

TABLE G402.1.4 PSI and CHI FACTORS TO DETERMINE THERMAL BRIDGES FOR THE COMPONENT PERFORMANCE ALTERNATIVE

Thermal Bridge per Section G402.6	Thermal Bridge Compliant with Section G402.6		Thermal Bridge Non-Compliant with Section G402.6	
	psi factor (Btu/h-ft ² -F)	chi factor (Btu/h-ft ² -F)	psi factor (Btu/h-ft ² -F)	chi factor (Btu/h-ft ² -F)
G402.6.1 Balconies, slabs, and decks	0.2	n/a	0.5	n/a
G402.6.2 Cladding supports	0.2	n/a	0.3	n/a
G402.6.3 Structural beams and columns	n/a	1.0 carbon steel 0.3 concrete	n/a	2.0 carbon steel 1.0 concrete
G402.6.4 Vertical fenestration	0.15	n/a	0.3	n/a
G402.6.5 Parapets	0.2	n/a	0.4	n/a

For SI: W/m K = 0.578 Btu/h-ft²-F; 1 W/K = 1.90 Btu/h-°F

n/a = not applicable

G402.7 Thermal bridges in above-grade walls. Thermal bridges in above-grade walls shall comply with the section or an approved design.

Exceptions:

1. Buildings and structures located in Climate Zones 0 through 3.
2. Any thermal bridge with a material thermal conductivity not greater than 3.0 Btu/h-ft²-F.
3. Blocking, coping, flashing, and other similar materials for attachment of roof coverings.
4. Thermal bridges accounted for in the U-factor or G-factor for a building thermal envelope.

G402.7.1 Balconies and floor decks. Balconies and concrete floor decks shall not penetrate the building thermal envelope. Such assemblies shall be separately supported or shall be supported by structural attachments or elements that minimize thermal bridging through the building thermal envelope.

Exceptions: Balconies and concrete floor decks shall be permitted to penetrate the building thermal envelope where:

1. an area-weighted U-factor is used for above-grade wall compliance which includes a U-factor of 0.8 Btu/h-°F-ft² for the area of the above-grade wall penetrated by the concrete floor deck; or
2. an approved thermal break device of not less than R-10 is installed in accordance with the manufacturer's instructions.

G402.7.2 Cladding supports. Linear elements supporting opaque cladding shall be off-set from the structure with attachments that allow the continuous insulation, where present, to pass behind the cladding support element.

Exceptions:

1. An approved design where the above-grade wall U-factor used for compliance accounts for the cladding support element thermal bridge.
2. Anchoring for curtain wall and window wall systems.

G402.7.3 Structural beams and columns. Structural steel and concrete beams and columns that project through the building thermal envelope shall be covered with not less than R-5 insulation for not less than 2 feet (610 mm) beyond the interior or exterior surface of an insulation component within the building thermal envelope.

Exceptions:

1. Where an approved thermal break device is installed in accordance with the manufacturer's instructions.
2. An approved design where the above-grade wall U-factor used to demonstrate compliance accounts for the beam or column thermal bridge.

G402.7.4 Vertical fenestration. Vertical fenestration intersections with above-grade walls shall comply with one or more of the following:

1. Where above-grade walls include continuous insulation, the plane of the exterior glazing layer or, for metal frame fenestration, a non-metal thermal break in the frame shall be positioned within 2 inches (51 mm) of the interior or exterior surface of the continuous insulation.

2. An approved design where the above-grade wall U-factor used to demonstrate compliance accounts for the beam or column thermal bridge.
3. The surface of the rough opening, not covered by the fenestration frame, shall be insulated with insulation of not less than R-3 material or covered with a wood buck that is not less than 1.5 inches (457 mm) thick.
4. For the intersection between vertical fenestration and opaque spandrel in a shared framing system, manufacturer's data for the spandrel U-factor shall account for thermal bridges.

Exceptions:

1. Where an approved design for the above-grade wall U-factor used for compliance accounts for thermal bridges at the intersection with the vertical fenestration.
2. Doors

G402.7.5 Parapets. Parapets shall comply with one or more of the following as applicable:

1. Where continuous insulation is installed on the exterior side of the above-grade wall and the roof is insulated with insulation entirely above deck, the continuous insulation shall extend up both sides of the parapet not less than 2 feet (610 mm) above the roof covering or to the top of the parapet, whichever is less. Parapets that are an integral part of a fire-resistance rated wall, and the exterior continuous insulation applied to the parapet, shall comply with the fire-resistance ratings of the building code.
2. Where continuous insulation is installed on the exterior side of the above-grade wall and the roof insulation is below the roof deck, the continuous insulation shall extend up the exterior side of the parapet to not less than the height of the top surface of the roof assembly.
3. Where continuous insulation is not installed on the exterior side of the above-grade wall and the roof is insulated with insulation entirely above deck, the wall cavity or integral insulation shall extend into the parapet up to the exterior face of the roof insulation or equivalent R-value insulation shall be installed not less than 2 feet (610 mm) horizontally inward on the underside of the roof deck.
4. Where continuous insulation is not installed on the exterior side of the above-grade wall and the roof insulation is below the roof deck, the wall and roof insulation components shall be adjacent to each other at the roof-ceiling-wall intersection.

Exception: An approved design where the above-grade wall U-factor used for compliance accounts for the parapet thermal bridge.

TABLE C407.4.1(1) SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS

Portions of table not shown remain unchanged.

BUILDING COMPONENT CHARACTERISTICS	STANDARD REFERENCE DESIGN	PROPOSED DESIGN				
Space use classification	Same as proposed	The space use classification shall be chosen in accordance with Table C405.3.2(1) or C405.3.2(2) for all areas of the building covered by this permit. Where the space use classification for a building is not known, the building shall be categorized as an office building.				
Roofs	Type: insulation entirely above deck	As proposed				
	Gross area: same as proposed	As proposed				
	U-factor: as specified in Table C402.1.2	As proposed				
	Solar absorptance: 0.75, except as specified in Section C402.4 and Table C402.4 for Climate Zones 0, 1, 2, and 3	As proposed				
	Emittance: 0.90, except as specified in Section C402.4 and Table C402.4 for Climate Zones 0, 1, 2, and 3	As proposed				
Walls, above-grade	Type: same as proposed	As proposed				
	Gross area: same as proposed	As proposed				
	U-factor: as specified in Table C402.1.2	As proposed				
	Thermal bridges: Account for heat transfer consistent with compliant psi and chi factors from Table C402.1.4 for thermal bridges as identified in Section C402.7 that are present in the proposed design.	As proposed; psi and chi factors for proposed thermal bridges shall be determined in accordance with requirements in Section C402.1.4.				
	Solar absorptance: 0.75	As proposed				
	Emittance: 0.90	As proposed				
Walls, below-grade	Type: mass wall	As proposed				
	Gross area: same as proposed	As proposed				
	U-Factor: as specified in Table C402.1.2 with insulation layer on interior side of walls	As proposed				
Floors, above-grade	Type: joist/framed floor	As proposed				
	Gross area: same as proposed	As proposed				
	U-factor: as specified in Table C402.1.2	As proposed				
Floors, slab-on-grade	Type: unheated	As proposed				
	F-factor: as specified in Table C402.1.2	As proposed				
Opaque doors	Type: swinging	As proposed				
	Area: Same as proposed	As proposed				
	U-factor: as specified in Table C402.1.2	As proposed				
Vertical fenestration other than opaque doors	<p>Area</p> <table border="1"> <tr> <td>1.</td> <td>The proposed vertical fenestration area; where the proposed vertical fenestration area is less than 40 percent of above-grade wall area.</td> </tr> <tr> <td>2.</td> <td>40 percent of above-grade wall area; where the proposed vertical fenestration area is 40 percent or more of the above-grade wall area.</td> </tr> </table>	1.	The proposed vertical fenestration area; where the proposed vertical fenestration area is less than 40 percent of above-grade wall area.	2.	40 percent of above-grade wall area; where the proposed vertical fenestration area is 40 percent or more of the above-grade wall area.	As proposed
	1.	The proposed vertical fenestration area; where the proposed vertical fenestration area is less than 40 percent of above-grade wall area.				
	2.	40 percent of above-grade wall area; where the proposed vertical fenestration area is 40 percent or more of the above-grade wall area.				
	U-factor: as specified in Table C402.5	As proposed				
SHGC: as specified in Table C402.5 except						

	that for climates with no requirement (NR) SHGC = 0.40 shall be used	As proposed
	External shading and PF: none	As proposed
Skylights	Area	As proposed
	1. The proposed skylight area; where the proposed skylight area is less than that permitted by Section C402.1.	
	2. The area permitted by Section C402.1; where the proposed skylight area exceeds that permitted by Section C402.1.	
	U-factor: as specified in Table C402.5	As proposed
	SHGC: as specified in Table C402.5 except that for climates with no requirement (NR) SHGC = 0.40 shall be used.	As proposed
Lighting, interior	The interior lighting power shall be determined in accordance with Section C405.3.2. Where the occupancy of the building is not known, the lighting power density shall be 1.0 watt per square foot based on the categorization of buildings with unknown space classification as offices.	As proposed
Lighting, exterior	The lighting power shall be determined in accordance with Tables C405.5.2(1), C405.5.2(2) and C405.5.2(3). Areas and dimensions of surfaces shall be the same as proposed.	As proposed
Internal gains	Same as proposed	Receptacle, motor and process loads shall be modeled and estimated based on the space use classification. End-use load components within and associated with the building shall be modeled to include, but not be limited to, the following: exhaust fans, parking garage ventilation fans, exterior building lighting, swimming pool heaters and pumps, elevators, escalators, refrigeration equipment and cooking equipment.
Schedules	Same as proposed Exception: Thermostat settings and schedules for HVAC systems that utilize radiant heating, radiant cooling and elevated air speed, provided that equivalent levels of occupant thermal comfort are demonstrated by means of equal Standard Effective Temperature as calculated in Normative Appendix B of ASHRAE Standard 55.	Operating schedules shall include hourly profiles for daily operation and shall account for variations between weekdays, weekends, holidays and any seasonal operation. Schedules shall model the time-dependent variations in occupancy, illumination, receptacle loads, thermostat settings, mechanical ventilation, HVAC equipment availability, service hot water usage and any process loads. The schedules shall be typical of the proposed building type as determined by the designer and approved by the jurisdiction.

For SI: 1 watt per square foot = 10.7 w/m².

SWHF = Service Water Heat Recovery factor, DWHR = Drain Water Heat Recovery.

- a. Where no heating system exists or has been specified, the heating system shall be modeled as fossil fuel. The system characteristics shall be identical in both the standard reference design and proposed design.
- b. The ratio between the capacities used in the annual simulations and the capacities determined by sizing runs shall be the same for both the standard reference design and proposed design.
- c. Where no cooling system exists or no cooling system has been specified, the cooling system shall be modeled as an air-cooled single-zone system, one unit per thermal zone. The system characteristics shall be identical in both the standard reference design and proposed design.

- d. If an economizer is required in accordance with Table C403.5(1) and where no economizer exists or is specified in the proposed design, then a supply-air economizer shall be provided in the standard reference design in accordance with Section C403.5.
- e. The SWHF shall be applied as follows:
 1. Where potable water from the DWHR unit supplies not less than one shower and not greater than two showers, of which the drain water from the same showers flows through the DWHR unit then $SWHF = [1 - (DWHR \text{ unit efficiency} \times 0.36)]$.
 2. Where potable water from the DWHR unit supplies not less than three showers and not greater than four showers, of which the drain water from the same showers flows through the DWHR unit then $SWHF = [1 - (DWHR \text{ unit efficiency} \times 0.33)]$.
 3. Where potable water from the DWHR unit supplies not less than five showers and not greater than six showers, of which the drain water from the same showers flows through the DWHR unit, then $SWHF = [1 - (DWHR \text{ unit efficiency} \times 0.26)]$.
 4. Where Items 1 through 3 are not met, $SWHF = 1.0$.

Reason: We are asking that the thermal bridge mitigation portion of the draft that was added by the committee be deleted throughout the draft.

The thermal bridge mitigation proposal in the draft was a committee-developed document, CECPI-4-21, and was developed in the last month or so before the committee action. It was developed primarily by the proponents of conflicting proposals CEPI 33-21, CEPI 40-21, and CEPI 45-21. It was not developed with input from other important stakeholders such as structural engineers who would need to comply with this or the industries who assist designers with design.

We are asking that it be **deleted** or made a non mandatory appendix for the following reasons:

- **This hasn't been tried anywhere for any building.**
- **It hasn't been modeled as a whole building to see if it actually saves energy under actual weather conditions.** Cooling energy costs are now on par with heating energy costs in mild to cold climates through Climate Zone 5. This means that the thermal mass effects of thermal bridges have the potential to reduce peak loads and reduce cooling costs. This proposal focuses on steady-state effects. There is no indication that all these years of modeling buildings without thermal bridges has any impact on predicted loads or sizing calculations.
- **ASHRAE has developed addendum av**, likely to soon be published as part of 90.1-2022. This IECC draft is a severely truncated version of 90.1 addendum av. While this draft content is shorter than addendum av, many assume it is simpler, but it is challenging for compliance for many types of typical construction.
- **ASHRAE addendum av was developed over 8 years**, with significant input from many professionals. This draft in the IECC is oversimplified to the point of not allowing common construction methods.
- **Constructability was not considered and costs were not provided.** Cost effectiveness was not provided as required by ICC in the original proposal. The cost statement indicated it provides "*practical mitigation which does not require significant changes to current practices, setting a relatively low performance bar.*" While certain types of construction can easily comply, **typical construction cannot easily comply, which means the draft is not practical.**
- **The 20 to 70% savings in the reason statement of the original proposal for the current draft is not related to this proposal (it is an often repeated myth).** Just because thermal bridges in some buildings in some climates can result in significant energy loss doesn't mean that this proposal saves that amount of energy. California wanted to verify this and did a detailed analysis available online and showed 1% savings; they decided it was not worth the effort in training and compliance because it was so complex. Granted, California is generally warmer and uses different criteria but at least they did an analysis and considered compliance and enforcement. **This proposal will cost the commercial building industry huge design and construction costs with little or no energy saving value.** Just because a concept sounds good doesn't mean a proposal on the topic saves energy.
- **This IECC draft will result in some very forward-thinking jurisdictions attempting to require it** and the rest of the jurisdictions not knowing how to construct buildings or enforce it. It will require education on the new requirements for the design and regulatory communities. Every structural and envelope designer and every plan reviewer and building inspector will need education on these provisions and it takes a long time for the various professional associations to develop and deliver that new content. Big new concepts in a code trigger big new needs for education development and administration.
- **There is no analysis by climate zone.** As we tighten the envelope, more air conditioning and less heating is needed. This changes what saves energy in mixed climate zones.
- As an example of the simple flaws in the document, compliance is required for all fasteners, no matter how small, unless the performance alternative is used.

- Designers are not familiar with **psi and chi factors**. They cannot be calculated except as part of an expensive research project and they are variable depending on the type of thermal bridge and amount of insulation in the adjacent assembly. Values are not available for most assemblies. We do not support the default psi and chi factors in the table because they do not take into account these complexities. The performance alternative of this draft truncates the number of psi and chi factors resulting in significant inaccuracies. **Since users will not be familiar with these, they will think they are accurate when they are not.** They can be off by many multiples.
- **The performance alternative C402.1.4 does not allow the use of actual psi and chi factors for actual thermal bridges.**
- **In Section C402.7.1, Balconies and floor decks, exception 2, an approved thermal break of R-10 is allowed but is much more than what is necessary for a thermal break.** Consider that wood blocking, which is allowed as an exception, has an R-value of about R-1 or less. Even smaller thermal breaks in windows are effective.
- **In Section C402.7.2, Cladding supports, the language is flawed** as it does not allow for structural attachments for cladding systems, as allowed for anchoring in exception 2 for curtain walls. It is not clear how brick cladding on off-set shelf angles can be supported.
- **C402.7 allows exceptions for flashing on the roof but not around windows or dissimilar wall materials.** This proposal does not have input from the construction industry.
- **ACI/TMS 122.1, "Thermal Bridge Mitigation for Buildings Having Concrete and Masonry Walls and Masonry Veneer— Code Requirements,"** is the code for mitigating thermal bridges developed by concrete and masonry professionals. This should be considered an alternate path. ASHRAE 90.1-2022 or ASHRAE 90.1-2019, addendum av (both have the same criteria), are also an acceptable, stakeholder developed method.
- **The biggest thermal bridge in a building is the fenestration.** To put this in perspective, a slab edge has the same steady state heat transfer as a strip of fenestration one foot high. Granted a slab edge has thermal mass and glass has other benefits, but this is an example of the oversimplification of this proposal.
- The thermal bridge mitigation requirements in the current draft is applicable for walls with board insulation on the outside of the building, but this is not the way many buildings are constructed. Many buildings have a hard exterior surface for security, durability, resilience, or local reasons. ACI/TMS 122.1 provides an alternative for these types of construction and cladding attachments.
- The proposal does not provide industry time to adapt to radical changes in the way buildings are constructed.

Cost Impact: The code change proposal will decrease the cost of construction.

This removes the thermal bridge mitigation requirements that were added with no cost and energy savings justification. It will reduce the cost of construction.

Workgroup Recommendation

Proposal # 691

CED1-94-22

Proponents: Jay Crandell, representing Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2024 International Energy Conservation Code [CE Project]

Revise as follows:

C402.1 General. *Building thermal envelope* assemblies for buildings that are intended to comply with the code on a prescriptive basis in accordance with the compliance path described in Item 1 of Section C401.2.1 shall comply with the following:

1. The opaque portions of the *building thermal envelope* shall comply with the specific insulation requirements of Section C402.2 and the thermal requirements of either the U-, C- and F-factor ~~based~~ method of Section C402.1.2; the R-value ~~based~~ method of C402.1.3; or the component performance method alternative of Section C402.1.4. Where the total area of the through-wall penetrations of mechanical equipment is greater than 1 percent of the opaque above-grade wall area, the building thermal envelope shall comply with Section C402.1.2.4.
2. Wall solar reflectance and thermal emittance shall comply with Section C402.3.
3. Roof solar reflectance and thermal emittance shall comply with Section C402.4.
4. Fenestration in building envelope assemblies shall comply with Section C402.5.
5. Air leakage of the building thermal envelope shall comply with C402.6.
- 6: 7. Walk-in coolers, walk-in freezers, refrigerated warehouse coolers and refrigerated warehouse freezers shall comply with Section C403.12.
- ~~7: 6.~~ *Thermal bridges in above-grade walls* shall comply with Section C402.7.

Alternatively, where buildings have a vertical fenestration area or skylight area exceeding that allowed in Section C402.5, the building and *building thermal envelope* shall comply with Item 2 of Section C401.2.1 or Section C401.2.2.

C402.1.2 Assembly U-factor, C-factor or F-factor ~~based~~ method. *Building thermal envelope* opaque assemblies shall have a U-, C- or F-factor not greater than that specified in Table C402.1.2. Commercial buildings or portions of commercial buildings enclosing *Group R* occupancies shall use the U-, C- or F-factor from the "*Group R*" column of Table C402.1.2. Commercial buildings or portions of commercial buildings enclosing occupancies other than *Group R* shall use the U-, C- or F-factor from the "All other" column of Table C402.1.2

C402.1.3 Insulation component R-value method alternatives. For opaque portions of the *building thermal envelope* using this section as an alternative to Section C402.1.2, the R-values for cavity insulation and continuous insulation shall be not less than that specified in Table C402.1.3. Commercial buildings or portions of commercial buildings enclosing *Group R* occupancies shall use the R-values from the "*Group R*" column of Table C402.1.3. Commercial buildings or portions of commercial buildings enclosing occupancies other than *Group R* shall use the R-values from the "All other" column of Table C402.1.3.

TABLE C402.1.3 OPAQUE THERMAL ENVELOPE INSULATION COMPONENT MINIMUM REQUIREMENTS, R-VALUE METHOD ALTERNATIVES ^a

Portions of table not shown remain unchanged.

C402.1.4 Component performance method alternative. Building envelope values and fenestration areas determined in accordance with Equation 4-1 shall be an alternative to compliance with the *U*-, *F*-, *psi*-, *chi*-, and *C*-factors in Tables C402.1.2, C402.1.5, and C402.5 and the maximum allowable fenestration areas in Section C402.5.1. *Fenestration* shall meet the applicable SHGC requirements of Section C402.5.3.
(remainder of section unchanged)

Reason: This proposal is a clean-up so that the U-factor, R-value, and component performance methods are all titled the same and referenced the same in Section C402.1. These editorial changes also make the section titles consistent with the titles of Tables C402.1.2 and C402.1.3. Also, two items listed in Section C402.1 are re-ordered to align with the sequence of requirements and sections in C402.

Cost Impact: The code change proposal will neither increase nor decrease the cost of construction. This proposal is editorial in making section and table titles consistent. There are no changes in requirements.

Workgroup Recommendation

Proposal # 720

CED1-96-22

Proponents: Martha VanGeem, representing Masonry Alliance for Codes and Standards; Cortney Fried, representing Brick Industry Association (cfried@bia.org); Scott Campbell, representing NRMCA (scampbell@nrmca.org); Stephen Szoke, representing American Concrete Institute (steve.szoke@concrete.org); Nicholas Lang, representing Masonry Alliance for Codes & Standards (nlang@ncma.org)

2024 International Energy Conservation Code [CE Project]

Revise as follows:

C402.1 General. *Building thermal envelope* assemblies for buildings that are intended to comply with the code on a prescriptive basis in accordance with the compliance path described in Item 1 of Section C401.2.1 shall comply with the following:

1. The opaque portions of the *building thermal envelope* shall comply with the specific insulation requirements of Section C402.2 and the thermal requirements of either the U-, C- and F-factor based method of Section C402.1.2; the R-value based method of C402.1.3; or the component performance alternative of Section C402.1.4. Where the total area of the through-wall penetrations of mechanical equipment is greater than 1 percent of the opaque above-grade wall area, the building thermal envelope shall comply with Section C402.1.2.4.
2. Wall solar reflectance and thermal emittance shall comply with Section C402.3.
3. Roof solar reflectance and thermal emittance shall comply with Section C402.4.
4. Fenestration in building envelope assemblies shall comply with Section C402.5.
5. Air leakage of the building thermal envelope shall comply with C402.6.
6. Walk-in coolers, walk-in freezers, refrigerated warehouse coolers and refrigerated warehouse freezers shall comply with Section C403.12.
7. ~~Thermal bridges in above-grade walls~~ shall comply with one of the following:

7.1 Section C402.7

7.2 ASHRAE/IES Standard 90.1, Section 5.5.5 Linear Thermal Bridges and Point Thermal Bridges.

Alternatively, where buildings have a vertical fenestration area or skylight area exceeding that allowed in Section C402.5, the building and *building thermal envelope* shall comply with Item 2 of Section C401.2.1 or Section C401.2.2.

Reason: This proposal to the IECC brings the prescriptive portion of the ASHRAE 90.1 thermal bridge mitigation requirements into the IECC as an alternative path. During the last eight years, the ASHRAE 90.1 committee has developed a comprehensive proposal to reduce heat losses through thermal bridges in buildings (addendum av to ASHRAE 90.1-2019 which will be included in 90.1-2022 to be published soon). It is being added as a reference to a section because the requirements are comprehensive and extensive. It is more comprehensive and accurate than the requirements in the current IECC draft. This section number with the requirements is in ASHRAE/IES 90.1-2022, to be published soon. It is also available on the ASHRAE website as addendum av at this link. (or go to ASHRAE.org for technical resources/standards & guidelines/standards addenda/90.1-2019/addendum av)

https://www.ashrae.org/file%20library/technical%20resources/standards%20and%20guidelines/standards%20addenda/90_1_2019_av_20220729.pdf

The ASHRAE standing standards project committee SSPC 90.1 received public review from stakeholders and resolved many of their comments through an ANSI public review process over many years. The individual criteria measures that were analyzed were found to be **cost effective** on their own using the ASHRAE method for cost effectiveness. The proposal covers reduction of heat losses through roof edges, parapets, floor edges, projections including balconies, exterior cladding supports including shelf angles, wall/window interfaces, and other large penetrations through the building envelope. It is more detailed than the current draft but is more applicable to actual construction.

The thermal bridge mitigation criteria in the current draft was developed quickly and has some flaws, which is why this proposal should be considered as an alternative. The thermal bridge mitigation proposal in the draft was a committee-developed document, CECPI-4-21, and was developed in the last month or so before the committee action. It was developed primarily by the proponents of conflicting proposals CEPI 33-21, CEPI 40-21, and CEPI 45-21. It was not developed with input from other important stakeholders such as structural engineers who would need to comply with this or the industries that guide the design.

- The current IECC draft is a severely truncated version of 90.1 addendum av. While it is shorter, many assume that it is simpler, but it is challenging for compliance for many types of typical construction.

- The current draft **hasn't been tried anywhere for any building.**

- The current draft **hasn't been modeled as a whole building to see if it actually saves energy** under actual weather conditions. Cooling energy costs are now on par with heating energy cost in mild to cold climates through Climate zone 5. This means that the thermal mass effects of thermal bridges have to potential to reduce peak loads and reduce cooling costs. There is no indication that all these years of modeling buildings without thermal bridges has any impact on predicted loads or sizing calculations.

- **Constructability was not considered and costs were not provided for the requirements in the current draft.** Cost effectiveness was not provided as required by ICC. The cost statement indicates it provides "*practical mitigation which does not require significant changes to current practices, setting a relatively low performance bar.*" While certain types of construction can easily comply, **typical construction cannot easily comply, which means the IECC draft is not practical.**
- **The 20 to 70% savings in the reason statement provided with the requirements in the current draft is an often-repeated myth.** Just because thermal bridges in some buildings in some climates can result in significant energy loss doesn't mean that this proposal saves that amount of energy. California wanted to verify this and did a detailed analysis available online and showed 1% savings; they decided it was not worth the effort in training and compliance because it was so complex. Granted, California is generally warmer and uses different criteria but at least they did an analysis and considered compliance and enforcement.
- **This current requirements in the draft will cost the commercial building industry huge design and construction costs with little or no energy saving value.** Just because a concept sounds good doesn't mean a proposal on the topic saves energy.
- **There is no analysis by climate zone** for the current requirements in the draft – as we tighten the envelope, more air conditioning and less heating is needed. This changes what saves energy for mixed climate zones.
- As an example of the simple flaws in the current requirements, compliance is required for all fasteners, no matter how small, unless the performance alternative is used.
- **The performance alternative C402.1.4 does not allow the use of actual psi and chi factors for actual thermal bridges.**
- In Section C402.7.1, **Balconies and floor decks, exception 2, an approved thermal break of R-10 is allowed but is much more than what is necessary for a thermal break.** Consider that wood blocking, which is allowed as an exception, has an R-value of about R-1 or less. Even smaller thermal breaks in windows are effective.
- **In Section C402.7.2, Cladding supports, the language is flawed** as it does not allow for structural attachments for cladding systems, as allowed for anchoring in exception 2 for curtain walls. It is not clear how brick cladding on offset shelf angles can be supported.
- **C402.7 allows exceptions for flashing on the roof but not around windows or dissimilar wall materials.**
- The thermal bridge mitigation requirements in the current draft work for walls with board insulation on the outside of the building, but this is not the way many buildings are constructed. Many buildings have a hard exterior surface for security, durability, resilience, or local reasons. ASHRAE 90.1 provides an alternative for these types of construction and cladding attachments.
- The current draft does not provide industry time to adapt to radical changes in the way buildings are constructed.

Cost Impact: The code change proposal will neither increase nor decrease the cost of construction. This proposal contains an alternative that will not increase the cost of construction compared to what is in the current draft.

Workgroup Recommendation

Proposal # 730

CED1-97-22

Proponents: Martha VanGeem, representing Masonry Alliance for Codes and Standards; Scott Campbell, representing NRMCA (scampbell@nrmca.org); Stephen Szoke, representing American Concrete Institute (steve.szoke@concrete.org); Nicholas Lang, representing Masonry Alliance for Codes & Standards (nlang@ncma.org); Cortney Fried, representing Brick Industry Association (cfried@bia.org); Brian Trimble, representing International Masonry Institute (btrimble@imiweb.org)

2024 International Energy Conservation Code [CE Project]

Revise as follows:

C402.1 General. *Building thermal envelope* assemblies for buildings that are intended to comply with the code on a prescriptive basis in accordance with the compliance path described in Item 1 of Section C401.2.1 shall comply with the following:

1. The opaque portions of the *building thermal envelope* shall comply with the specific insulation requirements of Section C402.2 and the thermal requirements of either the U-, C- and F-factor based method of Section C402.1.2; the R-value based method of C402.1.3; or the component performance alternative of Section C402.1.4. Where the total area of the through-wall penetrations of mechanical equipment is greater than 1 percent of the opaque above-grade wall area, the building thermal envelope shall comply with Section C402.1.2.4.
2. Wall solar reflectance and thermal emittance shall comply with Section C402.3.
3. Roof solar reflectance and thermal emittance shall comply with Section C402.4.
4. Fenestration in building envelope assemblies shall comply with Section C402.5.
5. Air leakage of the building thermal envelope shall comply with C402.6.
6. Walk-in coolers, walk-in freezers, refrigerated warehouse coolers and refrigerated warehouse freezers shall comply with Section C403.12.
7. ~~Thermal bridges in above-grade walls~~ shall comply with one of the following:

7.1. Section C402.7.

7.2. ACI/TMS 122.1

Alternatively, where buildings have a vertical fenestration area or skylight area exceeding that allowed in Section C402.5, the building and *building thermal envelope* shall comply with Item 2 of Section C401.2.1 or Section C401.2.2.

CHAPTER 6 [CE] REFERENCED STANDARDS

Add new text as follows:

ACI American Concrete Institute, 38800 Country Club Dr., Farmington Hills, MI 48331. ACI Code 122.1-2021 Thermal Bridge Mitigation for Buildings Having Concrete and Masonry Walls and Masonry Veneer—Code Requirements C402.1

Reason: This proposal to the IECC brings the ACI/TMS 122.1 code on thermal bridge mitigation requirements into the IECC as an alternative path. It includes requirements at slab edges, for parapets, and for shelf angles.

ACI-TMS 122.1-21 is a joint code written using ACI's consensus process including a public comment period and numerous committee ballots at each stage of the process. ACI is an ANSI standards developer and also uses this process for ACI 318 which is the concrete building code. Work began in 2018 to develop a consensus standard by the industry that pushed the concrete and masonry industry further to mitigate thermal bridges but was easier to understand, and therefore would find adoption. The concrete and masonry industry considers themselves leaders in developing this. Use of this code will incur additional expenses in building design and construction but will help mitigate thermal bridges.

ACI-TMS 122.1-21 is free to all code officials as are all ACI codes and standards referenced in codes. Code officials can send an email to codes@concrete.org to obtain a complimentary copy. ACI-TMS 122.1-21 is also added to the reference section.

Alternatives. It is not unusual for the IECC to have separate criteria for separate kinds of walls systems developed by an industry following ANSI procedures. Section R402.1 has an exception for log homes designed according to ICC 400, Standard on the Design and Construction of Log Structures. Using this exception, log homes do not have to follow the IECC residential insulation requirements for walls.

It is common for alternatives and exceptions in the IECC to have different energy savings. For instance, in the IECC 2021, Section C402.4.1 on maximum vertical fenestration area provides alternatives with different energy savings as does section C402.4.2 on minimum skylight fenestration area. Complying with the U factor table (Table C402.1.4) or the R-value table (Table C402.1.3) will provide different energy savings. Exception 2 in section C402.7 of the current draft (for low thermal conductivity materials such as wood) to the thermal bridging requirements provides different energy savings because it allows extensive wood thermal bridges. Compliance with ICC 400 provides different energy savings than the IECC.

Different methods, alternatives, and exceptions consider various costs of construction and are also provided for easy of compliance.

Benefits. The benefit of this standard is that it provides constructible options, and it is easy to understand and implement. This will lead to better adoption, compliance by industry, and enforcement by code officials. The thermal bridge mitigation requirements in the current draft work for walls with board insulation on the outside of the building, but this is not the way many buildings are constructed. Many buildings have a hard exterior surface for **security, durability, resilience**, or local reasons. ACI 122.1 provides an alternative for these types of construction and cladding attachments.

The thermal bridge mitigation criteria in the current draft were developed quickly and have some flaws, which is why this proposal should be considered as an alternative. The thermal bridge mitigation proposal in the draft was a committee-developed document, CECPI-4-21, and was developed in the last month or so before the committee action. It was developed primarily by the proponents of conflicting proposals CEPI 33-21, CEPI 40-21, and CEPI 45-21. It was not developed with input from other important stakeholders, such as structural engineers who would need to comply with this or the industries that guide the design.

- **The current draft hasn't been tried anywhere for any building.**

- **The current draft hasn't been modeled as a whole building to see if it actually saves energy** under actual weather conditions. Cooling energy costs are now on par with heating energy costs in mild to cold climates through Climate Zone 5. This means that the thermal mass effects of thermal bridges have the potential to reduce peak loads and reduce cooling costs. There is no indication that all these years of modeling buildings without thermal bridges has any impact on predicted loads or sizing calculations.

- **Constructability was not considered and costs were not provided for the requirements in the current draft.** Cost effectiveness was not provided as required by ICC. The cost statement for the current draft indicates it provides "practical mitigation which does not require significant changes to current practices, setting a relatively low performance bar." While certain types of construction can easily comply, typical construction cannot easily comply, which means the current draft is not practical.

- The 20 to 70% savings in the reason statement provided with the requirements in the current draft is an often-repeated myth. Just because thermal bridges in some buildings in some climates can result in significant energy loss doesn't mean that this proposal saves that amount of energy. California wanted to verify this and did a detailed analysis available online and showed 1% savings; they decided it was not worth the effort in training and compliance because it was so complex. Granted, California is generally warmer and uses different criteria but at least they did an analysis and considered compliance and enforcement. This current requirements in the draft will cost the commercial building industry huge design and construction costs with little or no energy saving value. Just because a concept sounds good doesn't mean a proposal on the topic saves energy.

- There is no analysis by climate zone for the current requirements in the draft – as we tighten the envelope, more air conditioning and less heating is needed. This changes what measures save energy for mixed climate zones.

- As an example of the simple flaws in the current draft requirements, compliance is required for all fasteners, no matter how small, unless the performance alternative is used.

- The performance alternative C402.1.4 **does not allow the use of actual psi and chi factors** for actual thermal bridges.

- In Section C402.7.1, Balconies and floor decks, exception 2, an approved thermal break of R-10 is allowed but is much more than what is necessary for a thermal break. Consider that wood blocking, which is allowed as an exception, has an R-value of about R-1 or less. Even smaller thermal breaks in windows are effective.

- In Section C402.7.2, Cladding supports, the language is flawed as **it does not allow for structural attachments** for cladding systems, as allowed for anchoring in exception 2 for curtain walls. It is not clear how brick cladding on offset shelf angles can be supported.

- **C402.7 allows exceptions for flashing on the roof but not around windows or dissimilar wall materials.**

- The thermal bridge mitigation requirements in the current draft work for walls with board insulation on the outside of the building, but this is not the way many buildings are constructed. Many buildings have a hard exterior surface for **security, durability, resilience**, or local reasons. ACI/TMS 122.1 provides an alternative for these types of construction and cladding attachments.

- The current draft does not provide industry time to adapt to radical changes in the way buildings are constructed.

In addition, this needs to be added to Chapter 6:

ACI.

American Concrete Institute, 38800 Country Club Dr., Farmington Hills, MI 48331

Section C402.1.6

Cost Impact: The code change proposal will neither increase nor decrease the cost of construction.
This proposal contains an alternative that will not increase the cost of construction compared to what is in the current draft.

Workgroup Recommendation

Proposal # 732

CED1-135-22

Proponents: Greg Johnson, representing National Multifamily Housing Council (gjohnsonconsulting@gmail.com)

2024 International Energy Conservation Code [CE Project]

Add new text as follows:

APPENDIX DD THERMAL BRIDGES IN ABOVE-GRADE WALLS

Delete and substitute as follows:

~~G402.7 Thermal bridges in above-grade walls. Thermal bridges in above-grade walls shall comply with the section or an approved design.~~

~~Exceptions:~~

- ~~1. Buildings and structures located in Climate Zones 0 through 3.~~
- ~~2. Any thermal bridge with a material thermal conductivity not greater than 3.0 Btu/h-ft-°F.~~
- ~~3. Blocking, coping, flashing, and other similar materials for attachment of roof coverings.~~
- ~~4. Thermal bridges accounted for in the U-factor or C-factor for a building thermal envelope.~~

DD101.1 Thermal bridges in above-grade walls. Thermal bridges in above-grade walls shall comply with the section, this appendix or an approved design.

Exceptions:

1. Buildings and structures located in Climate Zones 0 through 3.
2. Any thermal bridge with a material thermal conductivity not greater than 3.0 Btu/h-ft-°F.
3. Blocking, coping, flashing, and other similar materials for attachment of roof coverings.
4. Thermal bridges accounted for in the U-factor or C-factor for a building thermal envelope.

Revise as follows:

~~G402.7.1~~ DD101.1.1 Balconies and floor decks. Balconies and concrete floor decks shall not penetrate the building thermal envelope. Such assemblies shall be separately supported or shall be supported by structural attachments or elements that minimize thermal bridging through the building thermal envelope.

Exceptions: Balconies and concrete floor decks shall be permitted to penetrate the *building thermal envelope* where:

1. an area-weighted *U-factor* is used for *above-grade wall* compliance which includes a *U-factor* of 0.8 Btu/h-°F-ft² for the area of the *above-grade wall* penetrated by the concrete floor deck, or
2. an approved thermal break device of not less than R-10 is installed in accordance with the manufacturer's instructions.

~~G402.7.2~~ DD101.1.2 Cladding supports. Linear elements supporting opaque cladding shall be off-set from the structure with attachments that allow the continuous insulation, where present, to pass behind the cladding support element.

Exceptions:

1. An *approved design* where the above-grade wall *U-factor* used for compliance accounts for the cladding support element *thermal bridge*.
2. Anchoring for curtain wall and window wall systems.

~~G402.7.3~~ DD101.1.3 Structural beams and columns. Structural steel and concrete beams and columns that project through the *building thermal envelope* shall be covered with not less than R-5 insulation for not less than 2 feet (610 mm) beyond the interior or exterior surface of an insulation component within the *building thermal envelope*.

Exceptions:

1. Where an approved thermal break device is installed in accordance with the manufacturer's instructions.
2. An approved design where the above-grade wall *U-factor* used to demonstrate compliance accounts for the beam or column thermal bridge.

G402.7.4 DD101.1.4 Vertical fenestration. Vertical fenestration intersections with above grade walls shall comply with one or more of the following:

1. Where above-grade walls include continuous insulation, the plane of the exterior glazing layer or, for metal frame fenestration, a non-metal thermal break in the frame shall be positioned within 2 inches (610 mm) of the interior or exterior surface of the continuous insulation.
2. An approved design where the above-grade wall U-factor used to demonstrate compliance accounts for the beam or column thermal bridge.
3. The surface of the rough opening, not covered by the fenestration frame, shall be insulated with insulation of not less than R-3 material or covered with a wood buck that is not less than 1.5 inches (457 mm) thick.
4. For the intersection between vertical fenestration and opaque spandrel in a shared framing system, manufacturer's data for the spandrel U-factor shall account for *thermal bridges*.

Exceptions:

1. Where an approved design for the above-grade wall U-factor used for compliance accounts for *thermal bridges* at the intersection with the vertical fenestration.
2. Doors

G402.7.5 DD101.1.5 Parapets. Parapets shall comply with one or more of the following as applicable:

1. Where continuous insulation is installed on the exterior side of the *above-grade wall* and the roof is insulated with insulation entirely above deck, the continuous insulation shall extend up both sides of the parapet not less than 2 feet (610 mm) above the roof covering or to the top of the parapet, whichever is less. Parapets that are an integral part of a fire-resistance rated wall, and the exterior continuous insulation applied to the parapet, shall comply with the fire resistance ratings of the building code.
2. Where continuous insulation is installed on the exterior side of the above-grade wall and the roof insulation is below the roof deck, the continuous insulation shall extend up the exterior side of the parapet to not less than the height of the top surface of the roof assembly.
3. Where continuous insulation is not installed on the exterior side of the *above-grade wall* and the roof is insulated with insulation entirely above deck, the wall cavity or integral insulation shall extend into the parapet up to the exterior face of the roof insulation or equivalent R-value insulation shall be installed not less than 2 feet (610 mm) horizontally inward on the underside of the roof deck.
4. Where continuous insulation is not installed on the exterior side of the *above-grade wall* and the roof insulation is below the roof deck, the wall and roof insulation components shall be adjacent to each other at the roof-ceiling-wall intersection.

Exception: An *approved design* where the *above-grade wall U-factor* used for compliance accounts for the parapet *thermal bridge*.

C402.1 General. *Building thermal envelope* assemblies for buildings that are intended to comply with the code on a prescriptive basis in accordance with the compliance path described in Item 1 of Section C401.2.1 shall comply with the following:

1. The opaque portions of the *building thermal envelope* shall comply with the specific insulation requirements of Section C402.2 and the thermal requirements of either the U-, C- and F-factor based method of Section C402.1.2; the R-value based method of C402.1.3; or the component performance alternative of Section C402.1.4. Where the total area of the through-wall penetrations of mechanical equipment is greater than 1 percent of the opaque above-grade wall area, the building thermal envelope shall comply with Section C402.1.2.4.
2. Wall solar reflectance and thermal emittance shall comply with Section C402.3.
3. Roof solar reflectance and thermal emittance shall comply with Section C402.4.
4. Fenestration in building envelope assemblies shall comply with Section C402.5.
5. Air leakage of the building thermal envelope shall comply with C402.6.
6. Walk-in coolers, walk-in freezers, refrigerated warehouse coolers and refrigerated warehouse freezers shall comply with Section C403.12.
7. ~~Thermal bridges in above-grade walls shall comply with Section C402.7.~~

Alternatively, where buildings have a vertical fenestration area or skylight area exceeding that allowed in Section C402.5, the building and *building thermal envelope* shall comply with Item 2 of Section C401.2.1 or Section C401.2.2.

Reason: The original code change, CECPI-4-21, was committee developed in the few months before the vote. It was developed mainly by the proponents of conflicting proposals CEPI-33-21, CEPI-40-21, and CEPI-45-21. It was developed without input from key stakeholders – structural engineers who would need to comply with this.

- This has **not been tried anywhere** for any building to see if it is realistic.
- **It hasn't been modeled as a whole building** to see if it saves energy under actual weather conditions. Cooling energy costs are now on par with heating energy costs in mild to cold climates through climate zone 5 per PNNL reports, meaning thermal bridges have less effect than steady state analysis may indicate. Also, thermal mass effects of thermal bridges have the potential to reduce peak loads and reduce cooling costs. There is no indication that these many years of modeling buildings without consideration of thermal bridges has any impact on predicted loads or sizing calculations.

- **There is no analysis by climate zone** – as the envelope is tightened more air conditioning and less heating is needed. This changes the lens for mixed climate zones and what measures save energy.

- ASHRAE has developed Addendum av, likely to soon be published as part of 90.1-2022. CECPI-4-21 is a very truncated version of Addendum av and possibly violates ASHRAE copyright.

The simplification of CECPI-4-21 compared to Addendum av impacts constructability and the ability to comply. Addendum av was developed over 12 years, starting in 2010, with significant input from stakeholders whereas CECPI-4-21 was just developed without input from those primarily affected. It is oversimplified to the point of not allowing common construction methods.

- **Constructability was not considered, and costs and cost effectiveness were not provided** as required by ICC. The cost statement indicates it provides *“practical mitigation which does not require significant changes to current practices, setting a relatively low performance bar.”*

This statement is not true.

While certain types of construction can easily comply, some typical construction cannot – these provisions are not practical. The (20 to 70%) energy savings in the reason statement is not related to this proposal (it is an oft-repeated myth).

California wanted to verify this and did a [detailed analysis available online \(beginning on slide 68\)](#) and showed 1% savings; it was decided that adopting comparable requirements was not worth the effort in training and compliance because it was so complex. Additional detail:

“The Statewide CASE Team is not pursuing this measure due to significant concerns about the absence of a nonresidential registry or third-party entity ready to perform field inspection and verification by 2022 nor an established format for professionals to sign off that calculations had been properly performed.”

Granted, California is generally warmer, and uses different criteria, but its analysis considered compliance and enforcement. **This proposal will have extraordinary design and construction costs for the commercial building industry with little or no energy saving value.** Even though a concept sounds good doesn't mean a related proposal saves energy. **This proposal still allows thermal bridges – it just discriminates against some in favor of others.** It favors point connections through insulation which increases the potential for corrosion.

- The predictable result of this proposal will be that some forward-leaning jurisdictions will require it and find it has **unintended consequences**. Remaining jurisdictions and developers will not know how to enforce it or comply with it. It will require extensive education on the new requirements for the design and regulatory communities. Every structural and envelope designer, and every plan reviewer and building inspector, will need education on these provisions. It takes a long time for the various professional associations to develop and deliver new content. Big new concepts in code trigger big new education development and administration.

- An example of the basic flaws in the thermal bridging language: compliance is required for all fasteners, no matter how small, unless the performance path is used. Section C402.6.1, Balconies and floor decks, which requires an excessive thermal break of R-10, is another example. Consider that wood blocking, which is allowed as an overall exception, has an R-value of about R-1.25 Very small thermal breaks in window frames are effective and are a fraction of an R-value.

- **Designers are not familiar with psi and chi factors.** These factors cannot be calculated except via costly research, and they are variable depending on the type of thermal bridge and insulation in adjacent assemblies. **Values are not available for most assemblies.** The default psi and chi factors in 90.1 Addendum av are problematic; they do not account for these complexities. The performance alternative of this proposal truncates the number of psi and chi factors compared to Addendum av, resulting in even more significant inaccuracies. Since users will be new to these, they will think they are accurate when they are not. They can be off by many multiples.

- The component performance alternative in Section C402.1.5 does not allow the use of actual psi and chi factors for actual thermal bridges. Actual values from the major source of values - Morrison Hershfield, should be allowed.

- CEPI-30-21, which was disapproved, would have allowed for the ACI/TMS 122.1 as the standard for mitigating thermal bridges. This standard was developed by concrete and masonry professionals. This should be considered an alternate path.

- **The biggest thermal bridge in a building is the fenestration.** For perspective, a concrete slab edge has the same steady state heat transfer as a strip of one-foot-high fenestration. Granted, a slab edge has thermal mass, and glass has other benefits, but **this shows the oversimplification of this proposal.**

- The proposal does not provide industry time to adapt to radical changes in the way buildings are constructed.

Proposed resolution:

Make a non-mandatory appendix, which would permit beta testing by forward-leaning jurisdictions, and identification of needed improvements of the provisions, as well as development of critical educational offerings by the professional associations of the affected parties.

Cost Impact: The code change proposal will neither increase nor decrease the cost of construction. It is currently uncertain what cost impacts this proposal may have. Proponent did not provide a detailed analysis.

Workgroup Recommendation

Proposal # 676

CED1-136-22

Proponents: Vladimir Kochkin, representing NAHB (vkochkin@nahb.org)

2024 International Energy Conservation Code [CE Project]

Revise as follows:

C402.7 Thermal bridges in above-grade walls. Thermal bridges in above-grade walls shall comply with the section or an approved design.

Exceptions:

1. *Buildings* and structures located in Climate Zones 0 through ~~3~~ 4.
2. Any *thermal bridge* with a material thermal conductivity not greater than 3.0 Btu/h-ft-°F.
3. Blocking, coping, flashing, and other similar materials for attachment of roof coverings.
4. *Thermal bridges* accounted for in the *U-factor* or *C-factor* for a *building thermal envelope*.

Reason: There was no cost-effectiveness analysis provided with the proposal for thermal bridging. The statement that these provisions are already implied by the code is incorrect and inadequate. Until a cost-effectiveness analysis is provided, at a minimum climate zone 4 should be added to the list of exceptions.

The provisions should be vetted through the IBC structural committee – the structural engineering community will have to meet these requirements.

The state of California considered adding thermal bridging provisions but after conducting an analysis did not adopt such provisions. This supports adding Climate Zone 4 as there are parts of California in CZ 4 and 5.

Requirements for balconies are overly restrictive. An ASHRAE version of this proposal offered allowances for balconies by climate zone to make these requirements more feasible. For Climate Zone 4, up to 35% of the floor perimeter can be allocated to balconies in 90.1.

These highly complex provisions have not been tried on any design projects in the field and are not part of any above-code programs. Demonstrated experience with the newly proposed energy modeling provisions should be accumulated before locating them in the main body of the code.

This proposal offers to resolve these concerns by extending the exception to Climate Zone 4.

Cost Impact: The code change proposal will decrease the cost of construction.

This proposal will reduce the cost of construction in climate zone 4.

Workgroup Recommendation

Proposal # 812

CED1-137-22

Proponents: Bob Zabcik, representing Metal Construction Association (bob@ztech-consulting.com)

2024 International Energy Conservation Code [CE Project]

Revise as follows:

PSI-FACTOR (ψ -FACTOR). The heat loss factor per unit length of a linear thermal bridge characterized as a linear element of a building thermal envelope (Btu/h × ft × °F)[W/(m × K)].

THERMAL BRIDGE. An element or interface of elements that has a higher thermal conductivity than the surrounding *building thermal envelope*, which creates a path of least resistance for heat transfer.

Add new definition as follows:

LINEAR THERMAL BRIDGE. A thermal bridge characterized as a linear element of a building thermal envelope which penetrates the insulation.

POINT THERMAL BRIDGE. A thermal bridge characterized as a point element of a building thermal envelope which penetrates the insulation

2024 International Energy Conservation Code [CE Project]

Revise as follows:

CHI-FACTOR (χ -FACTOR). The heat loss factor for a single *point thermal bridge* characterized as a point element of a building thermal envelope (Btu/h × °F)[W/K].

C402.7 Thermal bridges in above-grade walls. Point thermal bridges and linear thermal bridges in above-grade walls shall comply with the section or an approved design.

Exceptions:

1. *Buildings* and structures located in Climate Zones 0 through 3.
2. Any linear thermal bridge with a material thermal conductivity not greater than 3.0 Btu/h-ft-°F.
3. Blocking, coping, flashing, and other similar materials for attachment of roof coverings.
4. Point thermal bridges and linear thermal bridges accounted for in the *U-factor* or *C-factor* for a *building thermal envelope*.

C402.7.2 Cladding supports. Linear elements supporting opaque cladding shall be off-set from the structure with attachments that allow the continuous insulation, where present, to pass behind the cladding support element.

Exceptions:

1. An *approved design* where the above-grade wall *U-factor* used for compliance accounts for the cladding support element linear thermal bridge.
2. Anchoring for curtain wall and window wall systems.

C402.7.3 Structural beams and columns. Structural steel and concrete beams and columns that project through the *building thermal envelope* shall be covered with not less than R-5 insulation for not less than 2 feet (610 mm) beyond the interior or exterior surface of an insulation component within the *building thermal envelope*.

Exceptions:

1. Where an approved thermal break device is installed in accordance with the manufacturer's instructions.
2. An approved design where the above-grade wall *U-factor* used to demonstrate compliance accounts for the beam or column point thermal bridge.

C402.7.4 Vertical fenestration. Vertical fenestration intersections with above grade walls shall comply with one or more of the following:

1. Where above-grade walls include continuous insulation, the plane of the exterior glazing layer or, for metal frame fenestration, a non-metal thermal break in the frame shall be positioned within 2 inches (610 mm) of the interior or exterior surface of the continuous insulation.
2. An approved design where the above-grade wall *U-factor* used to demonstrate compliance accounts for the beam or column thermal bridge.

3. The surface of the rough opening, not covered by the fenestration frame, shall be insulated with insulation of not less than R-3 material or covered with a wood buck that is not less than 1.5 inches (457 mm) thick.
4. For the intersection between vertical fenestration and opaque spandrel in a shared framing system, manufacturer's data for the spandrel U-factor shall account for *thermal bridges*.

Exceptions:

1. Where an approved design for the above-grade wall U-factor used for compliance accounts for point thermal bridges and linear thermal bridges at the intersection with the vertical fenestration.
2. Doors

TABLE C407.4.1(1) SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS

BUILDING COMPONENT CHARACTERISTICS	STANDARD REFERENCE DESIGN	PROPOSED DESIGN				
Space use classification	Same as proposed	The space use classification shall be chosen in accordance with Table C405.3.2(1) or C405.3.2(2) for all areas of the building covered by this permit. Where the space use classification for a building is not known, the building shall be categorized as an office building.				
Roofs	Type: insulation entirely above deck	As proposed				
	Gross area: same as proposed	As proposed				
	U-factor: as specified in Table C402.1.2	As proposed				
	Solar absorptance: 0.75, except as specified in Section C402.4 and Table C402.4 for Climate Zones 0, 1, 2, and 3	As proposed				
	Emittance: 0.90, except as specified in Section C402.4 and Table C402.4 for Climate Zones 0, 1, 2, and 3	As proposed				
Walls, above-grade	Type: same as proposed	As proposed				
	Gross area: same as proposed	As proposed				
	U-factor: as specified in Table C402.1.2	As proposed				
	<i>Thermal bridges: Account for heat transfer consistent with compliant psi- and chi-factors from Table C402.1.4 for <u>linear thermal bridges</u> and <u>point thermal bridges</u> as identified in Section C402.7 that are present in the proposed design.</i>	As proposed; <i>psi-</i> and <i>chi-</i> factors for proposed <u>linear thermal bridges</u> and <u>point thermal bridges</u> shall be determined in accordance with requirements in Section C402.1.4.				
	Solar absorptance: 0.75	As proposed				
	Emittance: 0.90	As proposed				
Walls, below-grade	Type: mass wall	As proposed				
	Gross area: same as proposed	As proposed				
	U-Factor: as specified in Table C402.1.2 with insulation layer on interior side of walls	As proposed				
Floors, above-grade	Type: joist/framed floor	As proposed				
	Gross area: same as proposed	As proposed				
	U-factor: as specified in Table C402.1.2	As proposed				
Floors, slab-on-grade	Type: unheated	As proposed				
	F-factor: as specified in Table C402.1.2	As proposed				
Opaque doors	Type: swinging	As proposed				
	Area: Same as proposed	As proposed				
	U-factor: as specified in Table C402.1.2	As proposed				
Vertical fenestration other than opaque doors	<p>Area</p> <table border="1"> <tr> <td>1.</td> <td>The proposed vertical fenestration area; where the proposed vertical fenestration area is less than 40 percent of above-grade wall area.</td> </tr> <tr> <td>2.</td> <td>40 percent of above-grade wall area; where the proposed vertical fenestration area is 40 percent or more of the above-grade wall area.</td> </tr> </table>	1.	The proposed vertical fenestration area; where the proposed vertical fenestration area is less than 40 percent of above-grade wall area.	2.	40 percent of above-grade wall area; where the proposed vertical fenestration area is 40 percent or more of the above-grade wall area.	As proposed
	1.	The proposed vertical fenestration area; where the proposed vertical fenestration area is less than 40 percent of above-grade wall area.				
	2.	40 percent of above-grade wall area; where the proposed vertical fenestration area is 40 percent or more of the above-grade wall area.				
	U-factor: as specified in Table C402.5	As proposed				
	SHGC: as specified in Table C402.5 except that for climates with no requirement (NR) SHGC = 0.40 shall be used	As proposed				
External shading and PF: none	As proposed					

Skylights	Area	As proposed
	1. The proposed skylight area; where the proposed skylight area is less than that permitted by Section C402.1.	
	2. The area permitted by Section C402.1; where the proposed skylight area exceeds that permitted by Section C402.1.	
	U-factor: as specified in Table C402.5	As proposed
	SHGC: as specified in Table C402.5 except that for climates with no requirement (NR) SHGC = 0.40 shall be used.	As proposed
Lighting, interior	The interior lighting power shall be determined in accordance with Section C405.3.2. Where the occupancy of the building is not known, the lighting power density shall be 1.0 watt per square foot based on the categorization of buildings with unknown space classification as offices.	As proposed
Lighting, exterior	The lighting power shall be determined in accordance with Tables C405.5.2(1), C405.5.2(2) and C405.5.2(3). Areas and dimensions of surfaces shall be the same as proposed.	As proposed
Internal gains	Same as proposed	Receptacle, motor and process loads shall be modeled and estimated based on the space use classification. End-use load components within and associated with the building shall be modeled to include, but not be limited to, the following: exhaust fans, parking garage ventilation fans, exterior building lighting, swimming pool heaters and pumps, elevators, escalators, refrigeration equipment and cooking equipment.
Schedules	Same as proposed Exception: Thermostat settings and schedules for HVAC systems that utilize radiant heating, radiant cooling and elevated air speed, provided that equivalent levels of occupant thermal comfort are demonstrated by means of equal Standard Effective Temperature as calculated in Normative Appendix B of ASHRAE Standard 55.	Operating schedules shall include hourly profiles for daily operation and shall account for variations between weekdays, weekends, holidays and any seasonal operation. Schedules shall model the time-dependent variations in occupancy, illumination, receptacle loads, thermostat settings, mechanical ventilation, HVAC equipment availability, service hot water usage and any process loads. The schedules shall be typical of the proposed building type as determined by the designer and approved by the jurisdiction.
Outdoor airflow	Where the proposed design specifies mechanical ventilation: 1. For systems 1-4 as specified in Tables C407.4.1(2) and C407.4.1(3), the outdoor airflow rate shall be determined in accordance with Section C403.7 and <i>International Mechanical Code</i> Section 403.3.1.1.2.3.4 Equation 4-8, using a system ventilation efficiency (E_y) of 0.75. 2. For systems 5-11 as specified in Tables C407.4.1(2) and C407.4.1(3), the outdoor airflow rate shall be determined in accordance with Section C403.7 and <i>International Mechanical Code</i> Section 403.3. Where the proposed design specifies natural ventilation, as proposed.	As proposed, in accordance with Section C403.2.2.
Heating systems	Fuel type: same as proposed design	As proposed
	Equipment type ^a : as specified in Tables C407.4.1(2) and C407.4.1(3)	As proposed
	Efficiency: as specified in the tables in Section C403.3.2.	As proposed

	Capacity ^b : sized proportionally to the capacities in the proposed design based on sizing runs, and shall be established such that no smaller number of unmet heating load hours and no larger heating capacity safety factors are provided than in the proposed design.	As proposed
Cooling systems	Fuel type: same as proposed design	As proposed
	Equipment type ^c : as specified in Tables C407.4.1(2) and C407.4.1(3)	As proposed
	Efficiency: as specified in Tables C403.3.2(1), C403.3.2(2) and C403.3.2(3)	As proposed
	Capacity ^b : sized proportionally to the capacities in the proposed design based on sizing runs, and shall be established such that no smaller number of unmet cooling load hours and no larger cooling capacity safety factors are provided than in the proposed design.	As proposed
	Economizer ^d : same as proposed, in accordance with Section C403.5.	As proposed
Service water heating ^e	Fuel type: same as proposed	As proposed
	Efficiency: as specified in Table C404.2	For Group R, as proposed multiplied by SWHF. For other than Group R, as proposed multiplied by efficiency as provided by the manufacturer of the DWHR unit.
	Capacity: same as proposed Where no service water hot water system exists or is specified in the proposed design, no service hot water heating shall be modeled.	As proposed
<u>Energy Recovery</u>	Where the proposed design specifies mechanical ventilation, as specified in Section C403.7.4 based on the <i>standard reference design</i> airflows.	As proposed
	Where the proposed design specifies natural ventilation, as proposed.	
Fan power	As specified in Section C403.8 for the proposed design. Exceptions: 1. Where the fan power of the proposed design is exempted from the requirements of Section C403.8, as proposed. 2. Fan systems addressed by Section C403.8.1: Fan system BHP power shall be as proposed or to the limits specified in Section C403.8.1, whichever is smaller. If the limit is reached, the power or each fan shall be reduced proportionally until the limit is met. 3. Fan systems serving areas where the mechanical ventilation is provided in accordance with an engineered ventilation system design of Section 403.2 of the <i>International Mechanical Code</i> shall not use the particulate filtration or air cleaner pressure drop adjustment available in Table C403.8(1) when calculating the fan system BHP limit for the portion of the airflow being treated to comply with the engineered ventilation system design.	As proposed
	Where a system providing on-site renewable energy has been modeled in the proposed design the same system shall be modeled identically in the <i>standard reference design</i> except the rated capacity shall meet the requirements of Section C405.15.1	

On-site Renewable Energy	<p>Where no system is designed or included in the proposed design, model an unshaded photovoltaic system with the following characteristics:</p> <p>Size: Rated capacity per Section C405.15.1</p> <p>Module Type: Crystalline Silicone Panel with glass cover, 19.1% nominal efficiency and temperature coefficient of -0.35%/°C, Performance shall be based on a reference temperature of 77°F (25°C), airmass of 1.5 atmosphere and irradiance of 317 Btu/h x ft² (1000 W/m²).</p> <p>Array Type: Rack mounted array with installed nominal operating cell temperature (INOCT) of 103°F (45°C).</p> <p>Total System Losses (DC output to AC output): 11.3%.</p> <p>Tilt: 0-degrees (mounted horizontally).</p> <p>Azimuth: 180 degrees.</p>	As proposed
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For SI: 1 watt per square foot = 10.7 w/m².

SWHF = Service Water Heat Recovery factor, DWHR = Drain Water Heat Recovery.

- a. Where no heating system exists or has been specified, the heating system shall be modeled as fossil fuel. The system characteristics shall be identical in both the standard reference design and proposed design.
- b. The ratio between the capacities used in the annual simulations and the capacities determined by sizing runs shall be the same for both the standard reference design and proposed design.
- c. Where no cooling system exists or no cooling system has been specified, the cooling system shall be modeled as an air-cooled single-zone system, one unit per thermal zone. The system characteristics shall be identical in both the standard reference design and proposed design.
- d. If an economizer is required in accordance with Table C403.5(1) and where no economizer exists or is specified in the proposed design, then a supply-air economizer shall be provided in the standard reference design in accordance with Section C403.5.
- e. The SWHF shall be applied as follows:
 1. Where potable water from the DWHR unit supplies not less than one shower and not greater than two showers, of which the drain water from the same showers flows through the DWHR unit then $SWHF = [1 - (DWHR \text{ unit efficiency} \times 0.36)]$.
 2. Where potable water from the DWHR unit supplies not less than three showers and not greater than four showers, of which the drain water from the same showers flows through the DWHR unit then $SWHF = [1 - (DWHR \text{ unit efficiency} \times 0.33)]$.
 3. Where potable water from the DWHR unit supplies not less than five showers and not greater than six showers, of which the drain water from the same showers flows through the DWHR unit, then $SWHF = [1 - (DWHR \text{ unit efficiency} \times 0.26)]$.
 4. Where Items 1 through 3 are not met, $SWHF = 1.0$.

C103.2 Information on construction documents. Construction documents shall be drawn to scale on suitable material. Electronic media documents are permitted to be submitted where *approved by the code official*. Construction documents shall be of sufficient clarity to indicate the location, nature and extent of the work proposed, and show in sufficient detail pertinent data and features of the building, systems and equipment as herein governed. Details shall include, but are not limited to, the following as applicable:

1. Energy compliance path.
2. Insulation materials and their *R*-values.
3. Fenestration *U*-factors and solar heat gain coefficients (SHGCs).
4. Area-weighted *U*-factor and solar heat gain coefficient (SHGC) calculations.
5. Mechanical system design criteria.
6. Mechanical and service water-heating systems and equipment types, sizes and efficiencies.

7. Economizer description.
8. Equipment and system controls.
9. Fan motor horsepower (hp) and controls.
10. Duct sealing, duct and pipe insulation and location.
11. Lighting fixture schedule with wattage and control narrative.
12. Location of *daylight* zones on floor plans.
13. Air barrier and air sealing details, including the location of the air barrier.
14. Location of pathways for routing of raceways or cable from the on-site renewable energy system to the electrical distribution equipment.
15. Point thermal bridges and linear thermal bridges as identified in Section C402.6.7.
16. Location reserved for inverters, metering equipment, ESS, and a pathway reserved for routing of raceways or conduit from the renewable energy system to the point of interconnection with the electrical service and the ESS.
17. Location and layout of a designated area for ESS.
18. Rated energy capacity and rated power capacity of the installed or planned ESS.

Reason: The current definition of thermal bridge is too broad and needs further distinction in order to properly link thermal bridges to their respective psi and chi factors.

The definition of Building Thermal Envelope includes all wall and roof assembly components, not just insulation. Yet it is only the penetration of the insulation that is relevant to a thermal bridge. So, if an element with a thermal conductivity in excess of 3 Btu/hr-ft-F (From Exception 2 of Section C402.7) penetrates the sheathing but not the insulation, it meets the definition of thermal bridge and very well might require the calculation of a psi- or chi-factor, yet the energy use impact of such a penetration is inconsequential.

Cost Impact: The code change proposal will neither increase nor decrease the cost of construction. This is simply a clarification to the current proposed language and will not impact the cost of construction.

Workgroup Recommendation

Proposal # 887

CED1-138-22

Proponents: Alyson Hallander, representing Schoeck

2024 International Energy Conservation Code [CE Project]

Revise as follows:

C402.7.1 Balconies and floor decks. Balconies and concrete floor decks shall not penetrate the building thermal envelope. Such assemblies shall be separately supported or shall be supported by structural attachments or elements that minimize thermal bridging through the building thermal envelope.

Exceptions: Balconies and concrete floor decks shall be permitted to penetrate the *building thermal envelope* where:

1. an area-weighted *U*-factor is used for *above-grade wall* compliance which includes a *U*-factor of 0.8 Btu/h-°F-ft² for the area of the *above-grade wall* penetrated by the concrete floor deck, or
2. an approved structural thermal break device ~~of with~~ not less than R-10 insulation material is installed in accordance with the manufacturer's instructions.

C402.7.5 Parapets. Parapets shall comply with one or more of the following as applicable:

1. Where continuous insulation is installed on the exterior side of the *above-grade wall* and the roof is insulated with insulation entirely above deck, the continuous insulation shall extend up both sides of the parapet not less than 2 feet (610 mm) above the roof covering or to the top of the parapet, whichever is less. Parapets that are an integral part of a fire-resistance rated wall, and the exterior continuous insulation applied to the parapet, shall comply with the fire resistance ratings of the building code.
2. Where continuous insulation is installed on the exterior side of the *above-grade wall* and the roof insulation is below the roof deck, the continuous insulation shall extend up the exterior side of the parapet to not less than the height of the top surface of the roof assembly.
3. Where continuous insulation is not installed on the exterior side of the *above-grade wall* and the roof is insulated with insulation entirely above deck, the wall cavity or integral insulation shall extend into the parapet up to the exterior face of the roof insulation or equivalent R-value insulation shall be installed not less than 2 feet (610 mm) horizontally inward on the underside of the roof deck.
4. Where continuous insulation is not installed on the exterior side of the *above-grade wall* and the roof insulation is below the roof deck, the wall and roof insulation components shall be adjacent to each other at the roof-ceiling-wall intersection.
5. Where an approved structural thermal break device with not less than R-10 insulation material aligned with the above-grade wall and roof insulation is installed in accordance with the manufacturer's instructions.

Exception: An *approved* design where the *above-grade wall U*-factor used for compliance accounts for the parapet *thermal bridge*.

TABLE C402.1.4 PSI- and CHI-FACTORS TO DETERMINE THERMAL BRIDGES FOR THE COMPONENT PERFORMANCE ALTERNATIVE

Thermal Bridge per Section C402.7	Thermal Bridge Compliant with Section C402.7		Thermal Bridge Non-Compliant with Section C402.7	
	psi-factor (Btu/h-ft-°F)	chi-factor (Btu/h-ft-°F)	psi-factor (Btu/h-ft-°F)	chi-factor (Btu/h-ft-°F)
C402.7.1 Balconies, slabs, and decks	0.2	n/a	0.5	n/a
C402.7.2 Cladding supports	0.2	n/a	0.3	n/a
C402.7.3 Structural beams and columns	n/a	1.0-carbon steel 0.3-concrete	n/a	2.0-carbon steel 1.0-concrete
C402.7.4 Vertical fenestration	0.15	n/a	0.3	n/a
C402.7.5 Parapets	0.2	n/a	0.4	n/a

For SI: W/m-K = 0.578 Btu/h-ft-°F; 1 W/K = 1.90 Btu/h-°F

n/a = not applicable

Reason: C402.7.1 reasons:

The proposed wording will make it feasible to meet thermal performance requirements with current structural thermal break products on the market.

The tweaks to the wording clarify that a manufactured structural thermal break is acceptable and that the R-value applies only to the **insulated material** of the manufactured assemblies.

Typical manufactured structural thermal breaks incorporate at least R-15 insulation material; however, when the thermal properties of the stainless steel reinforcement and the compression material of the devices are considered, the resulting assembly R-value is less than R-10 for nearly all structural thermal break assemblies.

C402.7.5 reasons:

Regarding parapets with adding C402.7.5.5, incorporating a structural thermal break within the parapet ensures a truly continuous building envelope compared to extending insulation 2' up along the parapet.

See below image for where a structural thermal break can be incorporated at a parapet to maintain continuous insulation:

ADDENDA

**ANSI/ASHRAE/IES Addendum av to
ANSI/ASHRAE/IES Standard 90.1-2019**

Energy Standard for Buildings Except Low-Rise Residential Buildings

Approved by the ASHRAE Standards Committee on June 25, 2022; by the ASHRAE Board of Directors on June 29, 2022; by the Illuminating Engineering Society on June 17, 2022; and by the American National Standards Institute on July 29, 2022.

This addendum was approved by a Standing Standard Project Committee (SSPC) for which the Standards Committee has established a documented program for regular publication of addenda or revisions, including procedures for timely, documented, consensus action on requests for change to any part of the standard. Instructions for how to submit a change can be found on the ASHRAE® website (<https://www.ashrae.org/continuous-maintenance>).

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FOREWORD

Work on Addendum av was initiated following the publication of ASHRAE Research Project (RP) 1365 "Thermal Performance of Building Envelope Details for Mid- and High-Rise Buildings." The RP found that unaccounted heat flow through the cumulative impact of thermal bridges can increase the annual energy consumption associated with the building envelope when compared to a building without thermal bridges.

Addendum av incorporates numerous comments from multiple public review periods. Exceptions are added for overhangs, additional compliance options are added for mass walls, allowances are increased for unmitigated thermal bridges, and clarifying language is added to Section 11 and Normative Appendix G.

The options shown were considered cost effective based on the methodology agreed to by SSPC 90.1, except for the large elements, in which case an allowance is provided. The current standard assumes a near-perfect building with no large elements passing through the thermal envelope. Addendum av therefore offers the user two options: construct a near-perfect wall or take advantage of the allowances.

Addendum cr to Standard 90.1-2019, which was published during the development of this addendum, provides requirements that limit building envelope tradeoffs in the performance paths in Section 11 and Normative Appendix G (aka building envelope backstops). Projects can comply with the proposed building envelope tradeoff limits either by meeting the prescriptive envelope requirements in Section 5.5 or using Section 5.6 "Building Envelope Trade-Off Option" to demonstrate that the energy cost penalty from the proposed envelope does not exceed the set margins. The backstop margins are 15% for residential building area types and 7% for nonresidential building area types.

Note: In this addendum, changes to the current standard are indicated in the text by underlining (for additions) and ~~strike through~~ (for deletions) unless the instructions specifically mention some other means of indicating the changes.

Addendum av to Standard 90.1-2019

Revise Section 3.2 as shown (I-P and SI).

chi-factor (χ or Chi): thermal transmittance of a *point thermal bridge* in units of Btu/(h·°F) [W/K]

[...]

clear-field thermal bridge: see *thermal bridge*.

[...]

linear thermal bridge: see *thermal bridge*.

[...]

point thermal bridge: see *thermal bridge*.

[...]

psi-factor (ψ or Psi): thermal transmittance per unit length of a *linear thermal bridge* in units of Btu/(h·ft·°F) [W/(m·K)]

[...]

thermal bridge: an element that has higher thermal conductivity than the surrounding materials, which creates a path of least resistance for heat transfer. For the purposes of determining *building envelope* requirements, the classifications for *thermal bridges* are defined as follows:

clear-field thermal bridge: elements of a *building envelope* assembly that are distributed over the area of the assembly and addressed in determining the thermal performance of the assembly in accordance with Normative Appendix A. Examples of *clear-field thermal bridges* include studs, webs and face shells of masonry units, ties, tracks, plates, girts and purlins for metal building envelopes, and fasteners. Fasteners used to construct assemblies in accordance

with Normative Appendix A are not considered nor separately defined as *point thermal bridges*.

linear thermal bridge: a length-based element associated with horizontal, vertical, or diagonal elements that penetrates the insulation in the *building envelope* and with length measured along the exterior surface of the *building envelope*. Examples of *linear thermal bridges* include edges of *floors*, balconies, columns and beams in the plane of an assembly, parapets, *roof-wall-floor* intersections, *fenestration* interfaces, shelf angles, and similar conditions not otherwise defined as a *clear field thermal bridge* or *point thermal bridge*.

point thermal bridge: a discrete element that penetrates the insulation in the *building envelope*. Examples of *point thermal bridges* include a beam penetrating a *wall*, a column penetrating a *roof* or *floor*, and an anchor or connection used to attach an element to the *building* and not otherwise defined as a *clear field thermal bridge* or *linear thermal bridge*. The cross-sectional area of the *point thermal bridge* is measured at the outer surface of the outermost layer of insulation that is penetrated by the element.

Revise Section 3.3 as shown (I-P and SI).

- χ *chi-factor*, thermal transmittance of a *point thermal bridge*
[. . .]
- L length of a *linear thermal bridge*
[. . .]
- min. minimum
[. . .]
- n number of occurrences a *point thermal bridge*
[. . .]
- Ψ *psi-factor*, thermal transmittance per unit length of a *linear thermal bridge*

Revise Section 5.5.3.2 as shown (I-P and SI).

5.5.3.2 Above-Grade Wall Insulation. Above-grade walls shall comply with the insulation values specified in Tables 5.5-0 through 5.5-8. For the purposes of this provision, wall top plates, tracks, headers, or bond beams are considered part of the base wall assembly.

Exception to 5.5.3.2: ~~Alternatively,~~ For mass walls, where the requirement in Tables 5.5-0 through 5.5-8 is for a maximum assembly U-0.151 (U-0.857) followed by footnote “b,” concrete masonry unit (CMU) walls complying with ASTM C90 concrete block walls that are ungrouted or partially grouted at 32 in. (800 mm) or greater~~less~~ on center vertically and 48 in. (1200 mm) or greater~~less~~ on center horizontally shall have their ungrouted openings (e.g., cores, cells) filled with insulating material having a maximum thermal conductivity of 0.44 Btu·in/ h·ft²·°F (0.063 W/(m·K)). Other mass walls with integral insulation shall meet the criteria when their U-factors are equal to or less than those for the appropriate thickness and density in the “Partly Grouted, Cells Insulated” column of Table A3.1.3.

Add new Section 5.5.5 as shown (I-P and SI).

5.5.5 Linear Thermal Bridges and Point Thermal Bridges. Where *linear thermal bridges* and *point thermal bridges* occur as described in Sections 5.5.5.1 through 5.5.5.5, they shall

- a. comply with the applicable requirements of Sections 5.5.5.1 through 5.5.5.5 or
- b. not exceed the mitigated *psi-factors* and *chi-factors* in Table A10.1, where the *psi-factors* and *chi-factors* for the *thermal bridges* are determined in accordance with Appendix A, Section A10.

For the purposes of Section 5.5.5, linear elements that are connected to the building structure by a series of point connections shall be permitted to be characterized as *linear thermal bridges* or as individual *point thermal bridges*.

Exceptions to 5.5.5:

1. *Buildings* located in Climate Zones 0 through 3.
2. *Semiheated spaces in buildings* located in Climate Zones 0 through 6.
3. *Clear-field thermal bridges*.
4. *Thermal bridges* in uninsulated assemblies.

5. Linear and point thermal bridges that have a material thermal conductivity less than 3.0 Btu·in/ h·ft²·°F (0.433 W/[m·K]).
6. Alterations to existing buildings other than additions.
7. Roofs that project over exterior walls.

Informative Note: For *linear thermal bridges* and *point thermal bridges* that fall under the provisions of Section 2.4 and cannot comply prescriptively with the provisions of Sections 5.5.5.1 through 5.5.5.4, projects can use Section 5.5.5.5, Section 11, Normative Appendix C, or Normative Appendix G.

5.5.5.1 Roof and Wall Intersections. Where a *roof with insulation entirely above deck* intersects an *exterior wall*, the intersection shall comply with Sections 5.5.5.1.1, 5.5.5.1.2, 5.5.5.1.3, and 5.5.5.1.4, as applicable. Blocking, nailers, and similar elements shall be permitted to interrupt insulation for securement of the *roof covering*, coping, flashing materials, or similar elements.

5.5.5.1.1 Roof Edges. At *roof edges* without parapets or overhangs, the *roof* insulation and the *wall* insulation shall comply with the following, as applicable to the location of the insulation:

- a. Where a wall has exterior continuous insulation, the *roof* insulation shall extend to the exterior of the *wall* insulation and the *wall* insulation shall extend to the *roof* insulation.
- b. Where a wall has cavity or integral insulation that represents more than 50% of the total wall insulation R-value, the *roof-to-wall* insulation shall comply with one of the following:
 1. The cavity or integral insulation shall extend to the underside of the roof insulation.
 2. The cavity or integral insulation shall extend to the underside of the roof deck, and the roof insulation shall extend to the exterior face of the wall. The *wall* insulation shall be permitted to be interrupted by roof framing members.
 3. Additional insulation having a rated R-value of insulation not less than R-5 (R-0.9) shall extend inward on the underside of the roof deck for not less than 2 ft (0.6 m) and be permitted to be interrupted by roof framing members.
 4. Insulation having a rated R-value of insulation not less than R-5 (R-0.9) shall be placed at the exterior of the roof edge and be located between the bottom plane of the roof insulation and the plane of the bottom of the roof deck.
 5. The wall insulation values in Tables 5.5-1 through 5.5-8 shall be adjusted in accordance with Table 5.5.5.1.2.1.
 6. The roof insulation values in Tables 5.5-1 through 5.5-8 shall be adjusted in accordance with Table 5.5.5.1.2.2.
- c. Where a mass wall has interior insulation that represents more than 50% of the total wall insulation R-value, the interior insulation shall extend to the underside of the roof deck, shall be permitted to be interrupted by framing members, and shall comply with one of the following:
 1. Additional insulation having a rated R-value of insulation not less than R-5 (R-0.9) shall extend inward on the underside of the roof deck for not less than 2 ft (0.6 m) and be permitted to be interrupted by roof framing members.
 2. Additional insulation having a rated R-value of insulation not less than R-5 (R-0.9) shall be placed at the exterior of the roof edge and be located between the bottom plane of the roof insulation and the plane of the bottom of the roof assembly in contact with the exterior wall.
 3. The wall insulation values in Tables 5.5-1 through 5.5-8 shall be adjusted in accordance with Table 5.5.5.1.2.1.
 4. The roof insulation values in Tables 5.5-1 through 5.5-8 shall be adjusted in accordance with Table 5.5.5.1.2.2.

Informative Note: See Informative Appendix J, Figures J-1.)

5.5.5.1.2 Parapets. At *roof edges* with parapets, the *exterior wall* insulation shall comply with one or more of the following as applicable to the location of the insulation and *wall* assembly:

- a. Where a wall has exterior continuous insulation, such *insulation* shall be applied to both vertical sides of the parapet.

Informative Note: See Informative Appendix J, Figure J-2[a].)

- b. Where a wall has cavity or integral insulation that represents more than 50% of the total wall insulation R-value, the *roof to wall* intersections at parapets shall comply with one of the following:

Table 5.5.5.1.2.1 Additional Wall Insulation Required for Mass Walls with Insulation on the Interior or Integral at Intersections with Roof Edges and Parapets

<u>Climate Zone</u>	<u>R-Value Increase</u>	<u>U-factor % Decrease</u>
4	R-1.0 (R-0.18)	8%
5	R-1.0 (R-0.18)	8%
6	R-1.5 (R-0.26)	10%
7	R-1.5 (R-0.26)	10%
8	R-2.5 (R-0.44)	14%

Table 5.5.5.1.2.2 Additional Roof Insulation Required for Mass Walls with Insulation on the Interior or Integral at Intersections with Roof Edges and Parapets

<u>Climate Zone</u>	<u>R-Value Increase</u>	<u>U-factor % Decrease</u>
4	R-7.0 (R-1.23)	24%
5	R-7.0 (R-1.23)	24%
6	R-7.0 (R-1.23)	26%
7	R-9.0 (R-1.58)	26%
8	R-9.0 (R-1.58)	26%

1. The wall insulation shall extend within the cavity of the parapet not less than the height of the top of the roof insulation. The wall insulation shall be permitted to be interrupted by roof framing members.
2. Additional insulation having a rated R-value of insulation not less than R-5 (R-0.9) shall extend inward on the underside of the roof deck for not less than 2 ft (0.6 m) and be permitted to be interrupted by roof framing members.
3. Insulation having a rated R-value of insulation not less than R-5 (R-0.9) shall be placed at the exterior of the roof edge and be located between the bottom plane of the roof insulation and the plane of the bottom of the roof deck.
4. The wall insulation values in Tables 5.5-1 through 5.5-8 shall be adjusted in accordance with Table 5.5.5.1.2.1
5. The roof insulation values in Tables 5.5-1 through 5.5-8 shall be adjusted in accordance with Table 5.5.5.1.2.2.

(Informative Note: See Informative Appendix J, Figure J-2[b].)

- c. Where a mass wall has interior insulation that represents more than 50% of the total wall insulation R-value, the interior insulation shall extend to the underside of the roof deck, shall be permitted to be interrupted by framing members, and shall comply with one of the following:
 1. Additional insulation having a rated R-value of insulation not less than R-5 (R-0.9) shall extend inward on the underside of the roof deck for not less than 2 ft (0.6 m) and be permitted to be interrupted by roof framing members.
 2. Additional insulation having a rated R-value of insulation not less than R-5 (R-0.9) shall be placed at the exterior of the roof edge and be located between the bottom plane of the roof insulation and the plane of the bottom of the roof assembly in contact with the exterior wall.
 3. The wall insulation values in Tables 5.5-1 through 5.5-8 shall be adjusted in accordance with Table 5.5.5.1.2.1.
 4. The roof insulation values in Tables 5.5-1 through 5.5-8 shall be adjusted in accordance with Table 5.5.5.1.2.2.

(Informative Note: See Informative Appendix J, Figure J-2[c] and J-2[d].)

5.5.5.1.3 Parapets within the Field of a Roof. Exterior continuous insulation having a minimum rated R-value of insulation not less than R-5 (R-0.9) shall be applied to both vertical sides of the parapet and extend from the coping at the top of the parapet to not less than the top of the roof insulation below.

Informative Notes:

1. See Informative Appendix J, Figure J-3.
2. Parapets that are an integral part of a fire-resistance-rated wall, and the exterior continuous insulation applied to the parapet, shall comply with the fire resistance ratings of the building code.

5.5.5.2 Walls and Intermediate Floor Intersections. At floor and exterior wall intersections, the exterior wall insulation shall comply with Sections 5.5.5.2.1, 5.5.5.2.2, and 5.5.5.2.3 as applicable to the type of floor intersection, exterior wall assembly and location of the exterior wall insulation.

5.5.5.2.1 Intermediate floor edges that do not serve as balconies or floor overhangs shall comply with the following as applicable:

- a. Where a wall has exterior continuous insulation, such insulation shall extend continuously past the floor edge.
- b. Where a wall has cavity insulation that represents more than 50% of the total wall insulation R-value, the cavity insulation shall extend to the underside of the floor deck and shall be permitted to be interrupted by floor framing members and wall top and bottom plates or tracks.

(Informative Note: See Informative Appendix J, Figure J-4[a] and J-4[b].)

- c. Where a mass wall has integral insulation that represents more than 50% of the total wall insulation R-value, the intermediate floor intersection shall comply with one of the following:
 1. The full thickness of integral insulation shall extend past the floor edge.
 2. Where the intermediate floor deck extends through the integral insulation, insulation having a rated R-value of insulation not less than R-5 (R-0.9) shall be maintained to the full depth of the floor edge on the exterior side of the floor edge.

(Informative Note: See Informative Appendix J, Figure J-4[c] and J-4[d].)

- d. Where a mass wall has interior insulation that represents more than 50% of the total wall insulation R-value, the interior insulation shall extend to the underside of the floor deck, shall be permitted to be interrupted by framing members, and shall comply with one of the following:
 1. Additional interior insulation having a rated R-value of insulation not less than R-5 (R-0.9) shall cover the full depth of the floor edge. Such insulation shall be permitted to be interrupted by floor framing members. Fire safing applied to the full depth of the floor edge meets this requirement.
 2. Additional insulation having a rated R-value of insulation not less than R-5 (R-0.9) shall cover the full depth of the floor edge on the exterior side of the wall.
 3. The wall insulation values in Tables 5.5-1 through 5.5-8 shall be adjusted in accordance with Table 5.5.5.2.1.

(Informative Note: See Informative Appendix J, Figure J-4[e] and J-4[f].)

- e. Where mass walls have not less than 50 percent of the rated R-value of insulation on the exterior side of the wall and the remainder on the interior side, the insulation on the interior side of the wall shall be permitted to be interrupted by an intermediate floor.

(Informative Note: See Informative Appendix J, Figure J-4[g].)

5.5.5.2.2 The total length of mass floor assembly projections serving as balconies or floor overhangs that penetrate the building envelope shall not exceed the percentages of the total building perimeter depicted in Table 5.5.5.2.2. For this calculation, total building perimeter is the sum of the perimeters of each above grade floor where it intersects the exterior building envelope.

Exceptions to 5.5.5.2.2:

1. Mass floor assembly projections located directly above and providing protection to a pedestrian walkway at street-level.
2. Mass floor assembly projections thermally broken with a continuous thermal spacer block not less than R-12 (R-2.1). The thermal spacer block shall be permitted to be interrupted by structural connections.

5.5.5.3 Exterior Cladding Support. Shelf angles that support masonry exterior cladding shall be offset from the floor edge or primary structural frame using point connections to accommodate the full depth of any exterior continuous insulation between the support and floor or structure, exclusive of the point connections. The cross-sectional area of point connections shall not exceed 1.5 in.²/lin ft (3200 mm²/lin m) for carbon steel connections or 2.3 in.²/lin ft (4900 mm²/lin m) for stainless steel. Other cladding supports that penetrate the exterior continuous insulation shall be subject to the provisions of Section 5.5.5.5 and be mounted away from the backup construction

Table 5.5.5.2.1 Additional Wall Insulation Required for Mass Walls With Insulation on the Interior Complying with Section 5.5.5.2(d)(3)

Climate Zone	R-Value Increase	U-factor % Decrease
4	R-1.5 (R-0.26)	13%
5	R-2.0 (R-0.35)	15%
6	R-2.5 (R-0.44)	16%
7	R-3.0 (R-0.53)	20%
8	R-4.0 (R-0.70)	25%

Table 5.5.5.2.2 Mass Floor Balcony or Floor Overhang Allowances

Climate Zone	Maximum Percent of Building Perimeter
4	35%
5	30%
6	20%
7	10%
8	0%

using point connections to accommodate the full depth of any exterior *continuous insulation* exclusive of the point connections.

Exception to 5.5.5.3: Girts in *metal building walls* as described in Normative Appendix A.

(Informative Note: See Informative Appendix J, Figure J-5.)

5.5.5.4 Opaque Wall and Vertical Fenestration Intersection. *Vertical fenestration* shall be installed in accordance with one or more of the following:

- a. For *vertical fenestration*, the outermost glazing layer shall be aligned within the thickness of or within 2 in. (50 mm) of either face of the *continuous insulation* layer.

(Informative Note: See Informative Appendix J, Figure J-6[a] and J-6[b].)

- b. For *vertical fenestration*, where *continuous insulation* is not present, the outermost glazing layer shall be aligned within the thickness of the *wall* insulation layer and not more than 2 in. (50 mm) from the exterior side of the outermost insulation layer.

(Informative Note: See Informative Appendix J, Figure J-6[c].)

- c. Intersections between *vertical fenestration* and *opaque walls* where the surfaces of the rough opening located between the edge of the frame of the *vertical fenestration* and the *opaque wall* insulation shall be

1. covered with a material having an *R-value* not less than R-3 (R-0.5), or
2. covered with wood framing not less than 1.5 in. (38 mm) thick, or
3. covered with a material having a thermal conductivity of not more than 3.0 Btu·in/ h·ft²·°F (0.433 W/(m·K)).

(Informative Note: See Informative Appendix J, Figure J-6[d] and J-6[e].)

- d. Intersections between *vertical fenestration* and *opaque* spandrel in a shared fenestration framing system shall have a thermal break with a thermal conductivity of 3.6 Btu·in/ h·ft²·°F (0.519 W/(m·K)) or less.

Exception to 5.5.5.4: Intersections between *vertical fenestration* and uninsulated *opaque walls*.

5.5.5.5 Other Elements and Building Assembly Intersections. Individual *point thermal bridges* and *linear thermal bridges* not addressed in Sections 5.5.5.1 through 5.5.5.4 shall comply with Equation 5.5.5.5.

$$\text{Above grade area of the building envelope} \geq \frac{347 \text{ Btu} \cdot \text{in.} / (\text{ft}^2 \cdot \text{h} \cdot \text{°F}) \times 0.003\% \times}{(k_1 \times A_1) + (k_2 \times A_2) + (k_3 \times A_3) \dots} \quad (5.5.5.5 \text{ I-P})$$

Table 5.5.5.5 Allowable Point Thermal Bridge Cross-Sectional Area

<u>Allowable Area per Point Thermal Bridge, in.²(mm²)</u>	<u>Common Material Name</u>
3 (1935)	Carbon steel
9 (5800)	Stainless steel
65 (41935)	Concrete and masonry

$$\text{Above grade area of the building envelope} > \frac{50 \text{ W}/(\text{m}\cdot\text{K}) \times 0.003\% \times}{(k_1 \times A_1) + (k_2 \times A_2) + (k_3 \times A_3) \dots} \quad (5.5.5.5 \text{ SI})$$

where

$k_1, k_2, k_3, \dots =$ thermal conductivity of material 1, material 2, material 3, etc., expressed in Btu·in./(ft²·h·°F) (W/[m·K]) for point thermal bridge material 1, material 2, material 3, etc. (e.g., concrete, carbon steel, stainless steel, wood)

$A_1, A_2, A_3, \dots =$ the total cross-sectional area of point thermal bridges and linear thermal bridges of material 1, material 2, material 3, etc., expressed in ft²(m²)

Exceptions to 5.5.5.5:

1. Service penetrations, including mechanical, electrical, plumbing, telecommunications, and fire services, that pass through the opaque building envelope.
2. Insulated roof curbs and blocking.
3. Individual point thermal bridges that are less than the allowances in Table 5.5.5.5.

(Informative Note: See ASHRAE Handbook—Fundamentals Appendix A, Chapter 26, or Chapter 33 for typical material thermal conductivity.)

Revise Section 5.6.1.1 as shown (I-P and SI).

5.6.1.1 All components of the *building envelope* shown on architectural drawings or installed in *existing buildings* shall be modeled in the *proposed design*. The *simulation program* model *fenestration* and *opaque building envelope* types and area shall be consistent with the *construction documents*. Any *building envelope* assembly not subject to the provisions of Section 5.5.5 that covers less than 5% of the total area of that assembly type (e.g., *exterior walls*) need not be separately described, provided it is similar to an assembly being modeled. If not separately described, the area of a *building envelope* assembly shall be added to the area of an assembly of that same type with the same *orientation* and thermal properties.

[...]

Revise Section 5.7.2 as shown (I-P and SI).

5.7.2 Permit Application Documentation. Application documents shall include, at a minimum, the type and *rated R-value of insulation* for each product; *opaque door* schedule showing the *U-factor* for each *opaque door* product as determined in accordance with Section 5.8.2; *fenestration* schedule showing the manufacturer, model number, orientation, area, *U-factor*, *SHGC*, and *VT* for each *fenestration* product as determined in accordance with Section 5.8.2; *air leakage* details in accordance with Section 5.4.3; and *point and linear thermal bridge details in the proposed building* shall be represented on the compliance documents in accordance with Section 5.5.5.

[...]

Insert new Section 5.8.2 as shown, and renumber subsequent sections accordingly (I-P and SI).

5.8.2 Fenestration and Doors

[...]

5.8.2.3 Manufacturer's Installation Instructions. Fenestration products shall be installed in accordance with *manufacturers' instructions*.

Modify Section 11, Table 11.5.1 as shown (I-P and SI).

Table 11.5.1 Modeling Requirements for Calculating Design Energy Cost and Energy Cost Budget

<i>Proposed Design (Column A)</i> <i>Design Energy Cost (DEC)</i>	<i>Budget Building Design (Column B)</i> <i>Energy Cost Budget (ECB)</i>
[...]	
5. Building Envelope	
<p>All components of the <i>building envelope</i> in the <i>proposed design</i> shall be modeled as shown on architectural drawings or as installed for <i>existing building envelopes</i>. <u>All opaque building envelope components shall be modeled accounting for thermal mass effects.</u></p> <p>Exceptions: The following <i>building</i> elements are permitted to differ from architectural drawings.</p> <ol style="list-style-type: none"> 1. Each <i>linear thermal bridge</i> and <i>point thermal bridge</i> as identified in Section 5.5.5 shall be modeled using either of the following techniques: <ol style="list-style-type: none"> a. A separate model of the assembly within the <i>energy simulation model</i>. b. Adjustment-of the clear-field <i>U-factor</i> in accordance with Appendix A10.2. 2. Each uninsulated assembly not identified in Section 5.5.5 shall be modeled using either of the following techniques: <ol style="list-style-type: none"> a. A separate model of the assembly <u>within the <i>energy simulation model</i>.</u> b. The <i>U-factors</i> of uninsulated assemblies can be averaged with larger adjacent surfaces of the same <i>class of construction</i> using an area-weighted average method. This average <i>U-factor</i> is modeled within the <i>energy simulation model</i>. 3. <u>Any other <i>building envelope</i> assembly, not subject to the requirements of Section 5.5.5, that covers less than 5% of the total area of that assembly type (e.g., <i>exterior walls</i>) <i>class of construction</i> need not be separately described, provided that it is similar to an assembly being modeled. If not separately described, the area of a <i>building envelope</i> assembly must be added to the area of the adjacent assembly of the same type <u><i>U-factors</i> of these assemblies shall be averaged with larger adjacent surfaces using an area-weighted average method. This average <i>U-factor</i> shall be modeled within the <i>energy simulation model</i>.</u></u> 	<p>The <i>budget building design</i> shall have identical <i>conditioned floor area</i> and identical exterior dimensions and orientations as the <i>proposed design</i>, except as follows:</p> <ol style="list-style-type: none"> a. <i>Opaque</i> assemblies, such as <i>roof, floors, doors, and walls</i>, shall be modeled as having the same heat capacity as the proposed design but with the minimum <i>U-factor</i> required in Section 5.5 for new <i>buildings</i> or <i>additions</i> and Section 5.1.3 for <i>alterations</i>. b. <u>Where <i>linear thermal bridges</i> and <i>point thermal bridges</i>, as identified in Section 5.5.5.1 through 5.5.5.5, are included in the <i>proposed design</i>, they shall be modeled by adjusting the <i>U-factor</i> of the parent assembly in accordance with the default values in Section A10. If the proposed design does not have <i>linear thermal bridges</i> and <i>point thermal bridges</i>, as identified in Sections 5.5.5.1 through 5.5.5.5, they shall not be modeled in the <i>budget building design</i>.</u> <p style="margin-left: 20px;"><u>If the balcony length in the <i>proposed design</i> exceeds the maximum allowed by Section 5.5.5.2.2, the area shall be reduced proportionally for each balcony until the limit set in Section 5.5.5.2.2 is met.</u></p> bc. The exterior <i>roof</i> surfaces shall be modeled with a solar reflectance and thermal emittance as required in Section 5.5.3.1.1(a). All other <i>roofs</i>, including <i>roofs</i> exempted from the requirements in Section 5.5.3.1.1, shall be modeled the same as the <i>proposed design</i>.
[...]	[...]

Modify Section 12 as shown (I-P and SI).

Reference	Title
[...]	
International Organization for Standardization (ISO) 1, rue de Varembe, Case postale 56, CH-1211 Geneve 20, Switzerland	
[...]	
ISO 10211 (2017)	<u>Thermal bridges in building construction—Heat flows and surface temperatures—Detailed calculations</u>
[...]	
ISO 14683 (2017)	<u>Thermal bridges in building construction—Linear thermal transmittance—Simplified methods and default values</u>
[...]	

Revise Normative Appendix A as shown (I-P and SI).

A1. GENERAL

[. . .]

A1.3 Applicant-Determined Psi-Factors and Chi-Factors for Thermal Bridges. The applicant shall determine values for *point thermal bridges* and *linear thermal bridges* using the assumptions in Section A10.

[. . .]

A10. THERMAL BRIDGING CHI FACTORS AND PSI FACTORS

A10.1 Determination of Psi-Factors and Chi-Factors. *Psi-factor* (ψ) and *chi-factor* (χ) values representative of an as-designed *thermal bridging* condition shall be determined in accordance with one of the following:

- a. From simulation models compliant with ISO 10211 using details representative of the actual construction and modeling assumptions consistent with generally accepted architectural and engineering practice.
- b. From ISO 14683.
- c. From testing of the assembly in accordance with ASTM C1363 with and without the presence of the *thermal bridge* condition to determine a linear transmittance value or point transmittance value for the *thermal bridge* condition.
- d. From application of heat transfer theory in accordance with generally accepted engineering practice and where approved by the *authority having jurisdiction*.
- e. As indicated in Table A10.1. The default column shall be used where the thermal bridge meets prescriptive requirements. The unmitigated column shall be used where the thermal bridge does not meet the prescriptive requirements.

(Informative Note: In Table A10.1, the values for *thermal bridge* details prescribed in Section 5.5.5 are based on data from ASHRAE Research Project 1365 and the BC Hydro Thermal Bridging Guide listed in Informative Appendix E.)

A10.2 Assembly U-Factor Adjustment for Simulation of Thermal Bridges. For the purpose of incorporating the effects of thermal bridges in simulations as required by Section 11 and Normative Appendix G, where a thermal bridge is not modeled as a separate element, the clear-field U-factors of modeled assemblies shall be modified in accordance with Equation A10.2. This modification shall be achieved in the simulation model by altering the conductance value assigned to any one or more insulation layers within the modeled assembly without altering the properties of modeled building material layers.

$$U_{tot} = \{[(\sum \psi_i \times L_i) + (\sum \chi_j \times n_j)]/A_{total}\} + U_o \quad (A10.2)$$

where

- U_{tot} = overall thermal transmittance, including the effect of *linear thermal bridges* and *point thermal bridges* not included in the *construction* assembly U_o -factor.
Btu/(h·ft²·°F) W/(m²·K)
- U_o = clear-field thermal transmittance of the *construction* assembly as determined in accordance with Section 5, Btu/(h·ft²·°F) (W/[m²·K])
- A_{total} = total *opaque* projected surface area of the *construction* assembly, ft² (m²)
- ψ_i = *psi-factor*, thermal transmittance for each type of *linear thermal bridge*.
Btu/(h·ft·°F) (W/[m·K])
- L_i = length of a particular *linear thermal bridge* as measured on the outside surface of the *building envelope*, ft (m)
- χ_j = *chi-factor*, thermal transmittance for each detail type of *point thermal bridge*.
Btu/(h·°F) (W/K)
- n_j = number of occurrences a particular type of *point thermal bridge*

Table A10.1 Thermal Bridging Psi-Factors and Chi-Factors for Thermal Bridges (I-P)

<u>Class of Construction— Wall, above Grade</u>	<u>Thermal Bridge Type</u>	<u>Section</u>	<u>Unmitigated</u>		<u>Default</u>	
			<u>Psi-Factor Btu/(h·ft·°F)</u>	<u>Chi-Factor Btu/(h·°F)</u>	<u>Psi-Factor Btu/(h·ft·°F)</u>	<u>Chi-Factor Btu/(h·°F)</u>
<i>Steel framed and metal buildings</i>	<u>Roof edge</u>	<u>5.5.5.1.1</u>	<u>0.450</u>	<u>N/A</u>	<u>0.140</u>	<u>N/A</u>
	<u>Parapet</u>	<u>5.5.5.1.2</u>	<u>0.289</u>		<u>0.151</u>	
	<u>Intermediate floor to wall intersection</u>	<u>5.5.5.2.1</u>	<u>0.487</u>		<u>0.177</u>	
	<u>Intermediate floor balcony or overhang to opaque wall intersection</u>	<u>5.5.5.2.2</u>	<u>0.487</u>		<u>0.177</u>	
	<u>Intermediate floor balcony in contact with vertical fenestration</u>	<u>5.5.5.2.2</u>	<u>0.974</u>		<u>0.177</u>	
	<u>Cladding Support</u>	<u>5.5.5.3</u>	<u>0.314</u>		<u>0.217</u>	
	<u>Wall to vertical fenestration intersection</u>	<u>5.5.5.4</u>	<u>0.262</u>		<u>0.112</u>	
	<u>Other element and assembly intersections</u>	<u>5.5.5.5</u>	<u>N/A</u>	<u>1.73</u>	<u>N/A</u>	<u>0.91</u>
<u>Mass (exterior or integral)</u>	<u>Roof edge</u>	<u>5.5.5.1.1</u>	<u>0.500</u>	<u>N/A</u>	<u>0.100</u>	<u>N/A</u>
	<u>Parapet</u>	<u>5.5.5.1.2</u>	<u>0.238</u>		<u>0.125</u>	
	<u>Intermediate floor to wall intersection</u>	<u>5.5.5.2</u>	<u>0.476</u>		<u>0.179</u>	
	<u>Intermediate floor balcony or overhang to opaque wall intersection</u>	<u>5.5.5.2.2</u>	<u>0.476</u>		<u>0.179</u>	
	<u>Intermediate floor balcony in contact with vertical fenestration</u>	<u>5.5.5.2</u>	<u>0.974</u>		<u>0.177</u>	
	<u>Cladding support</u>	<u>5.5.5.3</u>	<u>0.270</u>		<u>0.186</u>	
	<u>Wall to vertical fenestration intersection</u>	<u>5.5.5.4</u>	<u>0.188</u>		<u>0.131</u>	
	<u>Other element and assembly intersections</u>	<u>5.5.5.5</u>	<u>N/A</u>	<u>0.91</u>	<u>N/A</u>	<u>0.19</u>
<u>Mass (interior)</u>	<u>Roof edge</u>	<u>5.5.5.1.1</u>	<u>0.500</u>	<u>N/A</u>	<u>0.100</u>	<u>N/A</u>
	<u>Parapet</u>	<u>5.5.5.1.2</u>	<u>0.511</u>		<u>0.227</u>	
	<u>Intermediate floor to wall intersection</u>	<u>5.5.5.2</u>	<u>0.476</u>		<u>0.286</u>	
	<u>Intermediate floor balcony or overhang to opaque wall intersection</u>	<u>5.5.5.2.2</u>	<u>0.476</u>		<u>0.286</u>	
	<u>Intermediate floor balcony in contact with vertical fenestration</u>	<u>5.5.5.2</u>	<u>0.974</u>		<u>0.177</u>	
	<u>Cladding support</u>	<u>5.5.5.3</u>	<u>Same as mass (exterior)</u>			
	<u>Wall to vertical fenestration intersection</u>	<u>5.5.5.4</u>	<u>0.313</u>	<u>N/A</u>	<u>0.083</u>	<u>N/A</u>
	<u>Other element and assembly intersections</u>	<u>5.5.5.5</u>	<u>Same as mass (exterior)</u>			
<u>Wood-framed and other</u>	<u>Roof edge</u>	<u>5.5.5.1.1</u>	<u>0.450</u>	<u>N/A</u>	<u>0.140</u>	<u>N/A</u>
	<u>Parapet</u>	<u>5.5.5.1.2</u>	<u>0.032</u>		<u>0.032</u>	
	<u>Intermediate floor to wall intersection</u>	<u>5.5.5.2.1</u>	<u>0.336</u>		<u>0.049</u>	
	<u>Cladding support</u>	<u>5.5.5.3</u>	<u>0.186</u>		<u>0.043</u>	
	<u>Wall to vertical fenestration intersection</u>	<u>5.5.5.4</u>	<u>0.150</u>		<u>0.099</u>	
	<u>Other element and assembly intersections</u>	<u>5.5.5.5</u>	<u>N/A</u>	<u>0.33</u>	<u>N/A</u>	<u>0.07</u>

N/A = not applicable

Table A10.1 Thermal Bridging Psi-Factors and Chi-Factors for Thermal Bridges (SI)

Class of Construction— Wall, above Grade	Thermal Bridge Type	Section	Unmitigated		Default		
			Psi-Factor W/m K	Chi-Factor W/m K	Psi-Factor W/m K	Chi-Factor W/m K	
<i>Steel framed and metal buildings</i>	Roof edge	5.5.5.1.1	0.650	N/A	0.020	N/A	
	Parapet	5.5.5.1	0.500		0.260		
	Intermediate floor to wall intersection	5.5.5.2	0.842		0.307		
	Intermediate floor balcony or overhang to opaque wall intersection	5.5.5.2.2	0.842		0.307		
	Intermediate floor balcony in contact with vertical fenestration	5.5.5.2	1.686		0.307		
	Cladding support	5.5.5.2	0.554		0.376		
	Wall to vertical fenestration intersection	5.5.5.3	0.505		0.194		
	Other element and assembly intersections	5.5.5.54	N/A	0.92	N/A		0.48
Mass (exterior or integral)	Roof edge	5.5.5.1.1	0.750	N/A	0.150	N/A	
	Parapet	5.5.5.1	0.412		0.217		
	Intermediate floor to wall intersection	5.5.5.2	0.824		0.205		
	Intermediate floor balcony or overhang to opaque wall intersection	5.5.5.2.2	0.824		0.205		
	Intermediate floor balcony in contact with vertical fenestration	5.5.5.2	1.686		0.307		
	Cladding support	5.5.5.2	0.476		0.322		
	Wall to vertical fenestration intersection	5.5.5.3	0.325		0.226		
	Other element and assembly intersections	5.5.5.54	N/A	0.46	N/A		0.33
Mass (interior)	Roof edge	5.5.5.1.1	0.750	N/A	0.150	N/A	
	Parapet	5.5.5.1.2	0.884		0.393		
	Intermediate floor to wall intersection	5.5.5.2	0.824		0.495		
	Intermediate floor balcony or overhang to opaque wall intersection	5.5.5.2.2	0.824		0.495		
	Intermediate floor balcony in contact with vertical fenestration	5.5.5.2	1.686		0.307		
	Cladding support	5.5.5.3	Same as mass (exterior)				
	Wall to vertical fenestration intersection	5.5.5.4	0.543	N/A	0.143		N/A
	Other element and assembly intersections	5.5.5.5	Same as mass (exterior)				
Wood-framed and other	Roof edge	5.5.5.1.1	0.150	N/A	0.020	N/A	
	Parapet	5.5.5.1	0.056		0.056		
	Intermediate floor to wall intersection	5.5.5.2	0.582		0.084		
	Cladding support	5.5.5.2	0.322		0.074		
	Wall to vertical fenestration intersection	5.5.5.3	0.260		0.171		
	Other element and assembly intersections	5.5.5.4	N/A	0.33	N/A		0.04

N/A = not applicable

Modify Normative Appendix C, Section C1 as shown (I-P and SI).

C1.2.7 For Thermal Bridges Identified in Section 5.5.5. *Thermal bridge* inputs and specifications shall be individually identified for the thermal bridges indicated in Section 5.5.5 according to one of the following:

- a. Where the thermal bridge complies with one of the requirements of Sections 5.5.5.1 through 5.5.5.5, no additional inputs shall be required.
- b. Where the thermal bridge does not comply with one or more of the requirements of Sections 5.5.5.1 through 5.5.5.5, the *linear thermal bridge* type or *point thermal bridge* type, length or count, the assembly interrupted by this *thermal bridge*, and the *Psi-factor* or *Chi-Factor* shall be specified. The input shall be a user-defined value or one of the unmitigated values from Table A10.1.
- c. Where Section 5.5.5 and Sections 5.5.5.1 through 5.5.5.5, including exceptions, are not applicable to the *thermal bridge*, no additional inputs shall be required.

Modify Normative Appendix C, Section C2 as shown (I-P and SI).

C2.9 For thermal bridges.

- a. confirmation that the proposed design complies with the each of the requirements of Sections 5.5.5.1 through 5.5.5.5 including exceptions or
- b. where the proposed design does not comply with each of the individual requirements of Sections 5.5.5.1 through 5.5.5.5, list the *thermal bridges*, the proposed *psi-factors*, proposed *chi-factors*, and source information.

Modify Normative Appendix C, Section C3.5.5.4 as shown (I-P and SI).

C3.5.5.4 Thermal Bridges. *Linear* and *point thermal bridges* in the *proposed design* shall be either of the following:

- a. Not modeled where option (a) or (c) is selected in Section C1.2.7.
- b. Entered as individual *thermal bridge* inputs of length or count where option (b) is selected in Section C1.2.7 and addressed as follows:
 1. Individual *thermal bridges* in the proposed design that are indicated to comply with the requirements of Sections 5.5.5.1 through 5.5.5.5 need not be modeled.
 2. Individual *thermal bridges* in the proposed design that are indicated to not comply with the requirements of Sections 5.5.5.1 through 5.5.5.5 shall be modeled.
 3. Individual *thermal bridges* in the proposed design that are indicated to be not applicable with the requirements of Sections 5.5.5.1 through 5.5.5.5 need not be modeled.

Modify Normative Appendix C, Section C3.6 as shown (I-P and SI).

C3.6 Calculation of Base Envelope Performance Factor. The simulation model for calculating the *base envelope performance factor* shall modify the simulation model for calculating the *proposed envelope performance factor* as follows:

- a. All *opaque* assemblies shall be modeled with ~~maximum~~ the *U-factor* not greater than that required in Section 5.5.3 for the appropriate *class of construction*, *space-conditioning category*, and climate zone. *Mass walls* and *mass floors* shall be modeled with HC equal to 7.2 Btu/ft²·°F (147 kJ/m²·K). All other *opaque* assemblies shall be modeled with the same HC as the *proposed design*. *Mass walls* shall be modeled with equal mass on each side of the insulation. All other *opaque* assemblies shall be modeled with insulation on the exterior. *Thermal bridges* shall modify assembly *U-factors* in accordance with item C3.6b.
- b. *Thermal bridges*:
 1. Where option (a) is selected in Section C1.2.7, no modifications to the assembly *U-factors* are required.
 2. Where option (b) is selected in Section C1.2.7, the *U-factor* of the assembly interrupted shall be modified per Section A10.2 using the default values in Table A10.1 for the appropriate *class of construction*. Each of the *linear thermal bridges* or *point thermal bridges* identified in Sections 5.5.5.1 through 5.5.5.5 shall be modeled in the simulation model for calculating the proposed envelope performance. Where the balcony length in the proposed

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design is greater than allowed by Section 5.5.5.2.2, the area shall be reduced proportionally along each exposure until the limit set in Section 5.5.5.2.2 is met.

3. Where option (c) is selected in Section C1.2.7, no modifications to the assembly *U*-factors are required.

b~~c~~. The exterior *roof* surfaces shall be modeled [. . .]

Revise Informative Appendix E as shown (I-P and SI).

ASHRAE

1791 Tullie Circle
Atlanta, GA 30329-2305
(~~After 10/30/2020:~~
180 Technology Parkway
Peachtree Corners, GA 30092)

[. . .]

BC Hydro

Corporate Head Office
333 Dunsmuir Street
Vancouver, B. C. V6B 5R3

Subsection No.	Reference	Title/Source
[. . .]		
<u>Table A10.1</u>	<u>BC Hydro New Construction Program Orientation Manual (June 2016)</u>	<u>https://www.bchydro.com/powersmart/business/programs/new-construction.html#thermal</u>
<u>Table A10.1</u>	<u>ASHRAE Research Project 1365</u>	<u>The Impact of Thermal Bridges on Effective Thermal Resistance and Energy Use in Mid and High Rise Buildings</u>
[. . .]		

Modify Appendix G, Table G3.1 as follows:

Table G3.1 Modeling Requirements for Calculating Proposed Building Performance and Baseline Building Performance

No.	Proposed Building Performance	Baseline Building Performance
[...]		
5. <i>Building Envelope</i>		
<p>a. All components of the <i>building envelope</i> in the <i>proposed design</i> shall be modeled as shown on architectural drawings or as built for <i>existing building envelopes</i>. <u>All opaque building envelope components shall be modeled accounting for thermal mass effects.</u></p> <p>Exceptions: The following <i>building</i> elements shall be permitted to differ from architectural drawings:</p> <ol style="list-style-type: none"> 1. All uninsulated assemblies (e.g., projecting balconies, perimeter edges of intermediate floor slabs, concrete floor beams over parking garages, roof parapet) Each linear thermal bridge and point thermal bridge as identified in Section 5.5.5 shall be separately modeled using either of the following techniques: <ol style="list-style-type: none"> a. A separate model of each of these assemblies the assembly within the energy simulation model. b. Adjustment of the clear-field U-factor in accordance with Section A10.2. 2. Each uninsulated assembly not identified in Section 5.5.5 shall be modeled using either of the following techniques: <ol style="list-style-type: none"> a. A separate model of the assembly within the energy simulation model. b. Separate calculation of the U-factor for each of these assemblies. The U-factors of these uninsulated assemblies are then can be averaged with larger adjacent surfaces of the same class of construction using an area-weighted average method. This average U-factor is modeled within the energy simulation model. 3. Any other <i>building envelope</i> assembly, that covers less than 5% of the total area of that <i>class of construction</i> (e.g., <i>exterior walls</i>) need not be separately described, provided that it is similar to an assembly being modeled. If not separately described, the <i>U-factors</i> of these assemblies are then averaged with larger adjacent surfaces using an area-weighted average method. This average <i>U-factor</i> is modeled within the <i>energy</i> simulation model. 24. Exterior surfaces whose azimuth <i>orientation</i> and tilt differ by less than 45 degrees and are otherwise the same may be described as either a single surface or by using multipliers. <p>[...]</p>	<p>Equivalent dimensions shall be assumed for each <i>building envelope</i> component type as in the <i>proposed design</i>; i.e., the total gross area of <i>walls</i> shall be the same in the <i>proposed design</i> and <i>baseline building design</i>. The same shall be true for the areas of <i>roofs, floors, and doors</i>, and the exposed perimeters of concrete <i>slab on grade floors</i> shall also be the same in the <i>proposed design</i> and <i>baseline building design</i>. The following additional requirements shall apply to the modeling of the <i>baseline building design</i>:</p> <p>[...]</p> <ol style="list-style-type: none"> c. <u>Linear and Point Thermal Bridges.</u> Where <u>linear thermal bridges and point thermal bridges, as identified in Section 5.5.5, are modeled in the proposed design, they shall not be modeled in the budget building design.</u> <p>[...]</p>	

Add Informative Appendix J as shown (I-P and SI).

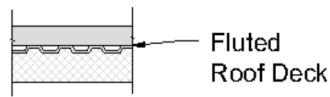
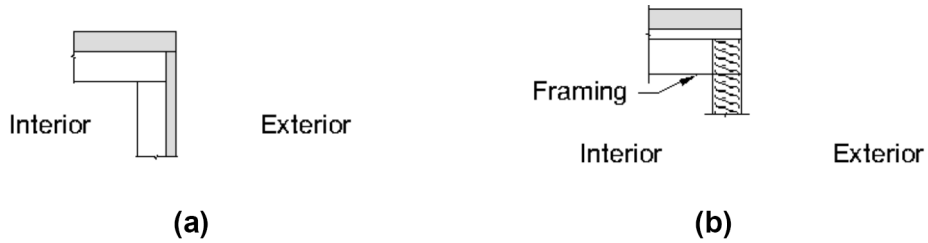
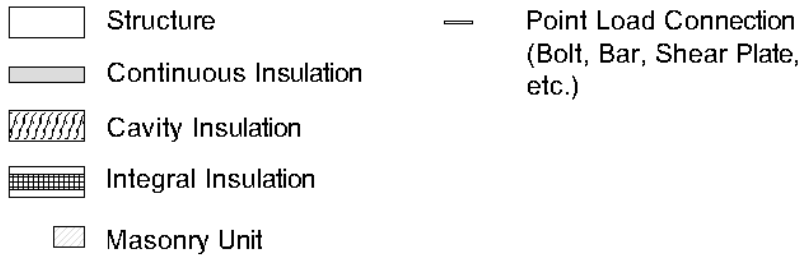
(This appendix is not part of this standard. It is merely informative and does not contain requirements necessary for conformance to the standard. It has not been processed according to the ANSI requirements for a standard and may contain material that has not been subject to public review or a consensus process. Unresolved objectors on informative material are not offered the right to appeal at ASHRAE or ANSI.)

INFORMATIVE APPENDIX J
INFORMATIVE FIGURES

This appendix contains informative reference figures for Sections 5.5.5.1 through 5.5.5.4 for the convenience of users of Standard 90.1 and not for use as specific details required for compliance. These figures are not intended to include all detailed variations that may meet the requirements. It is not intended that the figures represent all possible compliant configurations. The figures do not show roof membrane or wall cladding.

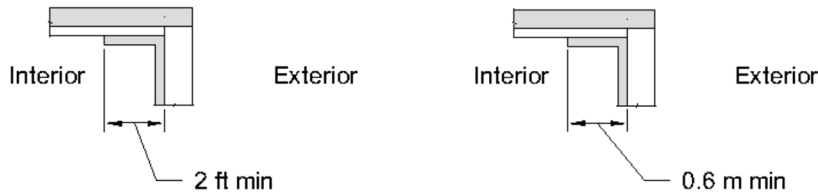
SYMBOLS

Key:



view from Interior

(c)



(d)



(e)

Figure J-1 Key:

- a. Wall with exterior continuous insulation (Section 5.5.5.1.1[a])
- b. Wall with cavity insulation (Section 5.5.5.1.1[b])
- c. Wall with interior or cavity insulation (Sections 5.5.5.1.1[b] and [c])
- d. Mass wall with interior insulation—I-P, SI (Section 5.5.5.1.1[c][1])
- e. Mass wall with interior insulation—I-P, SI (Section 5.5.5.1.1[c][2])

Key:

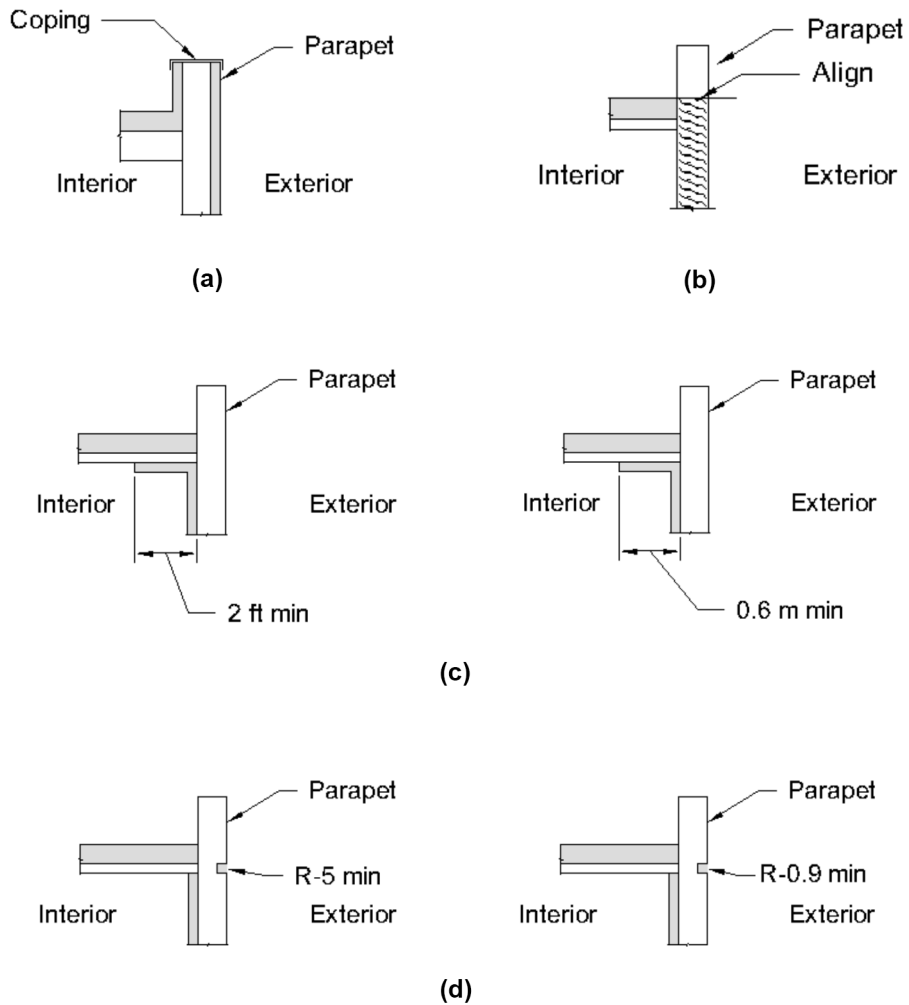
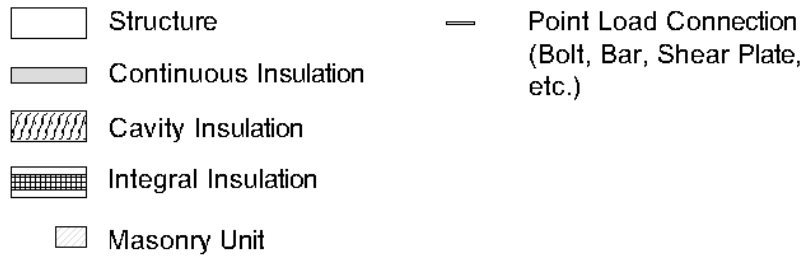








Figure J-2 Key:

- a. Wall with exterior continuous insulation (Section 5.5.5.1.2[a])
- b. Wall with cavity insulation (Section 5.5.5.1.2[b][1])
- c. Mass wall with interior insulation—I-P, SI (Section 5.5.5.1.2[c][1])
- d. Mass wall with interior insulation—I-P, SI (Section 5.5.5.1.21[c][2])

Key:

-  Structure
-  Continuous Insulation
-  Cavity Insulation
-  Integral Insulation
-  Masonry Unit

-  Point Load Connection
(Bolt, Bar, Shear Plate,
etc.)

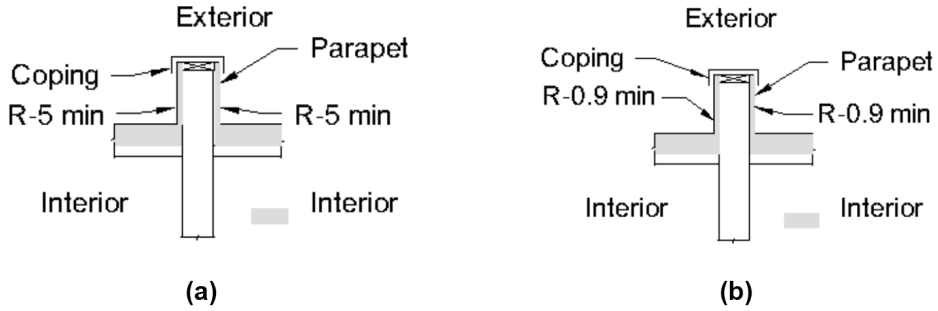


Figure J-3 Parapet within field of roof (a) I-P and (b) SI (Section 5.5.5.1.3).

Key:

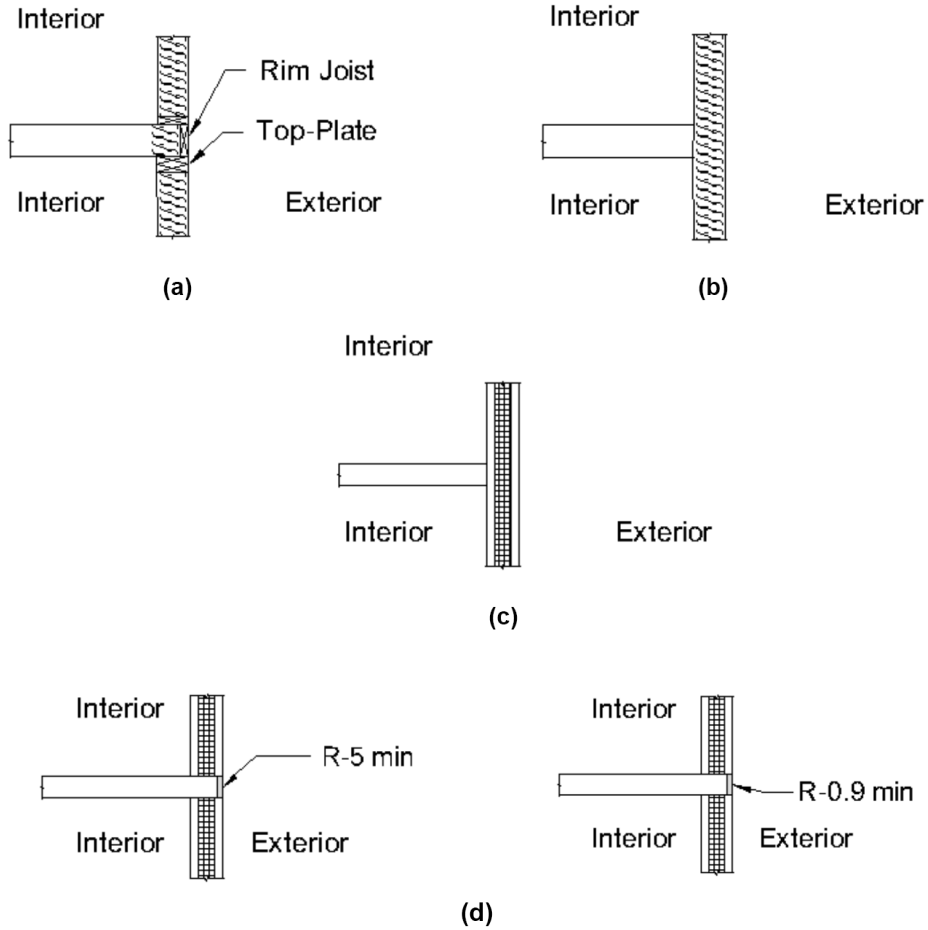
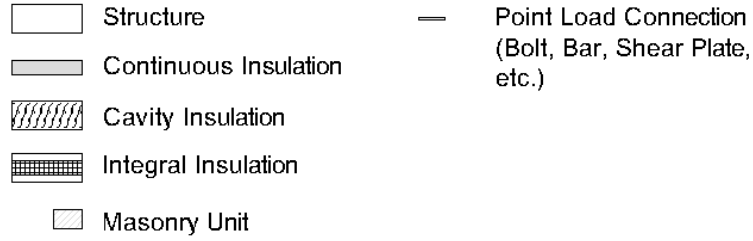


Figure J-4 Key:

- a. Wall with cavity insulation (Section 5.5.5.2.1[b])
- b. Wall with cavity insulation (Section 5.5.5.2.1[b])
- c. Wall with integral insulation (Section 5.5.5.2.1[c])
- d. Mass wall with integral insulation—IP, SI (Section 5.5.5.2.1[c])

Key:

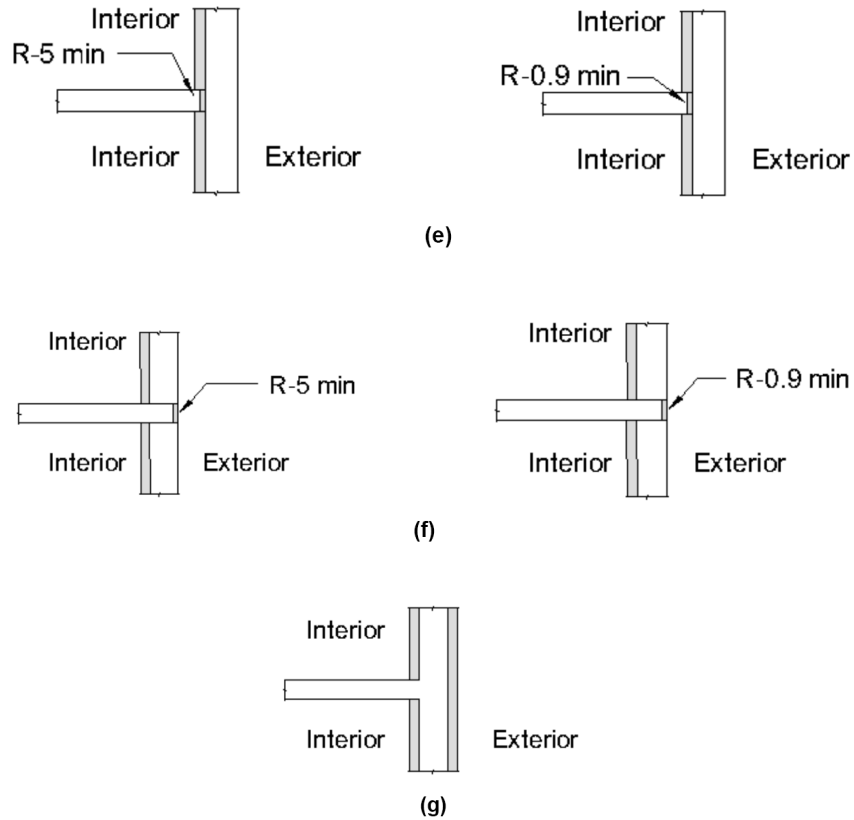
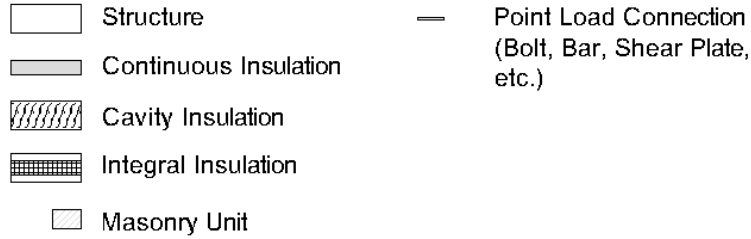


Figure J-4 (continued) Key:

- e. Mass wall with interior insulation—I-P, SI (Section 5.5.5.2.1[d][1])
- f. Mass wall with interior insulation—I-P, SI (Section 5.5.5.2.1[d][2])
- g. Mass wall with exterior continuous insulation plus interior insulation (Section 5.5.5.2.1[e])

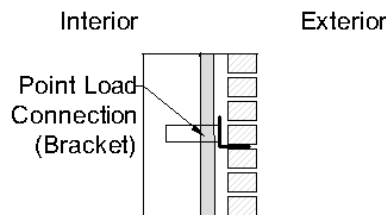


Figure J-5 Shelf angles supporting exterior cladding (Section 5.5.5.3).

Key:

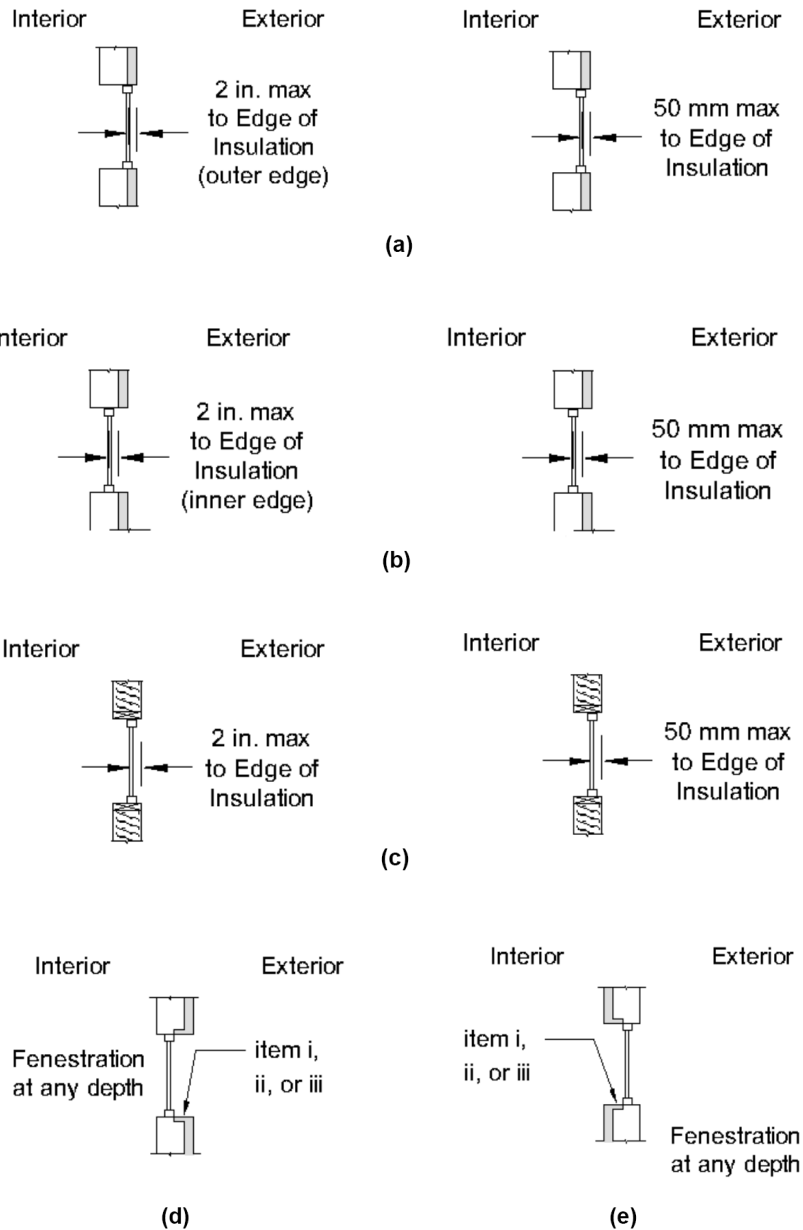
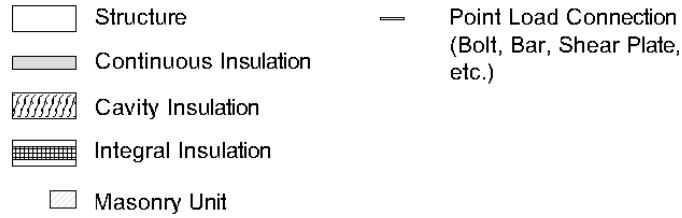


Figure J-6 Key:

- a. Fenestration and continuous insulation—I-P, SI (Section 5.5.5.4[a])
- b. Fenestration and continuous insulation—I-P, SI (Section 5.5.5.4[a])
- c. Fenestration and no continuous insulation—I-P, SI (Section 5.5.5.4[b])
- d. Insulation between fenestration and wall (Section 5.5.5.4[c])
- e. Insulation between fenestration and wall (Section 5.5.5.4[c])

POLICY STATEMENT DEFINING ASHRAE'S CONCERN FOR THE ENVIRONMENTAL IMPACT OF ITS ACTIVITIES

ASHRAE is concerned with the impact of its members' activities on both the indoor and outdoor environment. ASHRAE's members will strive to minimize any possible deleterious effect on the indoor and outdoor environment of the systems and components in their responsibility while maximizing the beneficial effects these systems provide, consistent with accepted Standards and the practical state of the art.

ASHRAE's short-range goal is to ensure that the systems and components within its scope do not impact the indoor and outdoor environment to a greater extent than specified by the Standards and Guidelines as established by itself and other responsible bodies.

As an ongoing goal, ASHRAE will, through its Standards Committee and extensive Technical Committee structure, continue to generate up-to-date Standards and Guidelines where appropriate and adopt, recommend, and promote those new and revised Standards developed by other responsible organizations.

Through its *Handbook*, appropriate chapters will contain up-to-date Standards and design considerations as the material is systematically revised.

ASHRAE will take the lead with respect to dissemination of environmental information of its primary interest and will seek out and disseminate information from other responsible organizations that is pertinent, as guides to updating Standards and Guidelines.

The effects of the design and selection of equipment and systems will be considered within the scope of the system's intended use and expected misuse. The disposal of hazardous materials, if any, will also be considered.

ASHRAE's primary concern for environmental impact will be at the site where equipment within ASHRAE's scope operates. However, energy source selection and the possible environmental impact due to the energy source and energy transportation will be considered where possible. Recommendations concerning energy source selection should be made by its members.

ASHRAE · 180 Technology Parkway · Peachtree Corners, GA 30092 · www.ashrae.org

About ASHRAE

Founded in 1894, ASHRAE is a global professional society committed to serve humanity by advancing the arts and sciences of heating, ventilation, air conditioning, refrigeration, and their allied fields.

As an industry leader in research, standards writing, publishing, certification, and continuing education, ASHRAE and its members are dedicated to promoting a healthy and sustainable built environment for all, through strategic partnerships with organizations in the HVAC&R community and across related industries.

To stay current with this and other ASHRAE Standards and Guidelines, visit www.ashrae.org/standards, and connect on LinkedIn, Facebook, Twitter, and YouTube.

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Addenda, errata, and interpretations for ASHRAE Standards and Guidelines are no longer distributed with copies of the Standards and Guidelines. ASHRAE provides these addenda, errata, and interpretations only in electronic form to promote more sustainable use of resources.

File Attachments for Item:

R-1 Petition #23-04 - RCO 311.7.1 Two handrails - Robert Kramer

BOARD OF BUILDING STANDARDS

6606 Tussing Road, P.O. Box 4009
Reynoldsburg, Ohio 43068-9009
(614) 644-2613
bbs@ohio.gov

www.com.state.oh.us/dico/bbs/default.aspx



APPLICATION FOR RULE CHANGE

Pursuant to section 3781.12 of the Revised Code and rules adopted by the Board of Building Standards, application is herewith submitted to adopt, amend, or annul a rule adopted by the Board pursuant to section 3718.10 of the Revised Code.

For BBS use:	
Petition #:	23-04
Date Recv'd:	03/27/2023

Submitter: ROBERT KRAMER CITIZEN
(Contact Name) (Organization/Company)

Address: 5690 GENEVIEVE PLACE
(Include Room Number, Suite, etc.)

FAIRFIELD OHIO 45014
(City) (State) (Zip)

Telephone Number: 513-885-4600 Fax Number: _____

Date: MARCH 26, 2023 E-mail Address: KEYNOTEMAN@HOTMAIL.COM

Code Section: 101

General Explanation of Proposed Change (attach additional sheets if necessary):

311.7.1 Stairways shall not be less than 36 inches (914 mm) in clear width at all points above the permitted handrail height and below the required headroom height. Handrails must be installed on both sides of all stairways and shall not project more than 4.5 inches (114 mm) on either side of the stairway and the minimum clear width of the stairway at and below the handrail height, including treads and landings, shall not be less than 31½ inches (787 mm) where a handrail is installed on one side and 27 inches (698 mm) where handrails are provided on both sides

1. Around 24,760,843 patients were admitted to emergency departments due to staircase-related injury during a 23 year-long study by NEISS.
2. In an average year, 1,076,558 people in the US suffer from a staircase-related injury.
3. More than 12,000 people meet death from falling down stairs every year. This itself tells how fatal a fall could be. Simple tripping down stairs or falling off the stairs can rewrite one's destiny. Since the fall will be very fast, the speed of impacting your head or back will occur in a fraction of a second.

The cost should be no more than \$200.00 per home.

Explanation of Cost Impact of Proposed Code Change*: _____

* Attach additional cost information as necessary to justify any statement of cost increase or cost decrease.

File Attachments for Item:

R-2 2019 RCO Proposed Amendments Stakeholder Comments

From: [Michael Essary](#)
To: [Richards, Jay](#)
Subject: RE: [External]:Proposed changed to RCO (Electrical)
Date: Thursday, April 27, 2023 11:12:41 AM
Attachments: [image001.png](#)

Mr. Richards:

Thank you for the quick response. I am not sure if it is still open to discussion on whether to remove the surge protection requirement, but if it is, I would hope that my input can be taken into consideration.

I realize that it appears that surge protectors only protect property (which is part of the purpose of the Code) but in doing so they also indirectly protect life. Transient damage goes beyond just worrying about your TV and computer, which are actually fairly well equipped to handle these events, and begins to effect life safety devices such as smoke/carbon monoxide alarms, GFCI devices and breakers, AFCI devices and breakers and even portable medical equipment installed in many homes.

The utility grid is ever aging and transient events are only getting more and more common and so the state sending the message that surge protection isn't critical is less than desirable and can create an artificial point of contention when discussing the importance of whole home surge protection with homeowners.

Given the small impact of the cost of an SPD on a panel or service upgrade, I think that the requirement should not be deleted from the RCO. SPDs can be purchased for as little as \$75 and install in less than 30 minutes.

Thank you for your time, justification for the addition of 230.67 is below.

230.67 Justification:

Electronic life-saving equipment such as fire alarm systems, IDCI's, GFCI's, AFCI's and smoke alarms, may be damaged when a surge occurs due to lighting, internal local switching as well as external utility switching. Other equipment is also damaged when subjected to surge. In many cases, electronic devices and equipment can be damaged and rendered inoperable by a surge and yet this damage is undetected by the owner. It is practical to require a SPD to provide a general level of protection. In almost all new service installations, as well as service upgrades, no consideration is given to providing a general level of protection to the "whole structure" which would include those devices that cannot be afforded a cord connected Type 3 SPD protection. First level subdivision (D) is included to require that when a service is upgraded, an SPD is to be installed.

For example, in 2002, the product standard for GFCI's was revised due to documented failures of devices that were occurred when the devices were subjected to transients. The fact that the electrical industry redesigned GFCI technology to address well documented damage to these life saving devices

is reason enough to require whole house/structure SPD protection. The changes that were made do not prevent the GFCI from being damaged but rather provide a requirement for these devices to self-test and determine if they were damaged and are no longer functioning properly.

Studies by recognized authorities including NEMA, IEEE, and UL, all substantiate the fact that surges can and do cause significant damage. Nationwide Insurance organizations recognize the need for effective surge protection as well and have published recommendations that include point-of-use surge protectors and installation of surge protection at service equipment.

The NEC must mandate a minimum requirement for surge protection in all services. It is “practical” to provide this minimum and feasible level of protection for all electronic life saving devices already mandated within the NEC. See Section 90.1 of the NEC.

-
Michael Essary

From: Jay.Richards@com.ohio.gov <Jay.Richards@com.ohio.gov>
Sent: Wednesday, April 26, 2023 5:22 PM
To: Michael Essary <Michael.Essary@blindandsons.com>
Subject: [External]:Proposed changed to RCO (Electrical)

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Mr. Essary,

Thank you for your inquiry regarding proposed amendments to the 2019 Residential Code of Ohio (RCO) and the changes to Chapter 34 Electrical in particular. We have not posted any justifications; however, we can offer the following general summary of discussions by the members of the Residential Construction Advisory Committee (RCAC) in regard to their recommendation to the Board. For amendments to the RCO, the Board relies on recommendation from the RCAC.

During review of the 2020 NEC, the RCAC heard significant comment on the proposed amendments to the NEC, including the exemption for surge protection, but decided to keep the exemption based on discussion that it was more of a property protection, rather than, a life safety issue. The intent is not to prohibit the inclusion of surge suppression should an owner choose to have this protection for their equipment. In this use, surge suppression is more an economic choice than an occupant safety requirement.

In response to issues surrounding the difficulties in requiring the use of GFCI protection of branch circuit outlets for outdoor HVAC equipment, the Nation Fire Protection Association (NFPA) adopted an exception to 210.8(F) in the 2023 NFPA 70 (NEC) because of reported incompatibility of GFCIs with certain HVAC equipment. Exception #2 to NEC 210.8 (F) reads:

Exception No. 2: GFCI protection shall not be required for listed HVAC equipment. This exception shall expire September 1, 2026.

The Board proposed to adopt the NEC exception without the expiration date in the draft Ohio Building Code (OBC) rules that includes adopting the 2023 NEC. The Board did this so we can verify that the incompatibility issue has been resolved with products available before the exemption is removed. Based on the Board's action, the RCAC recommended similar language. Also, please be aware the current amendment package to the RCO includes the proposed adoption of the 2020 edition of the NEC; however, next month, the RCAC will consider moving forward with the 2023 edition rather than the 2020 edition of the NEC as the base electrical code to which the approved Ohio exemptions are applied.

Jay Richards

Assistant Construction Code Administrator

Ohio Board of Building Standards

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From: Michael Essary <Michael.Essary@blindandsons.com>

Sent: Wednesday, April 26, 2023 12:51 PM

To: BBS, BBSOfficAsst3 <BBS@com.ohio.gov>

Subject: Proposed changed to RCO (Electrical)

To whom it may concern:

I am curious if the justifications for changes are posted anywhere with regards to the proposed adoptions to the 2019 RCO? There is one item specifically, 3401.1 – Item #4 - the deletion of 230.67, that I am very curious about.

Was there a justification for deletion of that requirement? The addition of 230.67 to the NEC passed with a 10-2 vote.

Given that the purpose of the code is to safeguard persons and property from the hazards of using electricity, removal of a device that is designed to safeguard equipment(property) seems like an odd decision to me.

Additionally, the requirement for GFCI protection of 50A and less outdoor outlets, should be maintained. If anything, maybe make an exception for mini split units but traditional A/C condensers should pose no issue when installed properly.

Thank you for your time,
Michael Essary

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2019 Residential Code of Ohio Amendments Comments

Commenter	Email	Code Section	Comment	Staff Comments	RCAC Recommendation	Code Committee Action
Joe Bargdill	joe.bargdill@westerville.org	317.1, 328.1, 507.2.1	<p>Section 403.1.2. Wood Treatment for pressure treated lumber below grade shall have a label showing rating UC4B according to AWPA U1.</p> <p>Note: most pressure treated lumber on the market (other than 4 x 4 or heavier) are only rated for ground contact. When used as a wood foundation material or pole building lumber below grade, the lumber should reflect a direct burial rating.</p> <p>Sections 317.1, 328.1, and 507.2.1 should also note this change.</p>			
mark ichtist	1171cplichristmd@gmail.com	Chpts 34 & 44	<p>It is my belief that the 2023 NEC be adopted for both the commercial and residential codes.</p> <p>One reason is it can be confusing keeping track of all of them. By the time they are adopted, there will be buildings still being inspected under the 2017 NEC. Having to remember the changes for the 2020 and 2023 as well as the 2017 will be more time consuming, and contractors as well as inspectors may get confused.</p> <p>I also believe they that it is an additional burden both on contractors and building departments spend money on both books, when the most recent standard is already published.</p> <p>Finally I believe the code should be adopted in full. There is not a reason in my opinion to take things out, when the code is a minimum safety standard as written.</p>			

Stehlin, Michael	Michael.Stehlin@hamilton-co.org	403.1.4.1	<p>I am writing in support of the proposed changes to the 2019 RCO. Specifically, I wholly support reinsertion of the exceptions that allow freestanding accessory structures under 600 and 400 SF to have footings less than frost depth. It is common in our jurisdiction to have detached garages and sheds of 200-600SF built with monolithic slabs with a turn down edge of 18" in depth. It was totally unnecessary to remove these exceptions in the 2019 RCO, and I am extremely supportive of their reintroduction. Detached accessory structures have been built this way for decades without any problem.</p>			
Bill Toole	wrt@tooleinspectors.com	Chpts 34 & 44	<p>I would propose not accepting the 2020 NEC and go to the 2023 NEC for use in review and inspection for the residential sector to match the acceptance of the 2023 NEC proposed for the 2024 OBC. Uniformity in the review and inspections process, the use of one referenced standard, ease of use for the installing contractor to only have to use one referenced standard, elimination of confusion for owners, designers and contractors rapidly come to mind in utilizing the same referenced standard year for review and regulation.</p>			

From: [Joe Bargdill](#)
To: [BBS, BBSOfficAsst3](#)
Subject: New Revisions To The 2019 RCO
Date: Thursday, March 2, 2023 1:17:47 PM

Section 403.1.2. Wood Treatment for pressure treated lumber below grade shall have a label showing rating UC4B according to AWPA U1.

Note: most pressure treated lumber on the market (other than 4 x 4 or heavier) are only rated for ground contact. When used as a wood foundation material or pole building lumber below grade, the lumber should reflect a direct burial rating.

Sections 317.1, 328.1, and 507.2.1 should also note this change.

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From: [mark ichtist](#)
To: [BBS, BBSOfficAsst3](#)
Subject: NEC changes for the residential and commercial codes of Ohio.
Date: Thursday, March 2, 2023 3:05:52 PM

It is my belief that the 2023 NEC be adopted for both the commercial and residential codes.

One reason is it can be confusing keeping track of all of them. By the time they are adopted, there will be buildings still being inspected under the 2017 NEC.

Having to remember the changes for the 2020 and 2023 as well as the 2017 will be more time consuming, and contractors as well as inspectors may get confused.

I also believe they that it is an additional burden both on contractors and building departments spend money on both books, when the most recent standard is already published.

Finally I believe the code should be adopted in full. There is not a reason in my opinion to take things out, when the code is a minimum safety standard as written.

Sent from my iPhone

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From: [Bill Toole](#)
To: [BBS, BBSOfficAsst3](#)
Cc: [Foley, Megan](#); [Hanshaw, Regina](#)
Subject: Comments to proposed amendments to 2019 RCO
Date: Saturday, March 11, 2023 12:05:57 PM

I would propose not accepting the 2020 NEC and go to the 2023 NEC for use in review and inspection for the residential sector to match the acceptance of the 2023 NEC proposed for the 2024 OBC. Uniformity in the review and inspections process, the use of one referenced standard, ease of use for the installing contractor to only have to use one referenced standard, elimination of confusion for owners, designers and contractors rapidly come to mind in utilizing the same referenced standard year for review and regulation.

Bill Toole

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From: [Stehlin, Michael](#)
To: [BBS, BBSOfficeAsst3](#)
Subject: Comment on Proposed Rule Change RCO 403.1.4.1
Date: Thursday, March 2, 2023 1:54:42 PM
Attachments: [image001.png](#)

Dear OBBS;

I am writing in support of the proposed changes to the 2019 RCO. Specifically, I wholly support reinsertion of the exceptions that allow freestanding accessory structures under 600 and 400 SF to have footings less than frost depth. It is common in our jurisdiction to have detached garages and sheds of 200-600SF built with monolithic slabs with a turn down edge of 18" in depth. It was totally unnecessary to remove these exceptions in the 2019 RCO, and I am extremely supportive of their reintroduction. Detached accessory structures have been built this way for decades without any problem.

Sincerely,

Michael Stehlin



Michael Stehlin, AIA
Chief Building Official, Planning + Development
Todd B. Portune Center for County Government
138 E. Court Street, Rm 801, Cincinnati, OH 45202
(O)513.946.4519 | www.hamiltoncountyohio.gov

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File Attachments for Item:

OB-1 Review of E-notification comments for AG 100 (OBC, OMC, OPC)

2024 Ohio Building Code Comments					
Commenter	Email	Code Section	Comment	Staff Comments	Code Committee Action
Anderson, Corie	canderson@mwalliance.org	Ch 13 (Received 5/10/23)	We urge the Board to adopt the unamended 2021 IECC to ensure the people of Ohio receive the wide-ranging benefits of improved building efficiency and to allow the state to access robust federal funding opportunities in the Infrastructure Investment and Jobs Act (IIJA) and Inflation Reduction Act (IRA).	Comment supports adoption of newer energy standards, recommend no change on request to eliminate Ohio-zations that provide relief	
Beres, Kurt	kurtb@designwithma.com	406.5.2.1 (Received 3/5/23)	Recommendation - to align with the requirements of table 705.5 Revise as follows "Where openings below grade provide required natural ventilation the outside horizontal clear space shall be one and one half times the depth of the opening up to 10' wide . The width of the horizontal clear space shall be maintained from grade down to the bottom of the lowest required opening."	Concern that 10' max width may not provide adequate natural ventilation for below-grade parking garages and that this proposal conflicts with IBC 1202.5.1.2.	
Beres, Kurt		406.5.2.1 (Received 3/24/23)	As discussed during the stakeholders meeting I have revised the proposed change below to align 406.5.2.1 with 406.5.2.1 Recommendation - to align with the requirements of 1206 Revise as follows "Where openings below grade provide required natural ventilation the outside horizontal clear space shall be one and one half times the depth of the opening up to 23' wide . The width of the horizontal clear space shall be maintained from grade down to the bottom of the lowest required opening."	The 2021 IBC Section 1205 (not 1206) deals with above-grade yards and courts. In contrast, IBC Section 406.5.2.1 is specifically addressing below-grade natural ventilation requirements; Recommend no change to model code; more appropriate for variance	
Beres, Kurt		705.6 (Received 3/5/23)	Add the following exception to 705.6 - Reasoning this is in keeping with 706.2 and allows the floor sheathing to act structurally. Exception - Floor and roof sheathing not exceeding 3/4" thickness are permitted to be continuous through the exterior wall assembly to interior face of the exterior wall sheathing in light frame construction.	The 2021 IBC Commentary states that this exception is intended to allow the roof and floor diaphragms to remain in-tact through a double fire-wall because there is only a small risk that the other fire wall (the non-fire side) would fail in a double-fire wall situation; Recommend no change to model code; no technical justification from fire protection perspective.	
Beres, Kurt		903.2.10 (Received 3/5/23)	Recommendation - (This proposed exception opens up existing opening parking garages to be have partial adaptive reuses while as written might be technically infeasible and allows them to be modified in the future and addresses the majority of concerns raised by fire departments concerning electric vehicles, 1: Early Detection of thermal runaway and 2: The ability to apply as much water as possible to the source of the fire which sprinklers are incapable of providing) Add exception 2: Open Parking Garages provided with additional stand pipes such that all parking spaces with vehicle charging stations are fully covered by two standpipes and any space equipped with an electric vehicle charging station is provided with heat detectors tied to a fire alarm system with automatic notification of the local fire department.	Given that modern cars are constructed primarily of plastic and sometimes have lithium ion batteries, the fire hazard is certainly higher than in years past. The model code sprinkler requirement attempts to control a car fire from spreading should it start. Even though life safety is not the primary concern in an open parking garage, this proposal does provide an alternative that attempts to address the growing concerns that the fire service has when fighting electric vehicle fires; Recommend adding this as a second exception that could apply in existing open parking garages that may not be able to meet the proposed separation requirements of the first exception if retain language as currently proposed - not recommended if keep complete exemption for open parking garages.	

Blaisdell, Howard	hblaisdell@moodynolan.com	NA (Received 4/10/23)	<p>I have shared the code revision process with my AIA committee and Elizabeth Krile with our local AIA chapter.</p> <p>I have started to look into the first draft of the proposed revisions and will review the 2nd draft when they are released next week. And as I said on the phone, thanks to you and your whole team as it is clear you have all done a lot of work in this process to update the codes to the 2021ICC series with the appropriate Ohioisms and your collective work is appreciated.</p>	NA	NA
Dearth, Aaron	adearth@simonsonconstruction.com	OBC Ch 13 (Received 5/10/23)	<p>Buildings and portions of buildings of Use group F & S that are NOT cooled may be considered as semi-heated for the purpose of thermal envelope insulation requirements when the calculated heat loss from thermal conduction at 70F Indoor Temperature and the 99.6% Outdoor Heating DB Temperature from ASHRAE Climatic Design Information is less than or equal to 12 BTUH per square foot. (Heating energy associated with outdoor air infiltration, ventilation and make-up air are excluded from the heat loss calculation as this energy is unrelated to the thermal envelope insulating value; but rather is dependent upon infiltration barrier and sealing, fresh air for occupants or make up air for process exhaust.)</p>	<p>Recommend no change based on comment.</p> <p>Proposed language already includes provisions that address the issue in a more limited, but technically defensible, manner that uses existing language as a basis. The original concern appeared to be related to the energy usage of the process equipment, including storage occupancies is not consistent.</p>	
Fauber, Jeremy	jpfauber@heapy.com	OBC 427/IFC 5306.2 (Received 3/29/23)	<p>For the facilities with med gas storage rooms compliance with both NFPA 99 and Ohio Fire Code 5306.2 is challenging because different approaches are taken by each requirement. The Center for Medicaid and Medicare Services (CMS) requires most of these facilities to comply with NFPA 99, so adding a requirement exempting facilities from complying with NFPA 99 if they meet OFC 5306.2 would not change the challenge of designing these spaces as they would still need to meet both NFPA 99 and OFC 5306.2. OMC section 407.1 requires ventilation to NFPA 99. NFPA 99 has specific ventilation requirements for med gas storage rooms as well as compliance with ASHRAE 170, which is duplicative of a requirement in the OMC. Ohio has requirements for med gas storage rooms in Ohio Fire Code 5306.2. Provide a path that med gas storage rooms designed in compliance with NFPA 99 ventilation requirements do not need to meet Ohio Fire Code 5306.2 ventilation requirements.</p>	<p>The IFC language has now been duplicated in the IBC 427. There are 3 optional compliance paths for storage rooms depending upon configuration. The Icodes intend for the IBC/IFC, NFPA 99, and ASHRAE 170 all be met in order to meet requirements of IBC. The ODH requires compliance with OBC and OFC in order to get license for hospitals. We have no control over OFC. Recommend keeping model code as-is and proponent should work with ICC to propose code change at national level; would conflict with fire code.</p>	
		OBC 427/IFC 5306.2 (Received 5/5/23)	<p>I've dug back into the design challenges that come with these spaces and most of it centered around the requirement in the interior 1 hour room not being able to cost effectively provide make-up air (supply air duct in 1 hour enclosure to the exterior). This left most designs needing to comply with the 1 hour exterior room requirement, but because of ASHRAE standard 170 they still had to provide mechanical exhaust, which meant that those rooms had to be designed with a lot of heating capacity due to the 100% outdoor air makeup. NFPA 99 requirements then further restricted heating options.</p>	<p>Jeremy's proposal needs more coordination and it doesn't address the concern for gas leakage to other areas of the building. Staff recommendation is still to retain model code for the reasons above.</p>	

Huber, Charles	Charles.Huber@lakewoodoh.net	105.3, 105.4 (Received 3/16/23)	Draft Ohio Building Code (OBC) 105.3 "Conditional approval" accurately reflects the statutory language at Ohio Revised Code (ORC) 3791.04(0) (extract attached). Draft OBC 105.4 "Phased approval" accurately reflects the statutory language at ORC 3791.04(G) (extract attached).	Draft Chapter 1 rule proposes to keep "Conditional approval", but proposes to delete "Nonconformance approval". Some OBOA members are supportive of the proposed change to omit the "nonconformance approval", others are not. Staff asked OBOA to come to the BBS with a recommendation; in absence of OBOA input recommend keep elimination of "nonconformance approval"	
Huber, Charles		105.4.1 (Received 4/26/23)	After Section 105.4.1 was moved from 105.3.1, the word "conditional" should have been changed to "phased"	Staff missed this text correction. Change will be made before filing rules.	NA
Ichrist, Mark	mdichrist@columbus.gov	Chapters 27 and 35 (Received 4/26/23)	I believe the 2023 NEC should be adopted without any changes.	For commercial buildings within the scope of the OBC, we are proposing to adopt the 2023 NEC. The only proposed change is to remove the sunset date in Section 210.8(F) exception 2. Recommend keep lanuage as prosed.	
Ichrist, Mark		Ch 13 (Received 4/26/23)	The controlled receptacle requirement deletion in the energy code should not be deleted as the cost is minimal, and simple to do.	This energy code change has been carried forward from our current code; no staff recommendation	
Molnar, David	dmolnar1@hotmail.com	Ch 1, approvals (Received 5/10/23)	The existing nonconformance and conditional approvals create confusion in trying to additionally define the process and owner's rights. Since we have a Partial Certificate of Occupancy, a partial approval would be a reasonable compliment. Stipulations would define what is approved and items of non-compliance would be listed on the Certificate of Plan Approval. The current description for phased approval is similar to a partial approval with the additional requirement that the owner/applicant would request specifically what they are asking to review.	Some OBOA members are supportive of the proposed change to omit the "nonconformance approval", others are not. Staff asked OBOA to come to the BBS with a recommendation; in absence of OBOA input recommend keep elimination of "nonconformance approval"	

Parmalee, Chris	christopher.parmelee@akewoodoh.net	107.6.1, 107.6.2 (Received 3/16/23)	Draft Ohio Building Code (OBC) 105.1 et seq. deletes existing OBC 105.1.1 Nonconformance approval. If this deletion's adopted, then: a. Existing and draft OBC 107.6.1 & 107.6.2 shows the building official determines whether the plans examiner's comments are to be communicated to the owner's representative asking whether the drawings will be revised and resubmitted. Estimated date of resubmission's obtained. b. Existing and draft OBC 107.6.2 reads in part, "The building official ... determines whether any approvals are possible, and issue the appropriate approval as described in Section 105." That section describes "Conditional approval." and "Phased approval." These descriptions (definitions) are driven by statute, Ohio Revised Code 3791.04(G) and 3791.04(D) respectively. c. It's unlikely that conditional approval (defined by statute) will be appropriate. That leaves either: (1) Phased approval, or (2) Disapproval of Plans Adjudication Order (no approval). 2. One or a series of phased approvals is a clumsy method where the issues are items such as: a. Accessible signage. b. Door hardware. c. Occupant load information in each room. d. Structural design loads. e. Occupancy Group(s)/Division(s). f. Exit signs, emergency powered means of egress lighting, conventional and emergency powered exit discharge lighting. Therefore, deleting nonconformance approval removes a tool building officials now have to expedite plan approval and construction commencement thereby avoiding unnecessary project costs. Also, Existing and draft OBC 107.6.1 Item 4 reads, "If the owner or owner's representative indicates that he work will not be brought into compliance with the rules of the board or requests an adjudication order, the plans examiner reports to the building official in accordance with section 107.6.2." This item was carried over from the original concept that the plans examiner would perform this communication. Before being adopted, OBC 107.6 was revised to show the building official (not the plans examiner) would perform this nonconformance communication. Delete OBC 107.6.1 Item 4.	A "phased approval" may be more appropriate in most cases because it appears that "conditional approval" is intended for conflicting interpretations of the code and "nonconformance approval" was only good for 30 days, creating a tracking requirement for the department. Some OBOA members are supportive of the proposed change to omit the "nonconformance approval", others are not. Staff asked OBOA to come to the BBS with a recommendation; in absence of OBOA input recommend keep elimination of "nonconformance approval." Recommend no change on comment to modify required actions of building department personnel when identifying of noncompliance because these requirements are intended to promote communication with owner's and is unrelated to nonconformance approval	
		105.4, 107.6.1 (received 5/8/23)	Repeating concern over proposed removal of "nonconformance approval"	Same staff comment as above.	

Planet, Karen	kplanet@rwaarchitects.com	1110.18 (Received 5/10/23)	<p>AIA Ohio is also in support of the new rules requiring adult changing stations with the exception of one item of concern. Under the proposed section 1110.18.1, the rule is written to include all Assembly occupancies where family or assisted use toilet or bathing rooms are provided. While we clearly understand the logic of using the family assist toilet facility as a common trigger point for the inclusion of adult changing stations, we are somewhat concerned with the application in the nightclub/bar/tavern classification. Because of the very low occupant to toilet fixture ratio in Table 2902.1, the new requirement as written could require an adult changing station in a facility as small as 1,500 SF. Similar types of uses that serve potentially large occupant loads, such as arenas, pools, and stadiums all have slightly more lenient occupancy loads. It is the committee's opinion that a similar occupancy count of 1:75 in place of the 1:40 for men might make this proposed rule a little more equitable. While there may be other data to support the 1:40 requirement, we believe the requirement as written may be overly restrictive.</p> <p>Finally, we would like the OBBS to consider instituting a transition period from the existing building code to the new code. In recognition of the long length of time projects are under development, we encourage the OBBS to provide a minimum of a six-month window to transition to the new code after the new codes are adopted and the new building codes are available for distribution. We also request this in recognition of the significant amount of changes being made to the code and the amount of training that will be required to complete the transition. We thank the Board and staff of the Ohio Board of Building Standards for your work in advancing these updated codes for the benefit of the health, safety, and welfare of the public. We look forward to continued cooperation with the Board as this process moves forward.</p>	The initial trigger for an adult changing station (ACS) in Group A (and M) is the same as for a required family or assisted toilet room. This is consistent with the 2024 IBC. The trigger for Group B occupancies had no precedent in the IBC. Table 2902.1 sets the water closet count. Nightclubs, bars, taverns and dance halls are the example list with the greatest need per occupant. Recommend no change. The current adoption timeline would accommodate the implementation concerns, but if adoption is delayed, the Board can modify the effective as needed.	
Randles, Chris	crandles@summitoh.net	Chapter 1 (approvals) (Received 5/9/23)	Support for elimination of nonconformance approval	Some OBOA members are supportive of the proposed change to omit the "nonconformance approval", others are not. Staff asked OBOA to come to the BBS with a recommendation; in absence of OBOA input recommend keep elimination of "nonconformance approval" Recommend no change on request to change plans examiners duties as approvals and denials are the exclusive responsibility of the building official to ensure uniform and consistent application of the codes within the jurisdiction	
Shockey, Alana	arshockey@columbus.gov	Ch 13 (Received 5/10/23)	To realize the maximum savings for its residents and businesses, Ohio must move fully to the 2021 IECC instead of its currently proposed hybrid between the 2018 and 2021 IECC.	Recommend no change based on comment. The RCAC will be reviewing the the newer editions of the energy codes later this year.	

Sekanick, Bruce	bruce@phillips-sekanick.com	1110.18 (Received 5/4/23)	The above seems to be reasonable and appropriate, however, it also appears that the A2, nightclub classification has a significantly lower occupancy than the other uses. We ask that this item be clarified, as there this would require the adult changing stations in buildings as small as 1,200 – 1,500 SF if a standing room occupant load was the basis of the calculation. In the specific application for nightclubs, is the aggregate calculation of 6 or more male and female water closets appropriate or would the aggregate of 12 male and female water closets, as indicated in “B” occupancies for educational facilities beyond the 12th grade, be more appropriate?	The observtion is correct regarding Group A2 nightclubs. The initial trigger for an adult changing station (ACS) in Group A (and M) is the same as for a required family or assisted toilet room. This is consistant with the 2024 IBC. The trigger for Group B occupancies had no precedent in the IBC. Table 2902.1 sets the water closet count. Nightclubs, bars, taverns and dance halls are the example list with the greatest need per occupant. Recommend no change.	
Taylor, Billy	btaylor@neii.org	3001.2 (received 5/5/23)	Replace 3001.2 with new language approved for the 2024 IBC to clarify intended functionality of the elevator emergency communication system.	Recommend including proposed language.	
Schwab, Corey, ODH	Corey.Schwab@odh.ohio	Chapter 2 (Received 5/9/23 - verbal communication)	Suggest modifying definitions of "private residential swimming pool" and "public swimmgng pool" for consistency with statute and Ohio department of health rules.	The statute appears to have modified the definition of "private residential swimming pool" to include some pools used for swimming lessons. Recommend to modify the definitions to align with statue and other agency rules for consistency.	
Schwab, Corey, ODH	Corey.Schwab@odh.ohio	3109.3.3 (Received 5/9/23 - verbal communication)	Remove ODH as determining the occupant load for the pool and deck areas as ODH does not have rules that establish an overall occupant load. ODH has rules that limit occupant load based on safety features (e.g. bathers per life guards.)	The Ohio building code does have provisions to determine occupant load for pools and the associated decks. Recommend modification of 3109.3.3 to use Table 1004.1.2 to calculate to the occupanct load for the purpose of determining egress capacity and toileting facilities related to the public swimming pool.	

May 10, 2023

Regina Hanshaw
Ohio Board of Building Standards
6606 Tussing Rd
Reynoldsburg, OH 43068

RE: MEEA Comments Supporting the Adoption of the Unweakened 2021 IECC

Dear Ms. Hanshaw and Members of the Board of Building Standards,

Thank you for the opportunity to comment on Ohio's building code update. The Midwest Energy Efficiency Alliance (MEEA) is a member-based non-profit organization promoting energy efficiency to optimize energy generation, reduce consumption, create jobs and decrease carbon emissions in all Midwest communities. MEEA has done work in Ohio related to energy codes in the past and has provided technical assistance to the Ohio Board of Building Standards during previous energy code adoption cycles.

MEEA strongly recommends the adoption of the 2021 International Energy Conservation Code (IECC) **without** weakening amendments for residential and commercial buildings in Ohio. We urge the Board to adopt the unamended 2021 IECC to ensure the people of Ohio receive the wide-ranging benefits of improved building efficiency and to allow the state to access robust federal funding opportunities in the Infrastructure Investment and Jobs Act (IIJA) and Inflation Reduction Act (IRA).

In addition, adopting the full 2021 IECC will provide the following benefits:

- Energy use and utility bill reduction for residents and businesses
- Promotion of new, local clean energy jobs
- Increased comfort and improved indoor air quality
- Increased grid reliability and resilience, allowing residents to shelter in place longer during extreme weather events and/or power outages
- Improved building infrastructure for generations to come
- Cost savings by installing efficiency measures at the time of initial construction, rather than retrofitting existing buildings
- Staying up to date with the most current model code and, thereby, staying up to date on improved building practices and technologies

The Unweakened¹ 2021 IECC will Save Energy and Money for Ohio Residents and Businesses

Buildings account for roughly 40% of all energy used and over 70% of all electricity used in the United States. Updated building energy codes have consistently shown to be the most cost-effective way to reduce that energy consumption – putting significant monetary savings back into pockets of building owners, businesses and residents. The U.S. Department of Energy (DOE) conducts state-specific energy savings and cost-effectiveness analyses for each new model commercial energy code. According to this research, updating Ohio's residential code from the 2015 IECC with weakening amendments to the unweakened 2021 IECC would result in statewide

¹ "Unweakened" refers to a version of the 2021 IECC that has not been amended to include reduced or lesser building standards than those contained in the full, unamended 2021 IECC.

energy savings of 12% and around \$260 of annual utility bill savings for the average Ohio household.²

Strong Energy Codes Make Ohio's Buildings Safer

The adoption of the 2021 IECC would lead to more energy efficient buildings in Ohio and, consequently, result in the construction of safer, more resilient buildings. Improving Ohio's resiliency and preparedness against emergencies such as blizzards, floods, heatwaves and power outages will bring obvious benefits to communities across the state, including increased safety, greater ability to comfortably shelter in place longer and improved health outcomes.³ Updating energy codes can also significantly reduce the stress on the grid and improve reliability by reducing the demand from buildings. This is critical during times of extreme weather, when energy resources from the grid can be strained. The most cost-effective time to prevent future damage from extreme weather is during initial building construction, and Ohio has an opportunity for long-term resiliency planning with the adoption of the unweakened 2021 IECC.

The Unweakened 2021 IECC Supports Job Creation in Ohio

In 2021, the clean energy sector supported more than 110,00 jobs in Ohio, of which 68% were in energy efficiency.⁴ All energy efficiency jobs are interdependent with the building industry, whether it be through HVAC, insulation or lighting. These are good, in-state jobs in a vital, growing sector of Ohio's economy. Updating the state's energy code to the unweakened 2021 IECC will result in the creation of over 680 jobs in the first year and 17,600 over the next 30 years.⁵ By updating the state's energy code to the 2021 IECC, Ohio has an opportunity to build on its strong foundation and continue to spur local construction and manufacturing jobs in the state.

Updated Energy Codes Provide Benefits to the Building Industry

The model codes are designed to *incrementally* increase efficiency standards, minimizing "big leaps" in requirements. By not staying up to date with the model codes, it becomes easier for jurisdictions to fall devastatingly behind, particularly in the workforce, as builders, contractors, architects, etc. will not be trained or well-versed on the newest building practices and technologies, and it will only get harder for them to learn as those practices and technologies continue to evolve. Therefore, MEEA recommends that Ohio adopt the most up-to-date model code (the *full* 2021 IECC), which is developed through a rigorous stakeholder engagement process made up of multiple industries.

Increased cost can be a point of concern with energy code adoption processes. It is important to remember that the building industry touches a home once – at the time of construction – but the residents who live in that home for decades will feel the impact of its construction practices for much longer. It is also much more cost-effective to include energy efficiency improvements at the time of initial construction than during subsequent renovations. The energy code is considered the floor – the least efficient building that can be constructed by law – and builders who are only building to the bare minimum may see a slight cost increase. However, for builders already building "better than code," there should be little to no actual increase in cost to meet an updated energy code.

² https://www.energycodes.gov/sites/default/files/2021-07/OhioResidentialCostEffectiveness_2021.pdf

³ <https://www.energycodes.gov/energy-resilience>

⁴ <https://www.cleanjobsmidwest.com/state/ohio>

⁵ https://www.energycodes.gov/sites/default/files/2021-07/OhioResidentialCostEffectiveness_2021.pdf

The 2021 IECC will Allow Ohio to Access Federal Funding

The United States federal government will provide billions of dollars in funding for updated energy code adoption and implementation, which should aid both the code enforcement community and building industry. Specifically, the Inflation Reduction Act will provide states with \$1 billion in energy codes funding opportunities.⁶ One third of this funding can go to states that meet or exceed the 2021 IECC and two thirds can go to states that require net-zero homes. There will also be additional funding available to train the workforce in energy efficiency technologies and methods. By updating to the 2021 IECC without weakening amendments, Ohio will be poised to apply for and receive this funding.

The 2021 IECC includes achievable, cost-effective standards that many states and municipalities across the Midwest have already adopted. The adoption of the unamended 2021 IECC would result in energy efficient buildings that are more affordable to operate and maintain for years to come in Ohio. However, the full value of the energy and cost savings, and other benefits associated with updating to the 2021 IECC, will be substantially reduced if weakening amendments are adopted in the final Ohio Building Code. The adoption of the unweakened 2021 IECC will reduce the cost of utility bills for residents, businesses and building owners, create more comfortable and healthier indoor environments and improve the resilience of buildings in the state. Adopting the newest and strongest building standards will ensure long-lasting benefits for all Ohioans.

If you have any additional questions, please contact MEEA's Senior Building Policy Associate, Corie Anderson at canderson@mwalliance.org. Thank you for your time and consideration.

Sincerely,



William Angelos
Interim Executive Director

⁶ <https://www.whitehouse.gov/wp-content/uploads/2022/12/Inflation-Reduction-Act-Guidebook.pdf>, page 113

From: [Beres, Kurt](#)
To: [BBS, BBSOfficeAsst3](#)
Cc: [Jim Mitchell](#); [David Prentice](#)
Subject: Comments on Draft Rules
Date: Sunday, March 5, 2023 4:43:16 PM

I am so excited to see the state of Ohio making the leap to the 2021 model code. The update is extremely important to adopt for our state's long term financial security and promotion of new businesses. As an architect, CBO, and MPE familiar with the OBC and 2021 model code I have compiled the following list of recommended changes for consideration as part of the adoption.

Revise the proposed definition for Agricultural Building:

AGRICULTURAL BUILDING. A structure designed and constructed to house farm implements, hay, grain, poultry, livestock or other horticultural products. This structure is not **to** be a place of human habitation or a place of employment where agricultural products are processed, treated or packaged, nor is it to be a place used by the public. (See definition of "AGRICULTURAL PURPOSES", section 101.2, and section 312 of this code).

406.5.2.1 Recommendation - to align with the requirements of table 705.5 Revise as follows "Where openings below grade provide required natural ventilation the outside horizontal clear space shall be one and one half times the depth of the opening **up to 10' wide**. The width of the horizontal clear space shall be maintained from grade down to the bottom of the lowest required opening."

406.6.2 Can you clarify the intent of deleting 406.6.2 ventilation is generally a basic requirement for enclosed garages.

507.14 To mimic 507.13 From the 2017 OBC to allow for use of property deeded or dedicated on adjacent properties be used for use in determining the compliance of an unlimited area building. This code section has been a mainstay of the OBC for several code cycles now and has been the envy of many of our sister states.

705.5 Add an exception to mimic the 2017 OBC to allow for property on an adjacent property to be deeded or dedicated as a no build zone and contribute to the fire separation distance. See above.

705.6 Add the following exception to 705.6 - Reasoning this is in keeping with 706.2 and allows the floor sheathing to act structurally.
Exception - Floor and roof sheathing not exceeding 3/4" thickness are permitted to be continuous through the exterior wall assembly to interior face of the exterior wall sheathing in light frame construction.

Revise Proposed Language for 706.8.1 to add the following exceptions (Reasoning the vestibule requirement impacts the ability of the fire walls to act independently and the code language for Horizontal Exits provides numerous additional protections further the existing language conflicts with the exception to 705.3)

Exception 1: Openings in double fire walls complying with section 1026 for Horizontal Exits.
Exception 2: Openings complying with 705.3 Exception 2

903.2.10 Recommendation - (This proposed exception opens up existing opening parking garages to be have partial adaptive reuses while as written might be technically infeasible and allows them to be modified in the future and addresses the majority of concerns raised by fire departments concerning electric vehicles, 1: Early Detection of thermal runaway and 2: The ability to apply as much water as possible to the source of the fire which sprinklers are incapable of providing) Add exception 2: Open Parking Garages provided with additional stand pipes such that all parking spaces with vehicle charging stations are fully covered by two standpipes and any space equipped with an electric vehicle charging station is provided with heat detectors tied to a fire alarm system with automatic notification of the local fire department.

The proposed table 1020.2 is confusing and is not in keeping with past OBC sections, as proposed it is identical in application to the table in the model code. Recommend eliminating in the table the words "or provided with a partial sprinkler system" and adding footnote C to 13R and footnote D to 13D while adding I-1 to the footnote and applying C to the 13 column in similar locations as the 2017 OBC.

1102.2 - The language does not do a good job for the purposes of ICCA117.1- 2017 to identify existing buildings. Recommend adding language referencing that existing buildings for the purposes of the application of requirements for existing buildings identified in ANSI A117.1 shall be buildings constructed using the 2017 Ohio Building Code or earlier.

References to Adult Changing Stations. 1110.18.1 - Recommend Revising #3 to include Group E occupancies serving special need students above the 6th grade. Recommend revising item 1 to make the requirement a tier above what is required for a family restroom since this would be a double burden or excluding M all together except for open and enclosed malls.

1210.3.1 Revise Exception 2 (Reasoning most child care uses provide low or no toilet partitions for younger children to allow staff to assist in potty training). New Section to read - Toilets rooms located in child day care facilities must provide facilities dedicated for the privacy of staff but may provide additional facilities without enclosing compartments solely for assisting with potty training as determined by the building official.

Kurt Beres

RA, CBO, MPE, LEED AP

Principal - Studio Lead - Technical Services / Industrial

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From: [Beres, Kurt](#)
To: [BBS, BBSOfficeAsst3](#)
Cc: [Jim Mitchell](#); [David Prentice](#)
Subject: Re: Comments on Draft Rules
Date: Friday, March 24, 2023 12:21:42 PM

As discussed during the stakeholders meeting I have revised the proposed change below to align 406.5.2.1 with

406.5.2.1 Recommendation - to align with the requirements of 1206 Revise as follows "Where openings below grade provide required natural ventilation the outside horizontal clear space shall be one and one half times the depth of the opening **up to 23' wide**. The width of the horizontal clear space shall be maintained from grade down to the bottom of the lowest required opening."

Kurt Beres

RA, CBO, MPE, LEED AP

Principal - Studio Lead - Technical Services / Industrial

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On Sun, Mar 5, 2023 at 4:42 PM Beres, Kurt <kurtb@designwithma.com> wrote:

I am so excited to see the state of Ohio making the leap to the 2021 model code. The update is extremely important to adopt for our state's long term financial security and promotion of new businesses. As an architect, CBO, and MPE familiar with the OBC and 2021 model code I have compiled the following list of recommended changes for consideration as part of the adoption.

Revise the proposed definition for Agricultural Building:

AGRICULTURAL BUILDING. A structure designed and constructed to house farm implements, hay, grain, poultry, livestock or other horticultural products. This structure is not **to** be a place of human habitation or a place of employment where agricultural products are processed, treated or packaged, nor is it to be a place used by the public. (See definition of "AGRICULTURAL PURPOSES", section 101.2, and section 312 of this code).

406.5.2.1 Recommendation - to align with the requirements of table 705.5 Revise as follows "Where openings below grade provide required natural ventilation the outside horizontal clear space shall be one and one half times the depth of the opening **up to 10' wide**. The width of the horizontal clear space shall be maintained from grade down to the bottom of the

lowest required opening."

406.6.2 Can you clarify the intent of deleting 406.6.2 ventilation is generally a basic requirement for enclosed garages.

507.14 To mimic 507.13 From the 2017 OBC to allow for use of property deeded or dedicated on adjacent properties be used for use in determining the compliance of an unlimited area building. This code section has been a mainstay of the OBC for several code cycles now and has been the envy of many of our sister states.

705.5 Add an exception to mimic the 2017 OBC to allow for property on an adjacent property to be deeded or dedicated as a no build zone and contribute to the fire separation distance. See above.

705.6 Add the following exception to 705.6 - Reasoning this is in keeping with 706.2 and allows the floor sheathing to act structurally.

Exception - Floor and roof sheathing not exceeding 3/4" thickness are permitted to be continuous through the exterior wall assembly to interior face of the exterior wall sheathing in light frame construction.

Revise Proposed Language for 706.8.1 to add the following exceptions (Reasoning the vestibule requirement impacts the ability of the fire walls to act independently and the code language for Horizontal Exits provides numerous additional protections further the existing language conflicts with the exception to 705.3)

Exception 1: Openings in double fire walls complying with section 1026 for Horizontal Exits.

Exception 2: Openings complying with 705.3 Exception 2

903.2.10 Recommendation - (This proposed exception opens up existing opening parking garages to be have partial adaptive reuses while as written might be technically infeasible and allows them to be modified in the future and addresses the majority of concerns raised by fire departments concerning electric vehicles, 1: Early Detection of thermal runaway and 2: The ability to apply as much water as possible to the source of the fire which sprinklers are incapable of providing) Add exception 2: Open Parking Garages provided with additional stand pipes such that all parking spaces with vehicle charging stations are fully covered by two standpipes and any space equipped with an electric vehicle charging station is provided with heat detectors tied to a fire alarm system with automatic notification of the local fire department.

The proposed table 1020.2 is confusing and is not in keeping with past OBC sections, as proposed it is identical in application to the table in the model code. Recommend eliminating in the table the words "or provided with a partial sprinkler system" and adding footnote C to 13R and footnote D to 13D while adding I-1 to the footnote and applying C to the 13 column in similar locations as the 2017 OBC.

1102.2 - The language does not do a good job for the purposes of ICCA117.1- 2017 to identify existing buildings. Recommend adding language referencing that existing buildings for the purposes of the application of requirements for existing buildings identified in ANSI A117.1 shall be buildings constructed using the 2017 Ohio Building Code or earlier.

From: [Blaisdell, Howard](#)
To: [Ohler, Deborah](#)
Subject: Code comments
Date: Monday, April 10, 2023 4:42:06 PM
Attachments: [image165721.png](#)

Good day Debbie,
Thanks for talking to me on the phone this afternoon.

I have shared the code revision process with my AIA committee and Elizabeth Krile with our local AIA chapter.

I have started to look into the first draft of the proposed revisions and will review the 2nd draft when they are released next week.

I had mentioned a plumbing code item and I am thankful that the committee has proposed keeping the revision to the IPC 410.4 allowing water dispensers in place of drinking fountains as we have a lot of clients who believe that is much more sanitary than the traditional drinking fountain.

And as I said on the phone, thanks to you and your whole team as it is clear you have all done a lot of work in this process to update the codes to the 2021ICC series with the appropriate Ohioisms and your collective work is appreciated.

Regards,
Howard Blaisdell

HOWARD BLAISDELL

AIA, LEED AP
ASSOCIATE PRINCIPAL
PROJECT MANAGER



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From: [Aaron Dearth](#)
To: [BBS, BBSOfficeAsst3; CSIPublicComments](#)
Cc: [Ohler, Deborah](#); [Michael Halapy](#); [Lewis Hinkel](#)
Subject: Public Comment on 2024 Code Rules
Date: Wednesday, May 10, 2023 1:26:45 PM
Attachments: [Outlook-hxvfabd4.jpg](#)

Good afternoon,

thank you for taking the time to talk to me at the previous Code Committee meetings, and our subsequent communications.

Having reviewed the proposed 2024 codes, my concerns and questions remain primarily in the adoption of the most recent Energy Code. Specifically speaking the insulation envelope requirements and their impact on Factory and Warehouse businesses.

As we discussed at the June and January code committee meetings, I feel that the F-Factory, and S-Storage uses are not being looked at in regard to their facilities use, and will not see the "energy savings" that these changes are intended to produce. While the general concept of increasing insulation values to save heating and cooling costs is a valid one, and will affect most building types. It is looking ONLY at the energy use that is controlled by the space conditioning and heat loss/gain through the envelope. In our experience, the typical F-Factory or S-Storage facility in Ohio, whether it be of wood, steel, or concrete construction, has other factors such as equipment loads, ventilation, and makeup air that drive the sizing of the HVAC units regardless of insulation values.

The example that i described in the previous meetings was a 100,000sf warehouse. To provide code required ventilation and keep air moving to control humidity on the stored good, Cambridge style makeup air units and exhaust fans were provided with a low 50 degree set point for minimal heating. Having consulted with both HVAC engineers and insulations representatives, that facility if upgraded to the proposed code would incur upward a potential of \$100k increase in insulation. However, as the units are selected for the proposed air movement they would not change. Meaning that the facility would see zero change in energy usage over time, and never recoup the "energy savings". These examples get even worse with F-Factory uses with production equipment and dust collection systems. We are seeing facilities with process air volumes well over 100k CFM, and makeup air units designed to compensate directly for the process air and code required ventilation levels. Those large units are controlled entirely by the equipment and ventilation loading and the insulation values, again, will not affect their size or energy use.

In effect, we are asking small and medium size businesses to incur additional costs in construction in the name of "energy savings" without actually saving energy. However, as we discussed in the past meetings, I do have a proposed solution. Ashrae 90.1 allows for a definition of a "Semi-heated" facility. This definition was designed to allow lesser insulation

values in facilities that were NOT air conditioned and provided minimal heating. In my opinion, these facilities that provide minimal heating in regards to the space conditioning fits with the spirit of Ashrae's standard.

I propose the following; if the ventilation component which has nothing to do with the thermal envelope, and equipment loads were eliminated from consideration so that the semi heated space would be defined by heat loss only. Then that load would fairly take into account the insulation and the possible "energy savings". Wording modified by OBC to Ashrae 90.1 could be such as the following:

Buildings and portions of buildings of Use group F & S that are NOT cooled may be considered as semi-heated for the purpose of thermal envelope insulation requirements when the calculated heat loss from thermal conduction at 70F Indoor Temperature and the 99.6% Outdoor Heating DB Temperature from ASHRAE Climatic Design Information is less than or equal to **12** BTUH per square foot. (Heating energy associated with outdoor air infiltration, ventilation and make-up air are excluded from the heat loss calculation as this energy is unrelated to the thermal envelope insulating value; but rather is dependent upon infiltration barrier and sealing, fresh air for occupants or make up air for process exhaust.)

As a quick example, using thermal envelope insulation from factory with roof at R37 and walls at R13, A sample building 100 foot by 100 foot with 22 foot height would have a calculated conduction heat loss of only **6.4** BTUH per square foot. These block load heating envelope calculations for a building are fairly simple and would be directly related to the potential energy loss. Furthermore, as each section of the building can be selected as "unconditioned", "semiheated", or "conditioned" independently in the ComCheck software this would be a simple change to implement with not modifications needed to any software. This solution would also be applicable to various building types and tied to the facilities Certificate of Occupancy in regard to the Use Group.

I hope this lengthy description covers the conversations we have had thus far, and achieves a well-received solution. Please let me know should you have any questions or would like any further examples from me.

Aaron J. Dearth, RA, AIA, NCARB
Architect



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From: [BBS, BBSOfficeAsst3](#)
To: [Ohler, Deborah](#)
Subject: FW: Ohio Mechanical Code Comments - NFPA 99
Date: Tuesday, April 4, 2023 8:05:42 AM
Attachments: [image002.png](#)

FYI

From: Jeremy P. Fauber <JPFauber@heapy.com>
Sent: Wednesday, March 29, 2023 3:41 PM
To: BBS, BBSOfficeAsst3 <BBS@com.ohio.gov>
Subject: Ohio Mechanical Code Comments - NFPA 99

OMC section 407.1 requires ventilation to NFPA 99. NFPA 99 has specific ventilation requirements for med gas storage rooms as well as compliance with ASHRAE 170, which is duplicative of a requirement in the OMC. Ohio has requirements for med gas storage rooms in Ohio Fire Code 5306.2. Provide a path that med gas storage rooms designed in compliance with NFPA 99 ventilation requirements do not need to meet Ohio Fire Code 5306.2 ventilation requirements.

Justification:

For the facilities with med gas storage rooms compliance with both NFPA 99 and Ohio Fire Code 5306.2 is challenging because different approaches are taken by each requirement. The Center for Medicaid and Medicare Services (CMS) requires most of these facilities to comply with NFPA 99, so adding a requirement exempting facilities from complying with NFPA 99 if they meet OFC 5306.2 would not change the challenge of designing these spaces as they would still need to meet both NFPA 99 and OFC 5306.2.

Thank you!

Jeremy Fauber, PE, CGD, LEED AP BD+C
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Ohler, Deborah

From: Jeremy P. Fauber <JPFauber@heapy.com>
Sent: Friday, May 5, 2023 4:15 PM
To: Ohler, Deborah
Subject: RE: Ohio Hospital Licensure and FGI Guidelines

Debbie,

I apologize for the delayed response. When we last spoke it was just as I was starting on a PTO break and I've been trying to get caught up since then. I believe there is a BBS meeting on May 10th or 11th. Would you provide me information on that meeting?

You asked this below:

Please clarify for me what specifically you are wishing for the BBS to change in our rules.

- As I currently understand your request, you are asking for the BBS to delete the three optional paths for construction and ventilation requirements found in section 427 of the 2021 IBC (which is similar to Section 5306 of the 2021 IFC) for medical gases at health care facilities?
- I think I understand that you are wishing to use the ventilation requirements found in the NFPA 99 and the ASHRAE 170 instead?
- Without language specific language to address medical gas storage in the OBC, it could be interpreted that the general compressed gas storage construction requirements in the IFC would be applicable for addressing the risk based upon the general references to the IFC in OBC Section 414 and 415 for hazardous materials storage. Do you have specific language in mind for the medical gas storage room construction requirements, maximum allowable quantities, occupancy classification, sprinkler requirements?

Are you no longer wishing to allow gas cabinets as an alternative?

I've dug back into the design challenges that come with these spaces and most of it centered around the requirement in the interior 1 hour room not being able to cost effectively provide make-up air (supply air duct in 1 hour enclosure to the exterior). This left most designs needing to comply with the 1 hour exterior room requirement, but because of ASHRAE standard 170 they still had to provide mechanical exhaust, which meant that those rooms had to be designed with a lot of heating capacity due to the 100% outdoor air makeup. NFPA 99 requirements then further restricted heating options.

I've indicated ~~striketrough~~ and underline text below that would help to address these challenges, but hopefully provide appropriate protection to the building systems and building occupants.

[F] 427.1 General

Medical gases at health care-related facilities intended for patient or veterinary care shall comply with Sections 427.2 through 427.2.3 in addition to requirements of Chapter 53 of the *International Fire Code*.

[F] 427.2 Interior Supply Location

Medical gases shall be located in areas dedicated to the storage of such gases without other storage or uses. Where containers of medical gases in quantities greater than the permitted amount are located inside the buildings, they shall be located in a 1-hour exterior room, 1-hour interior room or a *gas cabinet* in accordance with Section 427.2.1, 427.2.2 or 427.2.3, respectively. Rooms or areas where medical gases are stored or used in quantities exceeding the maximum allowable quantity per control area as set forth in TABLE 307.1(1) and [F] TABLE 307.1(2) shall be in accordance with Group H occupancies.

[F] 427.2.1 One-Hour ~~Exterior~~ Room – Natural Ventilation

A 1-hour exterior room shall be a room or enclosure separated from the remainder of the building by *fire barriers* constructed in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 711, or both, with a *fire-resistance rating* of not less than 1 hour. Openings between the room or enclosure and interior spaces shall be provided with *self-closing* smoke- and draft-control assemblies having a *fire protection rating* of not less than 1 hour. Rooms shall have not less than one *exterior wall* that is provided with not less than two vents. Each vent shall have a minimum free air opening of not less than 36 square inches (232 cm²) for each 1,000 cubic feet (28 m³) at normal temperature and pressure (NTP) of gas stored in the room and shall be not less than 72 square inches (465 cm²) in aggregate free opening area. One vent shall be within 6 inches (152 mm) of the floor and one shall be within 6 inches (152 mm) of the ceiling. Rooms shall be provided with not fewer than one automatic fire sprinkler to provide container cooling in case of fire.

[F] 427.2.2 One-Hour Interior Room – Mechanical Ventilation

~~Where an exterior wall cannot be provided for the room, a~~ A 1-hour interior room shall be provided and shall be a room or enclosure separated from the remainder of the building by *fire barriers* constructed in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 711, or both, with a *fire-resistance rating* of not less than 1 hour. Openings between the room or enclosure and interior spaces shall be provided with *self-closing* smoke- and draft-control assemblies having a *fire protection rating* of not less than 1 hour. An *automatic sprinkler system* shall be installed within the room. The room shall be exhausted through a duct to the exterior. ~~Supply and exhaust~~ Exhaust ducts shall be enclosed in a 1-hour rated *shaft enclosure* from the room to the exterior. Supply ducts shall be protected with combination fire-smoke dampers. Approved *mechanical ventilation* shall comply with the *International Mechanical Code* and be provided with a minimum rate of 1 cubic foot per minute per square foot (0.00508 m³/s/m²) of the area of the room.

[F] 427.2.3 Gas Cabinets

Gas cabinets shall be constructed in accordance with Section 5003.8.6 of the *International Fire Code* and shall comply with the following:

1. Cabinets shall be exhausted to the exterior through a dedicated exhaust duct system installed in accordance with Chapter 5 of the *International Mechanical Code*.
2. Supply and exhaust ducts shall be enclosed in a 1-hour rated *shaft enclosure* from the cabinet to the exterior. The average velocity of *ventilation* at the face of access ports or windows shall be not less than 200 feet per minute (1.02 m/s) with a minimum of 150 feet per minute (0.76 m/s) at any point of the access port or window.
3. Cabinets shall be provided with an *automatic sprinkler system* internal to the cabinet.

Jeremy Fauber, PE, CGD, LEED AP BD+C

Principal | Engineering Manager

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From: debbie.ohler@com.ohio.gov <debbie.ohler@com.ohio.gov>

Sent: Friday, April 7, 2023 10:48 AM

To: Jeremy P. Fauber <JPFauber@heapy.com>

Subject: RE: Ohio Hospital Licensure and FGI Guidelines

Caution: This email originated outside of HEAPY. Do not click any links or open any attachments unless you recognize the sender and the link and/or the attachment is expected or normal for business purposes.

Good morning, Jeremy.

I reached out to Alan Smith, Chief of the State Fire Marshal's Code Enforcement Bureau, to see if my contacts at the Ohio Department of Health (ODH) are still valid, given that ODH has restructured since I last talked with them. He gave me the following contact in the Bureau of Survey and Certification:

Ricky Hoover 614-752-6855 and mentioned that he would send me a few others (Paul and Dustin). I will forward them to you when Alan sends them to me.

The general phone number for the bureau is (614) 466-7713

As I look through the current Ohio Department of Health agency rules <https://codes.ohio.gov/ohio-administrative-code/3701> in the Ohio Administrative Code (OAC), it appears that the ODH hospital rules are found in 3701-59 (Hospitals) and 3701-83 (Licensing provisions for Health Care Facilities) of the OAC.

Interestingly, ODH rule 3701-83-10 of the OAC <https://codes.ohio.gov/ohio-administrative-code/rule-3701-83-10> paragraph (A) requires each ODH licensed health care facility to comply with BBS rules and the rules of the State Fire Marshal (the Ohio Fire Code). Additionally, looking at Section 2 of the new application for Hospital Licensure <https://odh.ohio.gov/know-our-programs/hospitals/resources/hospitallicenseapplication>, it appears that in order to receive a license from ODH, the hospital owner needs to show evidence of accreditation by one of the nationally recognized hospital accreditation organization (such as The Joint Commission (TJC), the Accreditation Commission for Health Care (ACHC), the Det Norske Veritas (DNV), the Center for Improvement in Healthcare Quality (CIHQ), or other Medicare-Approved Accreditation Organization) and submit a copy of their most recent accreditation survey report.

As I see it, from a technical perspective, in order for the owner to get a license, the owner is obligated to comply with the Ohio building and fire codes, the federal Center for Medicare & Medicaid Services (CMS) requirements <https://www.cms.gov/Medicare/Provider-Enrollment-and-Certification/CertificationandCompliance/LSC>, and the accreditation organization requirements such as the FGI guidelines published by The Joint Commission (TJC). CMS requires compliance with the NFPA Life Safety Code (LSC) which is not always consistent with the ICC codes that states adopt. I imagine that each accreditation organization may also have their own unique standards and guidelines. As such, designers need to be familiar with all requirements and find a way to comply with all.

Ideally, from my perspective, in order to provide better coordination and compliance, CMS should update and change their outdated design standards to recognize both NFPA LSC-based requirements and ICC I-code -based requirements. They are currently based upon the 2012 LSC which creates conflicts between building and fire codes adopted by the states.

Please clarify for me what specifically you are wishing for the BBS to change in our rules.

- As I currently understand your request, you are asking for the BBS to delete the three optional paths for construction and ventilation requirements found in section 427 of the 2021 IBC (which is similar to Section 5306 of the 2021 IFC) for medical gases at health care facilities?
- I think I understand that you are wishing to use the ventilation requirements found in the NFPA 99 and the ASHRAE 170 instead?
- Without language specific language to address medical gas storage in the OBC, it could be interpreted that the general compressed gas storage construction requirements in the IFC would be applicable for addressing the risk based upon the general references to the IFC in OBC Section 414 and 415 for hazardous materials storage. Do you have specific language in mind for the medical gas storage room construction requirements, maximum allowable quantities, occupancy classification, sprinkler requirements?
- Are you no longer wishing to allow gas cabinets as an alternative?

Hoping that you have a specific solution in mind that I can pass along to the Code Committee.
Debbie



Deborah D. Ohler, P.E., Construction Codes Administrator

Ohio Board of Building Standards

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Reynoldsburg, OH 43068-9009

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<https://com.ohio.gov/divisions-and-programs/industrial-compliance/boards/board-of-building-standards>

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From: Jeremy P. Fauber <JPFauber@heapy.com>
Sent: Thursday, April 6, 2023 4:20 PM
To: Ohler, Deborah <debbie.ohler@com.ohio.gov>
Subject: FW: Ohio Hospital Licensure and FGI Guidelines

Debbie,

It was good to talk with you today, I appreciate the time you were able to spend with me. See email below that I was made aware of last week and I'm trying to find out more information about what this means to our clients. If you know someone at Ohio Department of Health that I could talk with I would appreciate a contact I can reach out to.

Thank you!

Jeremy Fauber, PE, CGD, LEED AP BD+C

Principal | Engineering Manager

(P) 937-224-0861 x1062 | (D) 937-425-6636 | (C) 513-505-6814 | www.heapy.com

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From: Gabel, Linda <Linda.Gabel@osumc.edu>
Sent: Tuesday, March 28, 2023 6:15 PM

To: mcalkins@ideasinstitute.org; Jeremy P. Fauber <JPFauber@heapy.com>

Subject: Fw: Ohio Hospital Licensure and FGI Guidelines

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Linda Gabel, CHID, NCIDQ
Sr. Facility Planner
Wexner Medical Center Space and Facilities Planning
Room 207, 660 Ackerman Rd, Columbus, OH, 43202
614-366-0777 Office / 614-203-2303 Mobile
linda.gabel@osumc.edu

From: Peter Bardwell <pbardwell@bardwellassociates.com>

Sent: Friday, November 25, 2022 2:33 PM

To: O'Hara, Susan (OSU) <ohara.168@osu.edu>; Gabel, Linda <Linda.Gabel@osumc.edu>; Travis Tyson (tysont@ccf.org) <tysont@ccf.org>

Subject: Ohio Hospital Licensure and FGI Guidelines

External Email: CAUTION

Susan, Linda, and Travis,

I'll apologize in advance for this lengthy message --- and for the fact that you're each probably way out ahead of me on this!

We've each been named to the 2026 HGRC for *FGI Guidelines*, and we are each based in Ohio, which as you likely know, has been an interesting outlier --- one of the very few states having never embraced either licensure of hospitals or *FGI Guidelines*. That's all about to change with Chapter 3722 of the Revised Code requiring hospitals operating in Ohio to be licensed by the Ohio Department of Health no later than September 30, 2024. <https://odh.ohio.gov/know-our-programs/hospitals/hospitals>

Included in Section 3722.06 is the statement: "Not later than the date that is one year after the effective date of this section , the director of health shall adopt rules establishing health, safety, welfare, and quality standards for hospitals licensed under this chapter . . ." That one-year date may have already occurred at the end of September 2022, but I'm not aware of what has been specifically stated regarding health, safety, and welfare.

My point in addressing this is that if it's not too late, I would want those of us who are entrusted with writing the national standards for health, safety, and welfare of health facilities to be part of any standards developed as part of this new licensure process. In my past discussions with them, the DoH has historically chosen not to embrace the *Guidelines*, because it didn't want any "external parties" imposing standards on them. They also didn't see the need for licensure, but of course, that's changed --- and that's why I'd like to be pro-active regarding any additional language that would stipulate design standards.

I've practiced healthcare planning and design in nearly 2 dozen states, each of which has a different set of interpretations and adaptations of the *Guidelines*; some of which are incredibly difficult for provider organizations and design professionals to maneuver. And I wouldn't want Ohio to fall into that latter category.

From my perspective, Ohio's historic reticence to embrace the *Guidelines* has been of little consequence. In my over 3 decades of practice in Ohio, I've never once encountered a provider organization or colleague design firm that elected *not* to use the most recent version of *Guidelines* --- because there is a financial incentive to use them. For those who want to be reimbursed through CMS, it's implied that they meet current *Guidelines* standards.

So, the upside is that we're all already using the *Guidelines*, irrespective of whether the Department of Health mandates it or not. The downside is that, unlike other states, the Ohio DoH has historically had no role as an AHJ (Authority Having Jurisdiction) --- until a healthcare project is complete --- and only then will they advise owners and designers whether they agree with design interpretations made months and years prior. For better or for worse, other states require regular state reviews over the course of a design and construction process.

In the spirit of "if it ain't broke, don't fix it", I can easily be tempted to do nothing. I do, nevertheless, want to be proactive in the event that the DoH or the State Legislature are already trying to "fix" things.

You and your provider organizations may be way ahead of me on all this, and I'll welcome your thoughts.

Peter



Peter L. Bardwell, Emeritus FAIA and FACHA, LSSYB
BARDWELL+associates, LLC
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lakewoodoh.gov

Board of Building Standards (BBS)
PO Box 4009
Reynoldsburg OH 43068-9009
Via e-mail BBS@com.ohio.gov

March 16, 2023

Subject: BBS Common Sense Initiative Stakeholders' Meeting March 22, 2023; Draft OBC 105.3.1
Incomplete Fire Protection System Drawings

1. Reference Pamella Butts e-mail March 2, 2023. Draft Ohio Building Code (OBC) 105.3 "Conditional approval" accurately reflects the statutory language at Ohio Revised Code (ORC) 3791.04(D) (extract attached). Draft OBC 105.4 "Phased approval" accurately reflects the statutory language at ORC 3791.04(G) (extract attached).
2. Renumber, Draft OBC 105.3.1 to read 105.4.1 and revise text to read, "Incomplete fire protection system drawings. For fire protection system drawings, if actual fire protection system details or product listing information is not known at the time of plan examination, ~~conditional~~ phased plan approval shall be granted subject to subsequent submission of the information prior to installation of any part of the fire protection systems." This more accurately reflects the statutory language at ORC 3791.04(D) & (G).

Sincerely,

Charles E. Huber
Residential Plans Examiner

Atch
ORC 3791.04(D) & (G)

OHIO REVISED CODE (ORC) 3791.04(D) & (G) EXTRACTS

Extract ORC 3791.04(D)

... The board of building standards ... may adopt rules to provide for the approval, ... of the plans for construction of a foundation or any other part of a building ... before the complete plans and specifications for the entire building ... are submitted. ...

Extract ORC 3791.04(G)

... if the agency having jurisdiction objects to any portion of the plans or specifications, the owner or the owner's representative may request the agency to issue conditional approval to proceed with construction up to the point of the objection. Approval shall be issued only when the objection results from conflicting interpretations of the rules of the board ... rather than the application of specific technical requirements of the rules. ...



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Board of Building Standards (BBS)
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Via e-mail BBS@com.ohio.gov

April 25, 2023

Office of the Governor
Common Sense Initiative (CSI) Public Comments
77 S High St Fl 30
Columbus OH 43215-6108
Via e-mail CSIPublicComments@governor.ohio.gov

Subject: Proposed Ohio Building Code (OBC) Chapter 1, Ohio Administrative Code 4101:1-1-01

1. References:

- a. My letter March 16, 2023 (attached)
- b. Ohio Department of Commerce, Division of Industrial Compliance e-mail April 21, 2023

2. Reference 1.a showed the draft section addressing building construction documents (drawings) where "... if actual fire protection system details or product listing information is not known at the time of plan examination, ..." per Ohio Revised Code 3791.04(D) & (G) should receive a phased approval, not a conditional approval. The rule draft prepared for the March 22, 2023 CSI Stakeholders' Meeting has been revised. The revised draft announced by reference 1.b moved this provision from Section 105.3.1 (a subsection of conditional approval) to Section 105.4.1 (a subsection of phased approval) as suggested by reference 1.a. However, the draft rule announced by reference 1.b (draft as of April 20, 2023) failed to incorporate the text change shown in reference 1.a. The April 20, 2023 revised draft rule continues to read in part, "... of plan examination, conditional plan approval shall be granted ..." Revise the draft rule to read in part, "... of plan examination, phased plan approval shall be granted ..."

Sincerely,

Charles E. Huber
Residential Plans Examiner

Atch
a/s



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Via e-mail BBS@com.ohio.gov

March 16, 2023

Subject: BBS Common Sense Initiative Stakeholders' Meeting March 22, 2023; Draft OBC 105.3.1
Incomplete Fire Protection System Drawings

1. Reference Pamella Butts e-mail March 2, 2023. Draft Ohio Building Code (OBC) 105.3 "Conditional approval" accurately reflects the statutory language at Ohio Revised Code (ORC) 3791.04(D) (extract attached). Draft OBC 105.4 "Phased approval" accurately reflects the statutory language at ORC 3791.04(G) (extract attached).
2. Renumber, Draft OBC 105.3.1 to read 105.4.1 and revise text to read, "Incomplete fire protection system drawings. For fire protection system drawings, if actual fire protection system details or product listing information is not known at the time of plan examination, ~~conditional~~ phased plan approval shall be granted subject to subsequent submission of the information prior to installation of any part of the fire protection systems." This more accurately reflects the statutory language at ORC 3791.04(D) & (G).

Sincerely,

Charles E. Huber
Residential Plans Examiner

Atch
ORC 3791.04(D) & (G)

OHIO REVISED CODE (ORC) 3791.04(D) & (G) EXTRACTS

Extract ORC 3791.04(D)

... The board of building standards ... may adopt rules to provide for the approval, ... of the plans for construction of a foundation or any other part of a building ... before the complete plans and specifications for the entire building ... are submitted. ...

Extract ORC 3791.04(G)

... if the agency having jurisdiction objects to any portion of the plans or specifications, the owner or the owner's representative may request the agency to issue conditional approval to proceed with construction up to the point of the objection. Approval shall be issued only when the objection results from conflicting interpretations of the rules of the board ... rather than the application of specific technical requirements of the rules. ...

From: [Ichrist, Mark D.](#)
To: [BBS, BBSOfficeAsst3](#)
Cc: [CSIPublicComments](#)
Subject: New Ohio building code.
Date: Wednesday, April 26, 2023 10:12:49 AM

I believe the 2023 NEC should be adopted without any changes, and the controlled receptacle requirement deletion in the energy code should not be deleted as the cost is minimal, and simple to do.

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May 9, 2023

Board of Building Standards (BBS)
PO Box 4009
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Via BBS@com.ohio.gov

Office of the Governor
Common Sense Initiative (CSI) Public Comments
77 S High St Fl 30
Columbus, OH 43215-6108
Via CSIPublicComments@Governor.ohio.gov

Re: Proposed 2024 Ohio Building, Mechanical & Plumbing Code Rules

Thank you for the opportunity to submit written comments for the proposed 2024 Rule Changes. I am a Licensed Architect in the State of Ohio, and a Certified Building Official, Residential Building Official and Master Plans Examiner as well as an educator with certified courses through BBS. I currently work as a full Master Plans Examiner for a county, a part-time Building Official for a city and an Intermittent Plans Examiner for the Division of Industrial Compliance. I am currently the Treasurer for the Ohio Building Officials Association (OBOA) and Immediate Past President for the Five County Building Officials Association (FBOA). Representing myself, I would like to comment specifically on the modifications to approvals proposed for the Ohio Building Code (OBC) and Residential Code of Ohio (RCO).

The OBC and RCO Chapters 1 include similar language in most parts to the ICC model codes, but are based on Ohio's specific legal requirements, the language of approvals is the end result (license to build) where the model codes use the term permits. Ohio expanded the model code terminology to include nonconformance approvals and conditional approvals to provide additional options that satisfied specific needs. Over the years, these options have confused owners, design professionals and code officials and have not been uniformly applied throughout the State or sometimes within a jurisdiction. My comments center on simplifying the terminology and definitions to achieve the uniform application as well as provide the flexibility for both owners and jurisdictions to regulate while allowing projects to proceed at a reasonable pace.

The various degrees of approving a project should be simple: It's approved (we don't need any further information to review) or it's not approved (nothing submitted complies to allow construction to begin). There are many times where a project is in-between these end posts, where a portion of the work can be approved because the associated information is adequate, but other portions of the work cannot be approved because the information does not comply with the Code or more information is needed like a fire alarm system. Since we have a Partial Certificate of Occupancy, a partial approval would be a reasonable compliment. Stipulations would define what is approved and items of non-compliance would be listed on the Certificate of Plan Approval. The current description for phased approval is similar to a partial approval with the additional requirement that the owner/applicant would request specifically what they are asking to review. This is an important point that many lose sight of: what is allowed to be commented on for the next plan review since we are not allowed to keep adding correction items to previously reviewed documents. In a phased submission, the owner/applicant is defining what they want reviewed and therefore does not have the right to claim the building department did not follow OBC 107.4.2. Many building departments also charge an additional fee for a phased review/approval since the owner/applicant requested the "stop and go" process of reviewing the project numerous times.

The existing nonconformance and conditional approvals create confusion in trying to additionally define the process and owner's rights. In an effort to define the owner's rights and try to clarify the process (which belongs in OBC Section 107), everyone is confused and Building Officials are concerned that they are losing the tools that they have relied upon. Based on the legal processes in the State of Ohio, if the owner does not agree with the findings or Orders of the Building Official, they have 30 days in which to appeal. Providing an approval that can be revoked if the owner or Building Department do not do an addition step is burdensome and is forgotten more times than not. If a project receives anything less than a complete approval (nothing further needed) is it not a "conditional license to proceed with construction or materials up to the point where construction or materials objected to by the agency are to be incorporated into the building." Why is this only applicable when an appeal is in process? Because this language is only in conditional approval is it not applicable to the nonconformance approval?

This language in the nonconformance approval is confusing for many reasons: "such documents may be approved by the building official provided such nonconformance is not considered to result in a serious hazard and the owner or owner's representative subsequently submits revised construction documents showing evidence of compliance with the applicable provisions of the rules of the board. In the event such construction documents are not received within thirty days, the building official shall issue an adjudication order revoking the plan approval." If the owner does not submit compliance documents or an appeal after 30 days from the original submission response, why does the building official issue an adjudication order that provides the owner an additional 30 days to appeal?

If anything the Building Official issues with their signature on it can be considered an Order, why would a plan review, correction letter or certificate of plan approval be nothing less? Does an Adjudication Order need to be separately issued restating the items from a plan review? If the owner does not request everything or a specific correction item, have they surrendered their right to appeal it? If our goal is to expedite the permitting process and owner's appeal, why would we continue to define a two-step process when a single response with correction items is the Adjudication Order (stated as such and including the requirements required by Ohio Law and OBC 109.1).

I really appreciate the opportunity we all have with the process to update the Codes to improve the health safety and welfare in the State of Ohio and streamline or simplify the process where possible. If you have any questions or would like further information or discussion, please contact me.



David Molnar, RA, BO, RBO, MPE,
4201 Copley Rd
Copley, OH 44321
dmolnar1@hotmail.com
(330) 714-0982

From: [Charles Huber](#)
To: [BBS, BBSOfficAsst3](#); [CSIPublicComments](#)
Cc: [Christopher Parmelee](#); [William A. Wagner](#); [randles93@gmail.com](#); [crandles@summitoh.net](#); [David Molnar](#); [dmolnar@richlandcountyooh.gov](#); [Russ Rodic](#); [Spry, Michael](#)
Subject: Draft Ohio Building Code (OBC) Chapter 1, Ohio Administrative Code 4101:1-1-01, Nonconformance Approval & Communication
Date: Monday, May 8, 2023 8:52:12 AM
Attachments: [Parmelee ltr 5-8-23 Nonconformance Approval.pdf](#)

Reference Ohio Department of Commerce, Division of Industrial Compliance e-mail 4/21/23 (below). Attached is Christopher Parmelee, Lakewood Building Commissioner/Building Official letter regarding draft OAC 4101:1-1-01 OBC 105.1 et seq. regarding deletion of nonconformance approvals and 107.6.1 regarding the flawed language for nonconformance communications. Charles Huber, Lakewood Residential Plans Examiner, (W) 216-529-6689 sends.

----- Forwarded Message -----

Subject: Proposed 2024 OBC, OMC & OPC Rules

Date: Fri, 21 Apr 2023 16:08:44 +0000

From: Ohio Department of Commerce, Division of Industrial Compliance
<OhioCSI.Com.IC@public.govdelivery.com>

Reply-To: OhioCSI.Com.IC@public.govdelivery.com

To: chuber3@neo.rr.com

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commercelogo



April 21, 2023

Request for Public Comment:

Proposed 2024 Ohio Building, Mechanical & Plumbing Code

Rules

The Board of Building Standards proposes to update the Ohio Building (OBC), Mechanical (OMC) & Plumbing Codes (OPC) to the 2021 edition of the International Codes (I-Codes) published by the International Code Council (ICC) with Ohio modifications.

- Rescind and Adopt New Ohio Building Code Rules OAC 4101:1-1-01 through 4101:1-35-01
- Rescind and Adopt New Ohio Mechanical Code Rules OAC 4101:2-1-01 through 4101:2-15-01
- Rescind and Adopt New Ohio Plumbing Code Rules OAC 4101:3-1-01 through 4101:3-15-01

[View Business Impact Analysis and Proposed Rules](#)

These rules are open for comment between April 21, 2023 and May 10, 2023.

Please send your written comments on these rules to BBS@com.ohio.gov and CSIPublicComments@governor.ohio.gov

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May 8, 2023

Board of Building Standards (BBS)
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Via e-mail BBS@com.ohio.gov

Office of the Governor
Common Sense Initiative (CSI) Public Comments
77 S High St Fl 30
Columbus OH 43215-6108
Via e-mail CSIPublicComments@governor.ohio.gov

Subject: Proposed Ohio Building Code (OBC) Chapter 1, Ohio Administrative Code 4101:1-1-01

1. References:

- a. My letter March 16, 2023 (attached)
- b. Ohio Department of Commerce, Division of Industrial Compliance e-mail April 21, 2023

2. Reference 1.a shows the draft section addressing plan approvals [Ohio Building Code (OBC) 105.1 et. seq.] deletes existing OBC 105.1.1 which provides for "nonconformance approval." The rule draft prepared for the March 22, 2023 CSI Stakeholders' Meeting has been revised. However, the draft rule announced by reference 1.b (draft as of April 20, 2023) continues to delete the nonconformance approval. What remains in the April 20, 2023 revised draft rule is:

- a. Annual approval for alterations (Draft OBC 105.1.1)
- b. Conditional approval [Draft OBC 105.1.3 pursuant to Ohio Revised Code (ORC) 3791.04(G)].
- c. Phased approval [Draft OBC 105.1.4 pursuant to ORC 3791.04(D)].
- d. Disapproval of Plans Adjudication Order (no approval).

3. Lakewood completes approximately 1,050 plan reviews each year with a 15 day average turnaround (approval/disapproval) which is half of the 30 day maximum set in rule (Existing & Draft OBC 107.2.1). The existing nonconformance approval provisions immensely help that performance. The loss of the nonconformance approval will adversely impact both Lakewood's plan approval operations and the building owner or representative (designer/construction contractor/tenant) i.e. applicant timelines. The existing nonconformance approval provision allows the construction to proceed, but the applicant must within 30 days either revise the construction documents (drawings, specifications, etc.) addressing the items of nonconformance or state that an appeal to the Board of Building Appeals (which might be a variance request) pursuant to ORC 3781.19 & 2781.20 will be pursued. If the applicant fails to

do either response within 30 days, then the Building Official issues an Adjudication Order revoking the Certificate of Plan Approval (Nonconformance Approval) and if construction's commenced, then also stopping construction.

4. Under the draft rule, the applicant would be given a nonconformance communication letter requiring the applicant to respond stating whether the construction documents will be revised or not (Existing & Draft OBC 107.6.1). The applicant must also provide an estimated date of when those revised construction documents will be submitted. The 30 day maximum criteria calendar starting upon initial submission of application continues to toll against the Building Official while waiting for the applicant to respond to the nonconformance communication letter. The Building Official upon receiving the applicant's response that the construction documents will be revised/resubmitted under the draft rule has the following option while waiting for the revised drawings:
 - a. Issuing a Certificate of Plan Approval and simultaneously an Adjudication Order directing the construction documents be revised by a specific date.
 - b. Issuing a Certificate of Plan Approval (Phased Approval) and describing the nonconformance items preventing approval of the project portions excluded from approval.
 - c. Issuing a Disapproval of Plans Adjudication Order resulting in construction not being allowed to start at all.
5. Ohio Board of Building Standards has provided building department personnel mandatory continuing education on the importance of customer service including minimizing the plan review/approval/disapproval timeframe. Removing the Certificate of Approval (Nonconformance Approval) from the existing rule will:
 - a. Confuse applicants.
 - b. Create more work for building departments.
 - c. Slow the construction documents approval process.
6. Reference 1.a showed the existing and draft OBC 107.6.1 includes language that reflects the original thought that the Plans Examiner (instead of the Building Official) would communicate with the applicant regarding construction documents nonconformance items. Either:
 - a. Delete OBC 107.6.1, or
 - b. Revise OBC 107.6.1 Item 1.2 to read, "the items of noncompliance will not be brought into compliance and will be referred to the building official as indicated in item 4 below." Also delete OBC 107.6.1 Item 4 in its entirety without substitution/replacement, "~~If the owner or the owner's representative indicates that the work will not be brought into compliance with the rules of the board or requests an adjudication order, the plans examiner reports to the building official in accordance with section 107.6.2."~~
7. When a Certificate of Plan Approval (Nonconformance Approval) the Building Official keeps

his/her eyes on the calendar making sure that the (30 day) approval hasn't expired. This is a valuable resource. Do not remove something that benefits those jurisdictions that utilize nonconformance approvals as intended.

Sincerely,



Christopher S. Parmelee
Building Commissioner/Building Official

Atch
a/s

cc: Christopher Randles, Ohio Building Officials' Association (OBOA) Legislative & By-Laws Committee
Chair, randles93@gmail.com & crandles@summitoh.net
David Molnar, OBOA Treasurer, dmolnar1@hotmail.com & dmolnar@richlandcountyoh.gov
Russ Rodic, Building Officials' Conference of Northeast Ohio President, OBOA Board of Directors
rrodic@safebuilt.com



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Board of Building Standards (BBS)
PO Box 4009
Reynoldsburg OH 43068-9009
Via e-mail BBS@com.ohio.gov

March 16, 2023

Subject: BBS Common Sense Initiative Stakeholders' Meeting March 22, 2023; Draft OBC 105.1 et seq. Deletion of Existing OBC 105.1.1 Nonconformance Approval and OBC 107.6.1 Item 4 Communication Process for Items of Non-compliance.

1. Reference Pamela Butts e-mail March 2, 2023. Draft Ohio Building Code (OBC) 105.1 et seq. deletes existing OBC 105.1.1 Nonconformance approval. If this deletion's adopted, then:
 - a. Existing and draft OBC 107.6.1 & 107.6.2 shows the building official determines whether the plans examiner's comments are to be communicated to the owner's representative asking whether the drawings will be revised and resubmitted. Estimated date of resubmission's obtained.
 - b. Existing and draft OBC 107.6.2 reads in part, "The building official ... determines whether any approvals are possible, and issue the appropriate approval as described in Section 105." That section describes "Conditional approval." and "Phased approval." These descriptions (definitions) are driven by statute, Ohio Revised Code 3791.04(G) and 3791.04(D) respectively.
 - c. It's unlikely that conditional approval (defined by statute) will be appropriate. That leaves either:
 - (1) Phased approval, or
 - (2) Disapproval of Plans Adjudication Order (no approval).
2. One or a series of phased approvals is a clumsy method where the issues are items such as:
 - a. Accessible signage.
 - b. Door hardware.
 - c. Occupant load information in each room.
 - d. Structural design loads.
 - e. Occupancy Group(s)/Division(s)

- f. Exit signs, emergency powered means of egress lighting, conventional and emergency powered exit discharge lighting.
3. Therefore, deleting nonconformance approval removes a tool building officials now have to expedite plan approval and construction commencement thereby avoiding unnecessary project costs. Also, Existing and draft OBC 107.6.1 Item 4 reads, "If the owner or owner's representative indicates that he work will not be brought into compliance with the rules of the board or requests an adjudication order, the plans examiner reports to the building official in accordance with section 107.6.2." This item was carried over from the original concept that the plans examiner would perform this communication. Before being adopted, OBC 107.6 was revised to show the building official (not the plans examiner) would perform this nonconformance communication. Delete OBC 107.6.1 Item 4.

Sincerely,



Christopher S. Parmelee
Building Commissioner/Building Official



May 10, 2023

Regina Hanshaw
Executive Secretary
Ohio Board of Building Standards
6606 Tussing Road
Reynoldsburg, OH 43068
Regina.Hanshaw@com.ohio.gov

RE: Proposed Changes to the Ohio Building Codes

Dear Ms. Hanshaw,

On behalf of Ohio's Architects, AIA Ohio wishes to express our support for the proposed updates planned for the Ohio Building Code, Ohio Mechanical Code, Ohio Plumbing Code, and the Residential Code of Ohio. We support the efforts of the Ohio Board of Building Standards in implementing new rules that will positively impact the design and construction industry in Ohio by giving us the tools to design better and more sustainable communities.

AIA Ohio's Government Advocacy Committee, in reviewing the proposed changes, supports the proposed approach to the updating the code for:

- Modeling the updates on current, well-recognized, and time-tested standards
- Including new and relevant code sections that address advances in construction technology
- Adopting new processes and procedures to increase the efficiency of Ohio's building departments
- Updating standards referenced for accessibility and energy conservation to align Ohio's design requirements with current standards
- Incorporating updates to allow leading technologies to be used in building designs
- Modernizing the codes to bring Ohio into alignment with industry standards

We believe that the updates to the building codes will have a significant and positive impact on the design and construction industry in Ohio.

AIA Ohio is also in support of the new rules requiring adult changing stations with the exception of one item of concern. Under the proposed section 1110.18.1, the rule is written to include all Assembly occupancies where family or assisted use toilet or bathing rooms are provided. While we clearly understand the logic of using the family assist toilet facility as a common trigger point for the inclusion of adult changing stations, we are somewhat concerned with the application in the nightclub/bar/tavern classification. Because of the very low occupant to toilet fixture ratio in Table 2902.1, the new requirement as written could require an adult changing station in a facility as small as 1,500 SF.

Similar types of uses that serve potentially large occupant loads, such as arenas, pools, and stadiums all have slightly more lenient occupancy loads. It is the committee's opinion that a similar occupancy count of 1:75 in place of the 1:40 for men might make this proposed rule a little

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Worthington OH 43085
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Email: aiaohio@assnoffices.com

more equitable. While there may be other data to support the 1:40 requirement, we believe the requirement as written may be overly restrictive.

Finally, we would like the OBBS to consider instituting a transition period from the existing building code to the new code. In recognition of the long length of time projects are under development, we encourage the OBBS to provide a minimum of a six-month window to transition to the new code after the new codes are adopted and the new building codes are available for distribution. We also request this in recognition of the significant amount of changes being made to the code and the amount of training that will be required to complete the transition.

We thank the Board and staff of the Ohio Board of Building Standards for your work in advancing these updated codes for the benefit of the health, safety, and welfare of the public. We look forward to continued cooperation with the Board as this process moves forward.

Sincerely,



Karen Planet, AIA
Chair, AIA Ohio Government Advocacy Committee



John Orsini, AIA
AIA Ohio President



COUNTY OF SUMMIT, OHIO

Ilene Shapiro, County Executive

Division of Building Standards · buildingstandards.summitoh.net

1030 E Tallmadge Avenue · Akron OH 44310 · 330.630.7280 · fax 330.630.7296

5/9/23

Board of Building Standards (BBS)
PO Box 4009
Reynoldsburg OH 43068-9009
Via BBS@com.ohio.gov

Office of Governor State of Ohio
77 S High St Fl 30
Columbus OH 43215-6108
Via CSIPublicComments@governor.ohio.gov

Re: Proposed 2024 Ohio Building, Mechanical & Plumbing Code Rules

Thank you for this opportunity to submit written comments for the proposed 2024 Ohio Building, Mechanical & Plumbing Code Rules. On March 22nd I attended the stakeholders meeting at the Board of Building Standards conference room and voiced my support of the proposed change to remove 30-day nonconforming approvals. I continue to believe that by removing this approval type, the approval process will have the potential to become more streamlined and business friendly.

In my experience as the Building Official for Summit and Medina Counties, Owners understand phased approvals and do not understand 30-day nonconforming approvals. Time and time again when owners have a 30-day nonconforming approval their design team is unable to get plan corrections into the Department within the 30-day window. Once the 30-day window has expired, the Building Official is required to issue an adjudication order revoking the approval which puts a stop to construction. Summit County Building Standards averages 2,051 nonresidential plan reviews annually and removing cumbersome and hard to understand rules for the Owners to follow will only help with the processing of approvals by removing unnecessary paperwork.

To break ground and get projects started, the code already allows the owner to request phased approvals. This is a better option because there are no time limits on the approval, the only limit is the phase of the project that is approved. I have started encouraging owners to request phased approvals instead of 30-day nonconforming approvals and the process is working much better. Currently, we have two large high schools under a phased approval for footings and foundations. Both projects have plans in excess of 400 sheets and a 30-day temporary approval would not keep the projects under construction. Why would we want to penalize construction to process adjudication orders when phased approvals already allow completion of the phase without a time limit for the Owner's design team?

For small projects, 30-day approvals still do not work. A nonconforming approval is issued because the design plans have minor modifications that are needed to meet code requirements. What happens if the job is finished before 30 days and the modifications to the design plans are not received by the building department? Then the Building Official is required by law to issue an adjudication order which creates a process that can cost the owner time and money to get approval for a minor item. I understand it is the owner's responsibility to follow the conditions of the Nonconforming Approval, but in my experience, many owners act as their own project manager for small projects and do not have the necessary experience or knowledge to understand nonconforming approvals. Again, why

would we offer such an awkward and inconvenient tool to small business owners when it would be more appropriate to receive the additional information and grant full approval before costly construction begins.

In addition to removing nonconforming approvals, it is my opinion that section *107.6 Plan review, items of noncompliance* can be streamlined to help both owners and building departments. As the process is currently written, a plans examiner may communicate to the owner items of noncompliance with the submitted documents and then give the owner a choice to either revise the plans or refer the communication to the Building Official. The Building Official then will determine if the plans are noncompliant and render a final determination if the plans are indeed noncompliant or issue an adjudication order so that the Owner may then appeal the review items. By following this process, the reviews become cumbersome and confusing to owners and cause additional delays.

To render a solution and streamline *107.6*, Ohio Building Code Section *104.2.2.1 Master plans examiner* should be updated to allow master plans examiners to communicate results of plan reviews to owners instead of to the Building Official. This can be accomplished by giving a master plans examiner express authority or by using an approved policy of the Department like what is proposed for the order of reviewing submitted plans. I firmly believe by making this change, the burdensome and unwieldy code language can be streamlined to give Building Departments across the State better tools to respond to requests for approvals and eliminate the need for 30-day nonconforming approvals. This would meet the objectives of the Common Sense Initiative while still allowing proper code review of proposed construction in order to keep Ohioans safe.

Again, thank you for this opportunity to comment on the proposed 2024 Ohio Building, Mechanical & Plumbing Code Rules. If you should have any questions, please do not hesitate to contact me.

Kindest Regards,



Christopher Randles
Chief Building Official
Ilene Shapiro, Summit County Executive
1030 E. Tallmadge Ave
Akron, Ohio 44310
330-630-7287

May 10, 2023

FILED VIA EMAIL TO: BBS@com.ohio.gov
Board of Building Standards
Ohio Department of Commerce
6606 Tussing Road
Reynoldsburg, OH 43068

RE: Comments from the City of Columbus on the Proposed 2024 Updates to the Ohio Building, Mechanical, and Plumbing Codes

Dear Sir or Madam:

The City of Columbus appreciates the opportunity to comment on the proposed updates by the Board of Building Standards (the Board) to the Ohio Building, Mechanical, and Plumbing Codes. Columbus applauds the Board's proposed updates to the Ohio Building Codes to the 2021 edition of the International Codes (I-Codes), including the International Energy Conservation Code (IECC). Ohio is currently using commercial energy codes that are over ten years old. The updates are a huge step forward for all Ohioans and Ohio businesses. But the impact will be even stronger if Ohio adopts the 2021 IECC in its entirety instead of the proposed adoption of some standards from 2018 and some from 2021. If elements of the 2018 standards are adopted, by the time that the new Ohio codes come online in 2024, Ohio will be six years behind international best practices.

In Columbus and Central Ohio, the necessity for the Ohio Building Code to meet the most up-to-date standards is amplified due to the rate of construction. Thousands of new homes are needed here. Central Ohio is the fastest growing large metropolitan area in the Midwest¹, expected to grow by more than 1,000,000 people by 2050.² In addition to residential development, Ohio ranked #3 for overall economic development project wins across the nation.³ Columbus supports the Board in its proposed building code updates and asks that the Board ensure Ohio's long term development potential and the maximum energy savings for its residents and businesses by adopting the 2021 IECC in its entirety.

¹ <https://www.nbc4i.com/news/local-news/columbus-among-fastest-growing-metropolitan-areas-as-smaller-ohio-areas-shrink/>.

² <https://www.columbus.gov/development/economic-development/City-of-Columbus-Factbook/>, at page 23.

³ <https://www.globenewswire.com/news-release/2023/03/01/2618322/0/en/Ohio-Ranks-3-in-the-Nation-for-Overall-Economic-Development-Projects-and-Major-Investment-Projects-Per-Capita.html#:~:text=According%20to%20Site%20Selection%2C%20two%20of%20Ohio%E2%80%99s%20metropolitan,made%20a%20strong%20showing%20at%20%237%20per%20capita.>



Customer Service | Telephone (614) 645-8276 | Fax (614) 645-0222 | TDD (614) 645-7188

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Sewerage and Drainage | 1250 Fairwood Avenue | Columbus OH 43206 | Telephone (614) 645-7175 | Fax (614) 645-3801
Water Administration | 910 Dublin Road Columbus OH | 43215 | Telephone (614) 645-7020 | Fax (614) 645-3993
Director's Office | 910 Dublin Road | Columbus OH 43215 | Telephone (614) 645-6141 | Fax (614) 645-8019
columbus.gov

Energy costs are significantly increasing in much of the state. In Central Ohio, electric rates for residents and businesses are expected to rise by almost 30% this summer.⁴ In June, Northern Ohio customers will start paying double their current rates for electricity.⁵ By increasing energy efficiency standards in buildings across the state through advanced building codes, Ohio can help mitigate these rising energy costs for its residents and business owners. Through the adoption of an updated and efficient building code, the state can minimize excessive spending on the part of its residents and business owners through wasted or inefficient energy use – dollars proverbially thrown out the drafty window. This means that more money is available to spend in the local economy and less on residential or commercial utility bills.

Ohio will achieve the largest financial advantage through adopting the most up-to-date code rather than selling its residents and businesses short with an already outdated version. US Department of Energy (DOE) research shows there will be an almost 19% improvement in building efficiency by updating to the most recent IECC standard.⁶ DOE’s calculations, including the potential reduction in annual energy costs, were done using the standards in the 2021 IECC. While the investments in energy efficiency could slightly increase early costs of construction, the cost savings are positive by six years into life of the building.⁷ Moving to the 2021 IECC is cost-effective for all building types—residential and commercial.⁸ Thus, to realize the maximum savings for its residents and businesses, Ohio must move fully to the 2021 IECC instead of its currently proposed hybrid between the 2018 and 2021 IECC.

In addition to energy efficiency savings and resilient structures, modern building codes result in great reductions in greenhouse gas emissions. In 2021, Columbus launched the City’s Climate Action Plan. The City made bold commitments in the Climate Action Plan, including 45% reduction in citywide greenhouse gas emissions by 2030 and carbon neutrality by 2050. In the greenhouse gas reduction race, building codes matter. Energy use from buildings contributes 60% of greenhouse gas emissions in the Columbus area. The Climate Action Plan institutes a 15/20% reduction in building energy use for commercial/residential buildings, respectively, by 2030. Changing the way buildings are built and operated is essential to meeting these commitments. A modern building code applied to these projects over the next decade of residential and commercial development will make a huge difference for the next century of greenhouse gas emissions.

⁴ <https://www.dispatch.com/story/business/2023/03/24/aep-ohio-electric-bills-to-increase-almost-30-in-summer/70044736007/>.

⁵ <https://www.wkyc.com/article/money/firstenergy-rates-double-june-heres-how-northeast-ohio-customers-can-save-money/95-845f7a8b-baa2-4318-b62d-ef944ce80de7>.

⁶ <https://www.energycodes.gov/determinations>.

⁷ https://www.energycodes.gov/sites/default/files/2021-07/EED_1365_BROCH_StateEnergyCodes_states_OHIO.pdf.

⁸ https://www.energycodes.gov/sites/default/files/2021-07/EED_1365_BROCH_StateEnergyCodes_states_OHIO.pdf.

The City of Columbus requests that the Board update the Ohio Building, Mechanical, and Plumbing Codes to the most current version of the 2021 I-Codes, including the 2021 IECC. This will make Ohio buildings more resilient and energy efficient—resulting in energy cost savings for our residents and business owners for decades to come.

Thank you for your consideration of these comments. Should you have any questions, please contact Alana Shockey at arshockey@columbus.gov or call (614) 645-7157.

Sincerely,

A handwritten signature in cursive script that reads "Alana R. Shockey".

Alana R. Shockey
Deputy Director, Regulatory Compliance and Sustainability
Columbus Department of Public Utilities
arshockey@columbus.gov
(614) 645-7157

From: [Hanshaw, Regina](#)
To: [Richards, Jay](#); [Ohler, Deborah](#)
Subject: FW: 2024 OBC Section 1110.18 Clarification/ AIA Ohio
Date: Thursday, May 4, 2023 1:00:56 PM
Attachments: [image001.png](#)

FYI

From: Bruce Sekanick <bruce@phillips-sekanick.com>
Sent: Thursday, May 4, 2023 12:41 PM
To: Hanshaw, Regina <Regina.Hanshaw@com.ohio.gov>
Cc: Karen Planet <kplanet@rwaarchitects.com>; Kate@assnoffices.com
Subject: 2024 OBC Section 1110.18 Clarification/ AIA Ohio

As AIA Ohio reviews the language of the proposed 2024 OBC, we have identified the following item that we would like to have addressed:

Section 1110.18

A review of the above section found our members to be generally in support of the requirements outlined. In our analysis, we looked at the potential sizes of the spaces and occupant loads in each occupancy to determine the impact of the proposed rules on a variety of project types. The following was a quick analysis of the various occupancies covered under 1110.18.1:

1. "A" occupancies that require Family Assist restrooms will be required to have adult changing tables. Based on the occupancy count, this means that the adult changing stations are required where there is an aggregate of 6 or more male and female water closets or equivalents. The following are some of the uses and occupant counts that would require the installation of adult changing stations:
 - Restaurants and banquet halls: Occupancies of more than 450
 - **Night Clubs: Occupancies of more than 240**
 - Theatres or performing arts: Occupancies of more than 570
 - Auditoriums: Occupancies of more than 570
 - Places of Worship Occupancies of more than 675
 - Pools, Tennis Courts, Inside events Occupancies of more than 345

2. "M" occupancies that require Family Assist restrooms will be required to have adult changing tables. Based on the occupancy count, this means that the adult changing stations are required where there is an aggregate of 6 or more male and female water closets or equivalents. This would generally be for the following facilities:
 - Mercantile facilities: Occupancies of more than 3000 persons

3. "B" occupancies that are used as educational facilities beyond the 12th grade with an aggregate of 12 male and female water closets for use by classrooms and lecture halls. This would generally include the following facilities:
 - University or Community Colleges Classroom and Lecture halls with a capacity of more than 780 persons. (Buildings with lecture halls would obviously drive this condition.)

4. "E" facilities where assembly areas require 6 or more male and female water closets.
 - School facilities with gymnasiums or other assembly areas for more than 570 persons.

5. Highway Rest Stops and Service Plazas

- Self-explanatory.

The above seems to be reasonable and appropriate, however, it also appears that the A2, nightclub classification has a significantly lower occupancy than the other uses. We ask that this item be clarified, as there this would require the adult changing stations in buildings as small as 1,200 – 1,500 SF if a standing room occupant load was the basis of the calculation. In the specific application for nightclubs, is the aggregate calculation of 6 or more male and female water closets appropriate or would the aggregate of 12 male and female water closets, as indicated in “B” occupancies for educational facilities beyond the 12th grade, be more appropriate?

Thank you,
Bruce-

AIA Ohio Advocacy Committee

Bruce Sekanick, FAIA, OAA
Principal Architect

[c] 330.717.3905 [e] bruce@psaoh.com [d] 234.830.2030

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From: [Billy Taylor](#)
To: [BBS, BBSOfficeAsst3](#)
Subject: PUBLIC COMMENT: Ohio Building Code Update
Date: Friday, May 5, 2023 2:01:04 PM
Attachments: [image001.png](#)
[NEII Comments on Ohio Building Code Updates. 5.5.23.pdf](#)

To Members of the Board of Building Standards:

Please find attached comments from the National Elevator Industry, Inc. (NEII) on proposed rule changes to the Ohio Building Code. These comments are submitted for the review by the Board of Building Standards as they determine to formally file rules ahead of the June 3 public hearing.

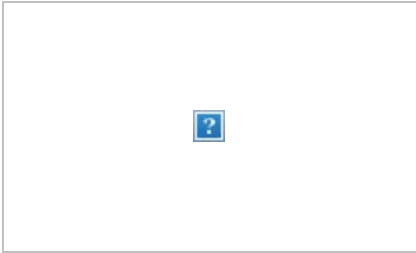
Please confirm receipt. And feel free to contact me with any questions. Thank you.

Best regards,

Billy

Billy J. Taylor
NEII • Director, Government Affairs
btaylor@neii.org
(213) 479-5738 (mobile)

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May 5, 2023

Board of Building Standards
Ohio Department of Commerce
77 South High Street, 23rd Floor
Columbus, OH 43215-6133

RE: NEII Comments on the Ohio Building Code Update

Dear Members of the Board:

The National Elevator Industry, Inc. (NEII) is the leading trade association for companies that manufacture, install, and maintain elevators, escalators, moving walks, and other building transportation products. NEII members collectively represent approximately eighty-five percent of the work hours in the building transportation industry. As such, we welcome the opportunity to comment on Ohio's proposed adoption of the 2021 International Building Code (IBC).

NEII is a strong proponent for the adoption of the latest edition of the model building codes and elevator codes without deviation. As with all versions of codes developed by the American Society of Mechanical Engineers (ASME), ASME A17.1/CSA B44:19 *Safety Codes for Elevators and Escalators* (A17.1) ensures a uniform and high level of safety throughout Ohio. A17.1 represents the optimum in safety, as it is developed and refined by hundreds of skilled experts representing all aspects of the elevator industry. Expertise is drawn from enforcing authorities, mechanical and electrical engineering and design experts, inspectors, consultants, labor authorities, building and facility owners, and installation and maintenance specialists. This state-of-the-art code is updated every three years and is used by all jurisdictions throughout the United States and Canada as a basis for elevator code.

NEII is also a proponent of coordination between codes during the adoption process. Coordination between the building and elevator codes is essential to prevent a conflict that was created by a provision added in the 2018 IBC and which remains in the 2021 edition. This provision, IBC Requirement 3001.2, mandates an emergency communication system for the deaf, hard of hearing, and speech impaired. NEII supports the intent of this code change, but the code language in the IBC does not provide detailed technical requirements to ensure consistent enforcement. To ensure the emergency communication system meets the needs of people of all abilities, NEII strongly recommends IBC Requirement 3001.2 be replaced with the following language that has been approved for inclusion in the 2024 IBC:

3001.2 Elevator emergency communication systems. An elevator emergency two-way communication system shall be provided that includes both visual and audible communication modes complying with the requirements in ASME A17.1/CSA B44. The system shall provide a means to enable authorized personnel to verify:

1. the presence of someone in the car,
2. that the person(s) is trapped,

Once entrapment is verified, the system shall enable authorized personnel to:

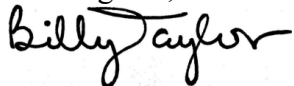
1. Determine if assistance is needed,
2. Communicate that help is on the way,
3. Communicate when help arrives on site.

This proposed revision to the 2021 IBC retains the base requirement for the system while referencing the technical requirements in A17.1. This modification will not increase or decrease the cost of construction because IBC Section 3001.1 also requires the system to comply with the requirements identified in A17.1 generally. This revision to the IBC language, along with adoption of the 2019 edition of A17.1 Requirement 2.27.1, eliminates this conflict.

NEII members worked closely with the American Society of Mechanical Engineers (ASME) Emergency Operations Committee to develop technical requirements for a communication system that would meet the intent of the IBC code change. These technical requirements have been included in the 2019 edition of A17.1 (Requirement 2.27.1). Requirement 2.27.1 ensures the communication system improves entrapment assessment by authorized personnel and conveys additional information to entrapped passengers who are deaf, hard of hearing, or speech impaired. These improvements will help reduce errors, as an entrapment is identified on the first activation of the phone button, independent of the passenger's ability to communicate. This requirement meets the intent of the IBC code change, complies with the guidelines identified in Title III of the Americans with Disabilities Act, and provides clear guidance to manufacturers and code authorities to ensure new systems meet the needs of all users. NEII strongly encourages Ohio to adopt the 2021 IBC along with the 2019 edition of ASME A17.1/CSA B44 or make the recommended modification to the 2021 IBC to eliminate any conflicts and to provide clear guidance for the design of the elevator emergency communication system.

NEII is committed to the safety of the public and elevator personnel. We stand ready to support the Board of Building Standards and look forward to hearing from you as to how we can support the Department in this review process. Please contact me at 213-479-5738 or via e-mail at btaylor@neii.org if you have any questions or need additional information. Thank you for your time and attention to this important industry issue.

Best regards,



Billy Taylor
Director, Government Affairs

2024 Ohio Existing Buildings Code Comments

Commenter	Email	Code Section	Comment	Staff Comments	Code Committee Action
Collins, Dave	dcollins@preview-group.com	Chapter 5 (3/30/23)	In Sections 503.18 and 506.6, either the owner or a tenant can get trapped in doing work beyond the work area when they exceed the 50% issue. There are exceptions, but they don't cover 100% of the types of work being performed that may trap the owner into doing things they don't plan on or expect to have to do.	Yes, the 2018 and 2021 IEBC has added some additional mandatory requirements in Ch 5 that exceed current OBC prescriptive requirements for alterations. These supplemental requirements are life safety, structural and accessibility related issues. Recommend no change to these sections.	
Collins, Dave		Chapter 8 (3/30/23)	In Sections 802.2.2, 802.2.3, 802.3, 802.4.1, 803.2.1.1, 803.4.2, 804.5.3.1, 804.5.4.1, 804.6.3.1, 804.6.4, and 804.8.2 either the owner or a tenant can get trapped in doing work beyond the work area when they exceed the 50% issue. There are exceptions, but they don't cover 100% of the types of work being performed that may trap the owner into doing things they don't plan on or expect to have to do.	Yes, the 2018 and 2021 IEBC has added some additional mandatory requirements in Ch 8 that exceed current OBC prescriptive requirements for alterations. If the owner chooses to comply using the Work Area method, they are likely wishing to incrementally improve the safety of their building. Why would we not allow this option. Recommend no change to these sections.	

From: [David Collins](#)
To: [Ohler, Deborah](#); [Hanshaw, Regina](#)
Subject: "Supplemental Requirements"
Date: Thursday, March 30, 2023 6:00:47 PM
Attachments: [IEBC Issues.docx](#)

As I indicated it is mostly found in Chapter 8. Either the owner or a tenant can get trapped in doing work beyond the work area when they exceed the 50% issue. There are exceptions, but they don't cover 100% of the types of work being performed that may trap the owner into doing things they don't plan on or expect to have to do.

There may be more, but these were what I found today!

Dave

David S. Collins, FAIA, NCARB



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503.18 Two-way communications systems. Where the work area for alterations exceeds 50 percent of the building area and the building has elevator service, a two-way communication systems shall be provided where required by Section 1009.8 of the International Building Code.

506.6 Enhanced classroom acoustics. In Group E occupancies, where the work area exceeds 50 percent of the building area, enhanced classroom acoustics shall be provided in all classrooms with a volume of 20,000 cubic feet (565 m³) or less. Enhanced classroom acoustics shall comply with the reverberation time in Section 808 of ICC A117.1.

802.2.2 Supplemental shaft and floor opening enclosure requirements. Where the work area on any floor exceeds 50 percent of that floor area, the enclosure requirements of Section 802.2 shall apply to vertical openings other than stairways throughout the floor.

Exception: Vertical openings located in tenant spaces that are entirely outside the work area.

802.2.3 Supplemental stairway enclosure requirements. Where the work area on any floor exceeds 50 percent of that floor area, stairways that are part of the means of egress serving the work area shall, at a minimum, be enclosed with smoketight construction on the highest work area floor and all floors below.

Exception: Where stairway enclosure is not required by the International Building Code or the International Fire Code.

802.2.3 Supplemental stairway enclosure requirements. Where the work area on any floor exceeds 50 percent of that floor area, stairways that are part of the means of egress serving the work area shall, at a minimum, be enclosed with smoketight construction on the highest work area floor and all floors below.

Exception: Where stairway enclosure is not required by the International Building Code or the International Fire Code.

802.3 Smoke compartments. In Group I-2 occupancies where the work area is on a story used for sleeping rooms for more than 30 care recipients, the story shall be divided into not less than two compartments by smoke barrier walls in accordance with Section 407.5 of the International Building Code as required for new construction.

802.4.1 Supplemental interior finish requirements. Where the work area on any floor exceeds 50 percent of the floor area, Section 802.4 shall apply to the interior finish and trim in exits and corridors serving the work area throughout the floor.

Exception: Interior finish within tenant spaces that are entirely outside the work area.

NOTE: this one only applies to work within the “work area.”

803.2.1.1 Supplemental automatic sprinkler system requirements. Where the work area on any floor exceeds 50 percent of that floor area, Section 803.2.1 shall apply to the entire floor on which the work area is located.

Exception: Occupied tenant spaces that are entirely outside the work area.

803.4.2 Supplemental fire alarm system requirements. Where the work area on any floor exceeds 50 percent of that floor area, Section 803.4.1 shall apply throughout the floor.

Exception: Alarm-initiating and notification appliances shall not be required to be installed in tenant spaces outside of the work area.

804.5.2.1 Supplemental requirements for door swing. Where the work area exceeds 50 percent of the floor area, door swing shall comply with Section 804.5.2 throughout the floor.

Exception: Means of egress within or serving only a tenant space that is entirely outside the work area.

804.5.3.1 Supplemental requirements for door closing. Where the work area exceeds 50 percent of the floor area, doors shall comply with Section 804.5.3 throughout the exit stairway from the work area to, and including, the level of exit discharge.

804.5.4.1 Supplemental requirements for panic hardware. Where the work area exceeds 50 percent of the floor area, panic hardware shall comply with Section 804.5.4 throughout the floor.

Exception: Means of egress within a tenant space that is entirely outside the work area.

804.6.3.1 Supplemental requirements for other corridor opening. Where the work area exceeds 50 percent of the floor area, Section 804.6.3 shall be applicable to all corridor windows, grills, sashes and other openings on the floor.

Exception: Means of egress within or serving only a tenant space that is entirely outside the work area.

804.6.4 Supplemental requirements for corridor openings. Where the work area on any floor exceeds 50 percent of the floor area, the requirements of Sections 804.6.1 through 804.6.3 shall apply throughout the floor.

804.8.2 Supplemental requirements for means-of egress lighting. Where the work area on any floor exceeds 50 percent of that floor area, means of egress throughout the floor shall comply with Section 804.8.1.

Exception: Means of egress within or serving only a

tenant space that is entirely outside the work area.

2024 Ohio Mechanical Code Comments

Commenter	Email	Section	Comment	Staff Comments	Code Committee Action
Fauber, Jeremy	jpfauber@heapy.com	Ch 15 (Received 3/29/23)	<p>In section 407.1 compliance with ASHRAE Standard 170 is required and chapter 15 indicates this is the 2017 version. Suggest that a path be provided to comply with Standard 170-2021 in lieu of 2017 version and still be in compliance with OMC. Justification: For many hospitals to receive funding from the Centers for Medicaid and Medicare services (CMS) they utilize accrediting agencies, such as the Joint Commission, to show eligibility for funding. Per the recent announcement from The Joint Commission they will be enforcing the 2022 FGI guidelines, which includes ASHRAE 170-2021. It would be beneficial to owners, architect, and building departments to be clear that compliance with ASHRAE 170-2021 would satisfy the requirements of OMC 407.1. This suggested path would give owners/engineers the option of choosing between ASHRAE 170-2017 or 2021 to meet compliance.</p>	<p>After discussion with Jeremy, he is supportive of an update of the ASHRAE 170 standard to the 2021 edition, rather than referencing two editions as he mentioned. Staff routinely does update standards when we update the code. This change was incorporated into the Enotification rule.</p>	NA
Fauber, Jeremy			See additional comment from Jeremy on OBC spreadsheet.		

From: [BBS, BBSOfficAsst3](#)
To: [Ohler, Deborah](#)
Subject: FW: Ohio Mechanical code Comments - Standard 170
Date: Tuesday, April 4, 2023 8:07:50 AM
Attachments: [TJC EC NEWS FGI 2022.pdf](#)
[image002.png](#)

From: Jeremy P. Fauber <JPFauber@heapy.com>
Sent: Wednesday, March 29, 2023 3:42 PM
To: BBS, BBSOfficAsst3 <BBS@com.ohio.gov>
Subject: Ohio Mechanical code Comments - Standard 170

In section 407.1 compliance with ASHRAE Standard 170 is required and chapter 15 indicates this is the 2017 version.

Suggest that a path be provided to comply with Standard 170-2021 in lieu of 2017 version and still be in compliance with OMC.

Justification:

For many hospitals to receive funding from the Centers for Medicaid and Medicare services (CMS) they utilize accrediting agencies, such as the Joint Commission, to show eligibility for funding. Per the recent announcement from The Joint Commission they will be enforcing the 2022 FGI guidelines, which includes ASHRAE 170-2021. It would be beneficial to owners, architect, and building departments to be clear that compliance with ASHRAE 170-2021 would satisfy the requirements of OMC 407.1. This suggested path would give owners/engineers the option of choosing between ASHRAE 170-2017 or 2021 to meet compliance.

Thank you!

Jeremy Fauber, PE, CGD, LEED AP BD+C

Principal | Engineering Manager

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The Joint Commission to Reference 2022 FGI *Guidelines*

EFFECTIVE JANUARY 1, 2023, THE JOINT COMMISSION WILL REFERENCE THE “MOST CURRENT EDITION” OF THE FACILITY GUIDELINES INSTITUTE’S *GUIDELINES FOR DESIGN AND CONSTRUCTION OF HOSPITALS AND GUIDELINES FOR DESIGN AND CONSTRUCTION OF OUTPATIENT FACILITIES*

Joint Commission–accredited health care organizations (HCOs) planning construction, remodeling, or demolition projects must comply with Environment of Care (EC) Standard EC.02.06.05: The [organization] manages its environment during demolition, renovation, or new construction to reduce risk to those in the organization. (The exact wording varies slightly by accreditation program.)

EP 1 of this standard provides guidance for what design criteria HCOs should use. Effective January 1, 2023, The Joint Commission will reference the “current” (2022) Facility Guidelines Institute (FGI) *Guidelines for Design and Construction*, as well as state rules and regulations and “other reputable standards and guidelines that provide equivalent design criteria.”

Hospitals, critical access hospitals, and laboratories should use FGI’s 2022 *Guidelines for Design and Construction of Hospitals* for guidance, while ambulatory care organizations should use FGI’s *Guidelines for Design and Construction of Outpatient Facilities*.

Although The Joint Commission does not specifically reference the 2022 *Guidelines for Design and Construction of Residential Health, Care, and Support Facilities*, nursing care centers and other residential facilities may consult this document, along with state rules and regulations and other authoritative standards and guidelines for construction and remodeling projects.

What follows is a sampling of highlights from the 2022 guidelines.

Emergency department access to care and efficiency

- ▶ The 2022 guidelines call for video surveillance at public entrances to emergency departments (EDs) and a duress alarm where entrances may be locked. This requirement was added to ensure that patients in distress can receive necessary care even when entrances are locked. (To learn more about the addition of these guidelines and the challenge of ensuring facility access at a time of increased security hardening, see the article “Improving Emergency Department Access” in the October 2022 issue of *EC News*.)
- ▶ To enable individuals with behavioral health conditions to seek immediate care without waiting with other individuals in a crowded ED, FGI proposes designing a distinct behavioral health crisis unit, increasingly known as an emergency psychiatric assessment treatment and healing (EmPath) unit. An EmPath unit should be located within or have easy access to the ED. An emerging design

From: [BBS, BBSOfficeAsst3](#)
To: [Ohler, Deborah](#)
Subject: FW: Ohio Mechanical Code Comments - NFPA 99
Date: Tuesday, April 4, 2023 8:05:42 AM
Attachments: [image002.png](#)

FYI

From: Jeremy P. Fauber <JPFAuber@heapy.com>
Sent: Wednesday, March 29, 2023 3:41 PM
To: BBS, BBSOfficeAsst3 <BBS@com.ohio.gov>
Subject: Ohio Mechanical Code Comments - NFPA 99

OMC section 407.1 requires ventilation to NFPA 99. NFPA 99 has specific ventilation requirements for med gas storage rooms as well as compliance with ASHRAE 170, which is duplicative of a requirement in the OMC. Ohio has requirements for med gas storage rooms in Ohio Fire Code 5306.2. Provide a path that med gas storage rooms designed in compliance with NFPA 99 ventilation requirements do not need to meet Ohio Fire Code 5306.2 ventilation requirements.

Justification:

For the facilities with med gas storage rooms compliance with both NFPA 99 and Ohio Fire Code 5306.2 is challenging because different approaches are taken by each requirement. The Center for Medicaid and Medicare Services (CMS) requires most of these facilities to comply with NFPA 99, so adding a requirement exempting facilities from complying with NFPA 99 if they meet OFC 5306.2 would not change the challenge of designing these spaces as they would still need to meet both NFPA 99 and OFC 5306.2.

Thank you!

Jeremy Fauber, PE, CGD, LEED AP BD+C
Principal | Engineering Manager
(P) 937-224-0861 x1062 | (D) 937-425-6636 | (C) 513-505-6814 | www.heapy.com
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2024 Ohio Plumbing Code Comments

Commenter	Email	Code Section	Comment	Staff Comments	Code Committee Action
Bellous, Brien	brienbellous@franklincountyohio.gov	802.1.7 (Received 4/11/23)	<p>This code change SHOULD NOT be allowed due to the unsanitary nature of the connection. Pot and pan sinks have required indirect connections since the 2009 IPC for good reason. The fixture is used for the washing of pots and pans used in cooking, baking and distributing food to the public. The sinks have three distinct bowls. One for washing, one for rinsing and one for sanitizing. The sanitization bowl is the one closest to the connection point. Because these sinks are required to discharge to a grease interceptor, many times the connection is to a hydromechanical device located adjacent to the fixture. This close proximity allows substantial chance of bacterial contamination to the bowl of the sink, via the direct connection. The increases in risk to public health and safety was a great enough concern that in 2009 the International Plumbing Code rightly changed to require an indirect connection. Following the science and storehouse of data that Public Health has on these matters should be the motivation to keep 3 compartment sinks indirect connections. Reverting back to a direct connection of this fixture for convenience sake is counter to everything our family of codes stand for. It is NOT true that indirect connections can not be achieved on above floor hydromechanical devices. Splashing is NOT a concern when fixtures are connected properly. These matters are a design issue and easily addressed. I urge the OBBS to continue to protect public health and safety by keeping current IPC language on requiring an indirect connection for this fixture.</p>	<p>The petition that the BBS approved back in 2018 to allow a direct connection is a reduction in protection; Recommend retaining model code language.</p>	
Blaisdell, Howard	hblaisdell@moodynolan.com	410.4 (Received 4/10/23)	<p>I had mentioned a plumbing code item and I am thankful that the committee has proposed keeping the revision to the IPC 410.4 allowing water dispensers in place of drinking fountains as we have a lot of clients who believe that is much more sanitary than the traditional drinking fountain.</p>	NA	NA
Gordon, Kyle	ktgordon@heapy.com	802.4 (Received 3/30/23)	<ul style="list-style-type: none"> • Chapter 2 Definition for a waste receptor includes standpipes. o 802.4 - "Ready access shall be provided to waste receptors." (this is contradicted in the same section, see below) o 802.4.3 - "Access shall be provided to standpipes and drains for rodding." • This is significant because of how Chapter 2 defines access and ready access. o Access: "That which enables a fixture, appliance, or equipment to be reached by ready access, or by a means that first requires the removal or movement of a panel or similar obstruction (see Ready Access). o Ready Access: "That which enables a fixture, appliance, or equipment to be directly reached without requiring the removal or movement of any panel or similar obstruction and without the use of a portable ladder, step stool, or similar device." • Access allows a standpipe to be concealed within casework, which has typical front-face hinged cabinet doors, in order to receive the discharge of countertop beverage dispensing equipment in a commercial breakroom setting. • Ready Access means a standpipe cannot be located within casework. We have encountered multiple inspectors on different projects who have stated that the opening of a cabinet door constitutes "the removal or movement of any panel or similar obstruction" (see Ready Access definition). • Solution: Section 802.4 should be amended to add, "Exception: Standpipes shall only require access." 	<p>Agree that the proposed exception makes sense given the code conflict; This exception was added to the Notification rule.</p>	NA

		802.4.3	<ul style="list-style-type: none"> There is currently no code language indicating if the trap of a standpipe must be located above its associated floor level. Because of this, hub drains and standpipes (as currently defined in the code) have some overlap in their categorization. This is important when considering that, according to current code, hub drains require Ready Access but standpipes only require Access. Section 802.4.2: "A hub drain shall be in the form of a hub or pipe extending not less than 1 inch above a water-impervious floor. Section 802.4.3: "Standpipes shall be individually trapped. Standpipes shall extend not less than 18 inches but not greater than 42 inches above the trap weir. Access shall be provided to standpipes and drains for rodding." If the location requirement of a standpipe's trap is not defined, then below is an example of these sections causing a logical conflict: <ul style="list-style-type: none"> A drain pipe extends 3" vertically upward through its associated floor, which is water impervious. Its trap weir, which is located below floor level, measures 20" from top of slab to trap weir. This drain pipe extends more than 1" above a water impervious floor. Therefore it is a hub drain and requires ready access. This drain pipe is individually trapped, and measures 23" above its trap weir. Therefore it is a standpipe and only requires access. Resolution: Section 802.4.3 should be amended to add "The trap of a standpipe shall not be installed below floor level." This section should read as follows: <ul style="list-style-type: none"> Standpipes shall be individually trapped. The trap of a standpipe shall not be installed below floor level. Standpipes shall extend not less than 18 inches but not greater than 42 inches above the trap weir. Access shall be provided to standpipes and drains for rodding." 	Staff sees no reason to limit the standpipe trap location to the same floor level as the standpipe just to distinguish between the type of access required for a standpipe (requiring <i>access</i>) and a hub drain (requiring <i>ready access</i>). Interestingly, however, the IAPMO Uniform Plumbing Code Section 804.1 does not allow a clothes washer standpipe trap to be below the floor. Many waste receptor traps are located below the floor. Recommend retaining model code language; proposal would limit design flexibility without technical justification.	
Jensen, Sarah	sarahjensen@franklincountyohio.gov	802.1.7 (Received 4/10/23)	In my understanding, the Ohio Board of Building Standards intends to approve a code change to the Ohio Plumbing Code which allows a direct connection of a 3-compartment pot and pan sink to the sanitary drainage system. If this code change is officially adopted, it will be published in the 2024 Ohio Plumbing Code. This proposal is blind to the contamination risks experienced with direct connections of this fixture. Since 2009, the requirement for an indirect connection has protected food establishment owners and the public from a "breeding ground" of bacteria found in the grease trap and sanitary drainage system. It defies reason to go back in time and achieve less protection for the public.	The petition that the BBS approved back in 2018 to allow a direct connection is a reduction in protection; Recommend retaining model code language.	
Richardson, Jim	JARichardson@columbus.gov	305.4.1 (Received 3/28/23)	Propose to adopt 305.4.1 as written-the building drain is still required to be protected and establishing the minimum depth of the building sewer ensure the portion of the building drain that extends beyond the foundation wall is protected.	RC 3781.03 gives authority for adopting building sewer regulations to other agencies, not BBS. Recommend	
		309.2	Propose to adopt as written-these are requirements for flood hazard resistance designs and need to be adhered to.	RC 3701.344 gives authority to adopt rules for individual water supplies and wells (private water systems) to ODH, not BBS. Recommend retaining Ohio	
		312.6	Propose to adopt as-312.6 Gravity Building Sewer-Approval shall be obtained from authority having jurisdiction prior to the issuance of a certificate of occupancy or certificate of completion.	RC 3781.03 gives authority for adopting building sewer regulations to other agencies, not BBS. Recommend	
		312.7	Propose to adopt as – 312.7 Forced/Pumped Building Sewer – approval shall be obtained from authority having jurisdiction prior to the issuance of a certificate of occupancy or certificate of completion.	RC 3781.03 gives authority for adopting building sewer regulations to other agencies, not BBS. Recommend	
		312.9	Propose to adopt as written.	This change was requested by the OHBA; Recommend retaining Ohio	

		403.2	Propose to adopt as written.	There has been concern shared with staff about allowing multiuser all gender restrooms in Group E; Recommend retaining Ohio change.	
		403.4.1	Propose to adopt as written.	This section requires signage to public restrooms, visible from main entrance. In 2016, the Code Committee suggested deleting this due to cost and aesthetics. Given the new signage requirement for adult changing tables, perhaps this signage deletion should be reconsidered. Recommend retaining	
		405.7	Propose to adopt as written.	The section for mental health center plumbing has been historically deleted because it is unclear what is meant by a mental health center. Recommend retaining Ohio change.	
		410.4	Propose - In other occupancies where water dispensers are provided, including disposable cups/containers, drinking fountains are not required to be installed.	This proposal seems to require the owner to provide disposable cups/containers. The building occupants could have their own reusable cups. Recommend retaining	
		421.5.2	Propose to adopt as written.	This change was requested by the OHBA; Recommend retaining Ohio	
		501.1	Propose to adopt as written.	This change attempts to clarify when the plumbing code applies vs. when the boiler rules apply to water heaters. Staff received many calls asking for this clarification. Recommend retaining	
		601.1	Propose to adopt as written.	The exceptions to the model code section are clarifications to the code user that other agencies have authority for the public and private water supply systems, some of which are located within a building. Recommend	
		602.3	Propose to adopt as written.	Individual water supplies are considered private water supplies. The ODH has statutory authority for adoption of rules, not the BBS.	
		603.2	Propose to adopt as written.	RC 3781.03 gives authority for adopting building sewer regulations to other agencies, not BBS. Recommend	
		605.2.1	Propose to adopt as written.	The exception was derived from exemptions found in the federal lead regulations 40 CFR 143.16.	

		606.1	Propose to adopt as written.	The requirement for a full-open valve at the base of every water riser pipe has been in the OPC for years. Recommend retaining Ohio change.	
		606.5.5	Propose to adopt as written.	This a pointer to the OEPA rule requiring a low pressure cutoff for booster pumps. Recommend retaining	
		607.1	Propose to adopt as written.	This sentence in Section 607.1 for tempered water at public hand washing facilities has been added in this section of the OPC to coordinate with Section 419.5 and to eliminate the conflict with the sentence in Section 607.1 that allows hot or tempered water for bathing or washing purposes. Recommend retaining Ohio change but	
		607.2.1	Propose to adopt as written.	The IECC (C404.6 and R403.5.1) and ASHRAE (Section 7.4.4) include pump control and temperature maintenance requirements that apply. The model code only addresses the IECC.	
		607.2.1.1	Propose to adopt as written.	The IECC (C404.6) and ASHRAE (Section 7.4.4) include pump control requirements that apply. Recommend retaining Ohio change that deletes this section in favor of energy code	
		607.5	Propose to adopt as written.	This section is proposed to be modified to properly reference all of the Ohio Energy compliance options, because the OPC applies to both commercial and residential. Recommend retaining	
		608.18	Propose to adopt entire section as written and add, "in accordance with the rules of the "Ohio Department of Health" set forth in Chapter 3701-28 of the Administrative Code, "Private Water Systems." at the end of each section.	This section has been historically shown with the charging paragraph referencing the ODH rules and subsections shown as deleted. We have no authority to adopt rules addressing private water supplies.	
		701.1	Propose to adopt as written.	RC 3781.03 gives authority for adopting building sewer regulations to other agencies, not BBS. Recommend	
		701.2	Propose to adopt as written.	This Ohio change clarifies that the sanitary must connect to a public sewer unless otherside approved by the other agencies having jurisdiction. Recommend retaining Ohio change.	

		701.3	Propose to adopt as written.	RC 3781.03 gives authority for adopting building sewer regulations to other agencies, not BBS. Recommend	
		701.4	Propose to adopt as written.	RC 3781.03 gives authority for adopting building sewer regulations to other agencies, not BBS. Recommend	
		701.5	Propose to adopt as written.	RC 3781.03 gives authority for adopting building sewer regulations to other agencies, not BBS. Recommend	
		701.8	Propose to not add, this is already covered by chapter 34 of the building code.	This change was made last cycle by the Code committee to clarify that existing plumbing piping systems may be reused in many circumstances. Recommend eliminating this section or placing in Chapter 3 because it could apply to all piping systems, not just	
		702.3	Propose to adopt the as written with the following addition on the end of the sentence: “, or as otherwise approved by the authority having jurisdiction.”	RC 3781.03 gives authority for adopting building sewer regulations to other agencies, not BBS. Recommend	
		703	Propose to adopt as written.	RC 3781.03 gives authority for adopting building sewer regulations to other agencies, not BBS. Recommend	
		705.10.2	Propose to adopt as written.	The ASTM standard allows for colors other than purple for primer. The BBS spent several meetings many years ago solving this issue. Recommend	
		708.1.2	Propose to adopt as written.	RC 3781.03 gives authority for adopting building sewer regulations to other agencies, not BBS. Recommend	
		709.1	Propose to adopt as written.	This was a change brought forward from years past. Recommend retaining Ohio change.	
		712.2	Propose to adopt as written.	This is a change recommended by the OHBA. Recommend retainng Ohio	
		714.1	Propose to adopt as written.	A backwater valve is often installed as a requirement of the local sewer purveyor on the building drain. Recommend retaining the Ohio change.	
		716	Propose to adopt as written with the additions of “, or as otherwise approved by the authority having jurisdiction.” at the end of 716.1 and 716.2.	RC 3781.03 gives authority for adopting building sewer regulations to other agencies, not BBS. Recommend	

		717	Adopt entire section as written.	Section 717 is titled Relining Building Sewers and Building Drains. The proposed rule retains only the sections addressing installation of building drains. The proposed deleted model code sections are redundant with Ch 1 & 7 or are manufacturer's installation	
		718.1	Adopt entire section as written.	Section 718 addresses building sewers which BBS has no authority to adopt. Recommend retaining Ohio change.	
		802.4	Propose to adopt as written.	This editorial Ohio change was made last cycle by the committee and clarifies that a strainer or basket is to be installed in the waste receptor rather than cover the outlet of the waste receptor. Recommend retaining	
		1002.4.1	Propose to adopt as written.	This change was recommended by the OHBA. Recommend retaining Ohio	
		1003.1	Propose to adopt as written.	Often times, the requirement for interceptors usually originates with the local sewer purveyor and their FOG program, not the OPC. Recommend	
		1003.4	Propose to adopt as written.	The sewer purveyor rules will dictate how and what type of industrial waste is permitted to be drained into the sewer. Recommend retaining Ohio	
		1101.2	Propose to adopt as written.	This change was intended to clarify that the OPC Ch 11 only applies to courtyards when a building is involved. Recommend retaining Ohio change.	
		1102.4	Propose to adopt as written.	RC 3781.03 gives authority for adopting building sewer regulations to other agencies, not BBS. Recommend	
		1109.1	Propose to adopt as written.	RC 3781.03 gives authority for adopting building sewer regulations to other agencies, not BBS. Recommend	
		1113.1.4	Propose to adopt as written.	This change is needed to enable the exception to be used for all buildings where the RCO applies, not just one- and two-family dwellings, and to reflect our deletion of Section 1102.4. Recommend retaining Ohio change.	
		Ch 12	Propose to adopt entire chapter as written.	This scoping section change is proposed to eliminate nonmedical oxygen because nonmedical oxygen is considered process piping, exempt from approval. Recommend	

		Ch 13	Propose to adopt entire chapter as written. This is a situation where we have two State entities that are not on the same page with how the rules are adopted or will be enforced. The plumbing inspector will always be the last line of defense when it comes to the protection of potable water systems inside of buildings. Given the potential danger associated with having separate non-potable water systems within buildings, it is imperative that this chapter remains intact in the code and remains under the authority of certified plumbing plans examiners for plan reviews and certified plumbing inspectors for inspections.	BBS staff has worked with ODH staff Rebecca Fugitt and Rachel Townsend in years past. In fact, Ms. Ohler was on the ODH recycled water committee and provided language to ODH staff for recommended adoption when the Ohio law changed giving ODH authority for rule writing for recycled water systems. Both Rebecca and Rachel have retired. Audrey Blakeman has taken Rachel's place. I talked with Audrey about recycled water rule status. She confirmed that adopting those rules are still on their agenda, but they haven't	
		Ch 13	Direct quote from Mary Shaffer at ODH-"I have discussed this with our interim manager of the private water systems program here at ODH. The private water systems rules pertain to potable drinking water and do not cover collecting storm water for irrigation purposes. Recycled water systems for the purpose of providing potable drinking water does fall under ODH. It is my understanding that is not what is happening at this location and therefore the reclaiming or catching of storm water for irrigation does not fall under the purview of ODH private water program."	"The rules of the ODH include a definition of "Human Consumption". See paragraph (CCC) of rule 3701-28-01 of the Administrative Code: (CCC) "Human consumption" means the ingestion or absorption of water or water vapor as the result of drinking, cooking, dishwashing, hand washing, bathing, showering, oral hygiene, or other domestic uses such as flushing toilets and doing laundry. This definition is consistent with their paragraph (XXX) definition of "Private Water System" that includes #10 Auxiliary water sources that enter a	
		Ch 14	Propose to adopt entire chapter as written.	Subsurface graywater soil absorption systems are not considered plumbing systems or building services piping. Therefore, the BBS would consider this type of system process piping, exempt from approval. Recommend retaining rule, but deleting last sentence if that	
Smith, Justin	justin.smith@kentohio.gov	802.1.7 (Received 4/12/23)	Many local health departments require commercial kitchen pot and pan sinks to be indirectly connected to the sanitary drainage system even though, up to and including the 2009 edition, the code either required or allowed a direct connection. Not only are hydromechanical grease interceptors breeding grounds of bacteria but routine food health department inspections show these sinks are routinely used as food preparation sinks. As of the 2012 edition of the IPC, this section's requirement for an indirect connection resolved a major conflict between the building/plumbing code and numerous local health department regulations. It offers a needed protection for the public who eat in these establishments.	The petition that the BBS approved back in 2018 to allow a direct connection is a reduction in protection; Recommend retaining model code language.	

From: [Bellous, Brien L.](#)
To: [Ohler, Deborah](#)
Subject: Comments on Petition #18-06 (plumbing code)
Date: Tuesday, April 11, 2023 10:40:08 AM

Good morning,

Please accept this email as a formal comment on proposed plumbing code change #18-06 – allowing a direct connection of 3 compartment sink to sanitary drainage system.

This code change SHOULD NOT be allowed due to the unsanitary nature of the connection. Pot and pan sinks have required indirect connections since the 2009 IPC for good reason. The fixture is used for the washing of pots and pans used in cooking, baking and distributing food to the public. The sinks have three distinct bowls. One for washing, one for rinsing and one for sanitizing. The sanitization bowl is the one closest to the connection point. Because these sinks are required to discharge to a grease interceptor, many times the connection is to a hydromechanical device located adjacent to the fixture. This close proximity allows substantial chance of bacterial contamination to the bowl of the sink, via the direct connection. The increases in risk to public health and safety was a great enough concern that in 2009 the International Plumbing Code rightly changed to require an indirect connection.

Following the science and storehouse of data that Public Health has on these matters should be the motivation to keep 3 compartment sinks indirect connections. Reverting back to a direct connection of this fixture for convenience sake is counter to everything our family of codes stand for. It is NOT true that indirect connections can not be achieved on above floor hydromechanical devices. Splashing is NOT a concern when fixtures are connected properly. These matters are a design issue and easily addressed.

I urge the OBBS to continue to protect public health and safety by keeping current IPC language on requiring an indirect connection for this fixture.

Thank you.

Brien L Bellous PI, PPE, MI, RBO, ASSE 6020
Plumbing and Medical Gas Inspection Supervisor
Franklin County Public Health
280 E. Broad Street
Columbus, Ohio 43215-4562
brienbellous@franklincountyohio.gov
(614) 525-5333

Prevent the spread of COVID-19

Minimize risk by getting vaccinated

Anyone fully vaccinated can resume most normal activities

Stay masked when indoors in public places and outdoors in crowds (even if vaccinated)

From: [Blaisdell, Howard](#)
To: [Ohler, Deborah](#)
Subject: Code comments
Date: Monday, April 10, 2023 4:42:06 PM
Attachments: [image165721.png](#)

Good day Debbie,
Thanks for talking to me on the phone this afternoon.

I have shared the code revision process with my AIA committee and Elizabeth Krile with our local AIA chapter.

I have started to look into the first draft of the proposed revisions and will review the 2nd draft when they are released next week.

I had mentioned a plumbing code item and I am thankful that the committee has proposed keeping the revision to the IPC 410.4 allowing water dispensers in place of drinking fountains as we have a lot of clients who believe that is much more sanitary than the traditional drinking fountain.

And as I said on the phone, thanks to you and your whole team as it is clear you have all done a lot of work in this process to update the codes to the 2021ICC series with the appropriate Ohioisms and your collective work is appreciated.

Regards,
Howard Blaisdell

HOWARD BLAISDELL

AIA, LEED AP
ASSOCIATE PRINCIPAL
PROJECT MANAGER



OFFICE: 614.461.4664 DIRECT: 614.280.1390 CELL: 614.216.0880

2021 AIA NATIONAL ARCHITECTURE FIRM AWARD

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From: [BBS, BBSOfficeAsst3](#)
To: [Ohler, Deborah](#)
Subject: FW: Proposed Change to 2024 Ohio Plumbing Code, Sections 802.4 and 802.4.3
Date: Tuesday, April 4, 2023 8:15:05 AM
Attachments: [image002.png](#)

FYI

From: Kyle T. Gordon <ktgordon@heapy.com>
Sent: Thursday, March 30, 2023 1:35 PM
To: BBS, BBSOfficeAsst3 <BBS@com.ohio.gov>
Cc: Darrin J. Thompson <DJThompson@heapy.com>; Jeremy M. Williams <JMWilliams@heapy.com>
Subject: Proposed Change to 2024 Ohio Plumbing Code, Sections 802.4 and 802.4.3

Salutations Board Members,

For your consideration, please see below for two (2) proposed amendments to the 2021 model International Plumbing Code for adoption into the 2024 Ohio Plumbing Code.

(All code references taken from IPC 2021)

The standpipe “access” contradiction:

- Chapter 2 Definition for a waste receptor includes standpipes.
 - **802.4** - "**Ready access** shall be provided to waste receptors."
(this is contradicted in the same section, see below)
 - **802.4.3** - "**Access** shall be provided to standpipes and drains for rodding."
- This is significant because of how Chapter 2 defines **access** and **ready access**.
 - **Access:** "That which enables a fixture, appliance, or equipment to be reached by ready access, or by a means that first requires the removal or movement of a panel or similar obstruction (see Ready Access)."
 - **Ready Access:** "That which enables a fixture, appliance, or equipment to be directly reached without requiring the removal or movement of any panel or similar obstruction and without the use of a portable ladder, step stool, or similar device."
- **Access** allows a standpipe to be concealed within casework, which has typical front-face hinged cabinet doors, in order to receive the discharge of countertop beverage dispensing equipment in a commercial breakroom setting.
- **Ready Access** means a standpipe cannot be located within casework. We have encountered multiple inspectors on different projects who have stated that the opening of a cabinet door constitutes "the removal or movement of any panel or similar obstruction" (see Ready Access definition).
- **Solution:** Section 802.4 should be amended to add, "**Exception:** Standpipes shall only require access."

Standpipe Trap Location Requirements Not Clear:

- There is currently no code language indicating if the trap of a standpipe must be located above its associated floor level. Because of this, hub drains and standpipes (as currently defined in the code) have some overlap in their categorization. This is important when considering that, according to current code, hub drains require **Ready Access** but standpipes only require **Access**.
 - **Section 802.4.2:** "A hub drain shall be in the form of a hub or pipe extending not less than 1 inch above a water-impervious floor."
 - **Section 802.4.3:** "Standpipes shall be individually trapped. Standpipes shall extend not less than 18 inches but not greater than 42 inches above the trap weir. **Access** shall be provided to standpipes and drains for rodding."
- If the location requirement of a standpipe's trap is not defined, then below is an example of these sections causing a logical conflict:

- A drain pipe extends 3" vertically upward through its associated floor, which is water impervious. Its trap weir, which is located below floor level, measures 20" from top of slab to trap weir.
 - This drain pipe extends more than 1" above a water impervious floor. Therefore it is a **hub drain** and requires **ready access**.
 - This drain pipe is individually trapped, and measures 23" above its trap weir. Therefore it is a **standpipe** and only requires **access**.
- Solution: Section 802.4.3 should be amended to add "The trap of a standpipe shall not be installed below floor level." This section should read as follows:
 - "Standpipes shall be individually trapped. **The trap of a standpipe shall not be installed below floor level.** Standpipes shall extend not less than 18 inches but not greater than 42 inches above the trap weir. Access shall be provided to standpipes and drains for rodding."

Thank you for your time,

Kyle Gordon

Plumbing Designer

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From: [Jensen, Sarah E.](#)
To: [Ohler, Deborah](#)
Cc: [joemazzola](#)
Subject: Comments regarding Proposed Plumbing Code Changes
Date: Monday, April 10, 2023 10:47:11 PM
Attachments: [Letter in Opposition to 2024 Plumbing Code Change - Sarah Jensen.pdf](#)
Importance: High

Debbie,

Good evening! I hope you had a refreshing weekend! I am reaching out to share with you my comments about a change in the Ohio Plumbing Code that we learned about during the Midwest Workshop last week which will have implications for our food facilities.

In my understanding, the Ohio Board of Building Standards intends to approve a code change to the Ohio Plumbing Code which allows a direct connection of a 3-compartment pot and pan sink to the sanitary drainage system. If this code change is officially adopted, it will be published in the 2024 Ohio Plumbing Code. This proposal is blind to the contamination risks experienced with direct connections of this fixture. Since 2009, the requirement for an indirect connection has protected food establishment owners and the public from a "breeding ground" of bacteria found in the grease trap and sanitary drainage system. It defies reason to go back in time and achieve less protection for the public.

One notable thing is that it appears the City of Columbus plumbing supervisor has stated that sanitarians across the state were behind the proposal because of potential splashing of the sink discharge at the indirect connection. I see no evidence of support in the Food Safety profession to endorse this direct connect connection and it is imperative we make our opposition clear. Is there ever a positive outcome when we lessen health and safety protections for the sake of convenience?

The code change proposal is shown below.

(B) Modify section 802.1.7 as follows:

Add the phrase ", or directly connect" after the term "air break" and add a second sentence that reads: "Food handling sinks are to comply with Section 802.1.1."

802.1.7	Petition #18-06	Modified to allow direct
(formerly 802.1.8)		connection for pot, pan and
		utensil sinks. Clarify that food
		sinks are under 802.1.1

I have attached my official comment letter. Please reach out if you have any questions. Have a great week!

Regards,

Sarah Jensen MPH, REHS, CP-FS
Assistant Health Commissioner
Director of Environmental Health
Franklin County Public Health
280 East Broad Street
Columbus, Ohio 43215-4562

SarahJensen@franklincountyohio.gov

Cell: (614) 561-3252

[Linked In](#)

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Pronouns: she, her, hers ([Why Pronouns Matter](#))

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For general information visit our website at myfcph.org/

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April 10, 2023

Debbie Ohler
Executive Secretary for the Ohio Board of Building Standards
6606 Tussing Rd,
Reynoldsburg, OH 43068

Dear Ms. Ohler:

My name is Sarah Jensen, and I am an Assistant Health Commissioner/ Director of Environmental Health at Franklin County Public Health. I am also a Registered Environmental Health Specialist (REHS), a member of the Conference for Food Protection (CFP) Executive Board, a member of the Ohio Environmental Health Association (OEHA), and a member of the Ohio Public Health Association (OPHA). I appreciate the opportunity to share my comments regarding the proposed code change to 3 compartment sink connections.

Since the 2012 International Plumbing Code (IPC), indirect connections have been recognized as the proper method of connecting 3 compartment sinks to the sanitary drainage system. Because 3 compartment sinks generate fats, oils and greases (FOG), a grease separation device is required by code prior to the sink effluent being received by the sanitary drainage system. These hydromechanical devices are breeding grounds of bacteria and are known to contaminate devices connected via drainage pipes. From 2012 to the current 2021 IPC, indirect connections are required because of this contamination risk.

Many local health departments require commercial kitchen pot and pan sinks to be indirectly connected to the sanitary drainage system even though, up to and including the 2009 edition, the code either required or allowed a direct connection. Not only are hydromechanical grease interceptors breeding grounds of bacteria but routine food health department inspections show these sinks are routinely used as food preparation sinks. As of the 2012 edition of the IPC, this sections requirement for an indirect connection resolved a major conflict between the building/plumbing code and numerous local health department regulations. It offers a needed protection for the public who eat in these establishments.

Codes evolve over time when matters of health and safety become evident in the built environment. Reverting to a 2009 view of direct connections of 3 compartment sinks will lend itself to a high contamination risk to the fixture, and to the public. It is our opinion at Franklin County Public Health that the Ohio



Board of Building Standards has an obligation to uphold proven scientific data showing a conclusive health protection by requiring the indirect connection of 3 compartment sinks. This proven protection is threaded through all of IPC chapter 8 and has a heavy emphasis on food handling and preparation fixtures.

Thank you again for allowing me to share my comments. I am happy to answer any questions you may have.

Sincerely,

Sarah Jensen

Sarah Jensen, MPH, REHS, CP-FS
Assistant Health Commissioner
Director of Environmental Health
Franklin County Public Health

From: [Richards, Jay](#)
To: [Ohler, Deborah](#)
Subject: FW: 2024 Ohio Code Adoption
Date: Tuesday, March 28, 2023 2:52:13 PM
Attachments: [image001.jpg](#)
[image002.jpg](#)
[Adoption_proposal_comments.pdf](#)
[image003.png](#)

FYI

Jay Richards
Assistant Construction Code Administrator

Ohio Board of Building Standards
6606 Tussing Road, PO Box 4009
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jay.richards@com.state.oh.us
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From: Richardson, James A. <JARichardson@columbus.gov>
Sent: Tuesday, March 28, 2023 10:08 AM
To: Foley, Megan <Megan.Foley@com.ohio.gov>; Hanshaw, Regina <Regina.Hanshaw@com.ohio.gov>; Richards, Jay <Jay.Richards@com.ohio.gov>
Subject: 2024 Ohio Code Adoption

All,

Unfortunately I have not had a lot of extra time since getting back from the OAPI Training Conference, in fact, the day of the 1st reading you had scheduled for the rules adoption I had prior commitments to attend to. I have attached my comments concerning the proposed rules adoption for the Ohio Plumbing Code, I copied each section in order from the adoption document and provided comments. If possible I would like to sit down and discuss these with OBS at some point.

Regards,

James A. Richardson Jr., CPD

City of Columbus
Building and Zoning Services
Plumbing Inspection Supervisor
plumbinginfo@columbus.gov
<http://www.columbus.gov/bzs/inspections/Plumbing/>

(F) Replace section 305.4.1 to read as follows:

305.4.1 Sewer depth. Deleted.

Propose to adopt 305.4.1 as written – the building drain is still required to be protected and establishing the minimum depth of the building sewer ensure the portion of the building drain that extends beyond the foundation wall is protected.

(G) Modify section 309.2 to replace the list as follows:

Propose to adopt as written – these are requirements for flood hazard resistance designs and need to be adhered to.

(N) Replace section 312.6 to read as follows: 312.6 Gravity sewer test. Deleted

Propose to adopt as – 312.6 Gravity Building Sewer – Approval shall be obtained from authority having jurisdiction prior to the issuance of a certificate of occupancy or certificate of competition.

(O) Replace section 312.7 to read as follows: 312.7 Forced sewer test. Deleted.

Propose to adopt as – 312.7 Forced/Pumped Building Sewer – approval shall be obtained from authority having jurisdiction prior to the issuance of a certificate of occupancy or certificate of competition.

(P) Add an exception to section 312.9 to read as follows:

Propose to adopt as written.

(C) Modify the first sentence of section 403.2 exception 6 to read as follows:

Propose to adopt as written.

(F) Replace section 403.4.1 with the following: 403.4.1 Directional signage. Deleted.

Propose to adopt as written.

(I) Replace section 405.7 with the following: 405.7 Plumbing in mental health centers. Deleted.

Propose to adopt as written.

(K) Replace the last sentence in section 410.4 to read as follows:

Propose - In other occupancies where *water dispensers* are provided, including disposable cups/containers, *drinking fountains* are not required to be installed.

(L) Modify section 421.5.2 to add exception #3 to read as follows:

Propose to adopt as written.

(A) Modify section 501.1 to add an exception to read as follows:

Propose to adopt as written.

(A) Replace section 601.1 with the following:

Propose to adopt as written.

(B) Replace section 602.3 in its entirety to read as follows:

602.3 Water Required

Propose to adopt as written.

(B) Replace section 603.2 with the following:

Propose to adopt as written.

(D) Add an exception to section 605.2.1 to read as follows:

Propose to adopt as written.

(G) Modify section 606.1, item #4, to read as follows:

Propose to adopt as written.

(H) Replace section 606.5.5 to read as follows:

Propose to adopt as written.

(I) Add a sentence at the end of section 607.1 to read as follows:

Propose to adopt as written.

607.2.1 Circulation systems and heat trace systems for maintaining heated water temperature in distribution systems.

Propose to adopt as written.

607.2.1.1 Pump controls for hot water storage systems.

Propose to adopt as written.

(L) Replace section 607.5 to read as follows:

Propose to adopt as written.

(P) Replace section 608.18 in its entirety to read as follows:

Propose to adopt entire section as written and add, "in accordance with the rules of the "Ohio Department of Health" set forth in Chapter 3701-28 of the Administrative Code, "Private Water Systems." at the end of each section.

(A) Modify section 701.1 as follows:

Propose to adopt as written.

701.2 Connection to sewer required.

Propose to adopt as written.

(C) Modify section 701.3 as follows:

Propose to adopt as written.

701.4 Sewage treatment.

Propose to adopt as written.

(E) Replace section 701.5 with the following:

Propose to adopt as written.

(G) Add section 701.8 to read as follows:

Propose to not add, this is already covered by chapter 34 of the building code.

(H) Replace section 702.3 with the following:

Propose to adopt the as written with the following addition on the end of the sentence: “, or as otherwise approved by the authority having jurisdiction.”

(J) Replace section 703 in its entirety with the following:

Propose to adopt as written.

(K) Modify section 705.10.2 as follows:

Propose to adopt as written.

(M) Replace section 708.1.2 with the following:

708.1.2 Building sewers.

Propose to adopt as written.

(N) Modify table 709.1 as follows:

Propose to adopt as written.

(O) Modify section 712.2 to add an exception as follows:

Propose to adopt as written.

(P) Modify section 714.1 as follows:

Propose to adopt as written.

(Q) Modify section 716 as follows:

Propose to adopt as written with the additions of “, or as otherwise approved by the authority having jurisdiction.” at the end of 716.1 and 716.2.

(R) Modify section 717 as follows:

Adopt entire section as written.

(S) Replace section 718.1 with the following:

Adopt entire section as written.

(D) Modify section 802.4 as follows:

Propose to adopt as written.

(E) Modify section 1002.4.1 to add an exception as follows:

Propose to adopt as written.

(F) Modify section 1003.1 as follows:

Propose to adopt as written.

(H) Modify section 1003.4 as follows:

Propose to adopt as written.

(A) Modify section 1101.2 as follows:

Propose to adopt as written.

(B) Replace section 1102.4 and table 1102.4 with the following:

Propose to adopt as written.

(C) Replace section 1109.1 with the following:

Propose to adopt as written.

(E) Replace section 1113.1.4 with the following:

Propose to adopt as written.

4101:3-12-01 Special piping and storage systems.

Propose to adopt entire chapter as written.

4101:3-13-01 Nonpotable water systems.

Propose to adopt entire chapter as written. This is a situation where we have two State entities that are not on the same page with how the rules are adopted or will be enforced.

Direct quote from Mary Shaffer at ODH –

“I have discussed this with our interim manager of the private water systems program here at ODH. The private water systems rules pertain to potable drinking water and do not cover collecting storm water for irrigation purposes. Recycled water systems for the purpose of providing potable drinking water does fall under ODH. It is my understanding that is not what is happening at this location and therefore the reclaiming or catching of storm water for irrigation does not fall under the purview of ODH private water program.”

OBBS explanation –

“The rules of the ODH include a definition of “Human Consumption”. See paragraph (CCC) of rule 3701-28-01 of the Administrative Code:

(CCC) "Human consumption" means the ingestion or absorption of water or water vapor as the result of drinking, cooking, dishwashing, hand washing, bathing, showering, oral hygiene, or other domestic uses such as flushing toilets and doing laundry.

This definition is consistent with their paragraph (XXX) definition of “Private Water System” that includes #10 Auxiliary water sources that enter a structure to supplement flushing and laundry washing.”

The plumbing inspector will always be the last line of defense when it comes to the protection of potable water systems inside of buildings. Given the potential danger associated with having separate non-potable water systems within buildings, it is imperative that this chapter remains intact in the code and remains under the authority of certified plumbing plans examiners for plan reviews and certified plumbing inspectors for inspections.

4101:3-14-01 Subsurface graywater soil absorption systems.

Propose to adopt entire chapter as written.

From: [Justin Smith](#)
To: [Ohler, Deborah](#)
Subject: Proposed Plumbing Changes for 3-Compartment Sink Connections
Date: Wednesday, April 12, 2023 3:09:48 PM
Attachments: [Letter in Opposition to 2024 Plumbing Code Change - Justin Smith 4.11.2023.pdf](#)

Ms. Ohler,

I understand that the comment period ended March 30, 2023, but I think this is too important to not share the KCHD perspective on the proposed changes to the plumbing code. Please see attached letter.

Thank you,

Justin Smith, REHS

Kent City Health Department

201 E. Erie Street

Kent, Ohio 44240

Ph:(330) 678-8109 Ext. 5208

Fax:(330) 678-2082

Email: Justin.smith@kentohio.gov

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KENT CITY HEALTH DEPARTMENT

201-G E. ERIE STREET, KENT OHIO 44240 (330) 678-8109 FAX (330) 678-2082



April 12, 2023

Debbie Ohler
Executive Secretary for the Ohio Board of Building Standards
6606 Tussing Rd,
Reynoldsburg, OH 43068

Dear Ms. Ohler:

My name is Justin Smith, and I am the Director of Environmental Health at Kent City Health Department (KCHD). I am also a Registered Environmental Health Specialist (REHS), a member of the Ohio Environmental Health Association (OEHA), and a member of the National Environmental Health Association (NEHA). I appreciate the opportunity to share my comments regarding the proposed code change to 3 compartment sink connections.

Since the 2012 International Plumbing Code (IPC), indirect connections have been recognized as the proper method of connecting 3 compartment sinks to the sanitary drainage system. Because 3 compartment sinks generate fats, oils and grease (FOG), a grease separation device is required by code prior to the sink effluent being received by the sanitary drainage system. These hydromechanical devices are breeding grounds of bacteria and are known to contaminate devices connected via drainage pipes. From 2012 to the current 2021 IPC, indirect connections are required because of this contamination risk.

Many local health departments require commercial kitchen pot and pan sinks to be indirectly connected to the sanitary drainage system even though, up to and including the 2009 edition, the code either required or allowed a direct connection. Not only are hydromechanical grease interceptors breeding grounds of bacteria but routine food health department inspections show these sinks are routinely used as food preparation sinks. As of the 2012 edition of the IPC, this section's requirement for an indirect connection resolved a major conflict between the building/plumbing code and numerous local health department regulations. It offers a needed protection for the public who eat in these establishments.

Codes evolve over time when matters of health and safety become evident in the built environment. Reverting to a 2009 view of direct connections of 3 compartment sinks will lend itself to a high contamination risk to the fixture, and to the public. It is our opinion at Kent City Health Department that the Ohio Board of Building Standards has an obligation to uphold proven scientific data showing conclusive health protection by requiring the indirect connection of 3 compartment sinks. This proven protection is threaded through all of IPC chapter 8 and has a heavy emphasis on food handling and preparation fixtures.

Thank you again for allowing me to share my comments. I am happy to answer any questions you may have.

Sincerely,

Justin Smith, BS, REHS, CPO
Director of Environmental Health
Kent City Health Department