GEW3-14 Chapter 6, 202, 302.1, 302.1.1, 903.1, 1003.2.2, 1003.2.3, 1007.3, 1007.3.1, 1007.3.2, 1007.3.3, 1007.3.3.1, 1007.3.3.2, 1007.3.3.3, Chapter 12, Table A106, A106.1, A106.5.1, A106.5.2, A106.6

Proponent: Steven Rosenstock, Electric Edison Institute, representing Edison Electric Institute (srosenstock@eei.org)

Delete without substitution:

SECTION 202 DEFINITIONS

ZERO ENERGY PERFORMANCE INDEX (zEPI). A scalar representing the ratio of energy performance of the proposed design compared to the average energy performance of buildings relative to a benchmark year.

Revise as follows:

601.3 Application. Buildings and their associated building sites shall comply with Section 601.3.1 or Section 601.3.2. the requirements of Section 7 and Normative Appendices A through D of the ASHRAE 189.1.

601.3.1 Performance-based compliance. Buildings designed on a performance basis shall comply with Sections 602, 608.6, 609, 610 and 611.

601.3.2 Prescriptive-based compliance. Buildings designed on a prescriptive basis shall comply with the requirements of Sections 605, 606, 607, 608, 609, 610 and 611.

601.4 Minimum requirements. Buildings shall be provided with metering complying with Section 603, and commissioning complying with Section 611. Where required in accordance with Section 604.1, building shall be provided with automated-demand response complying with Section 604.

601.5 Multiple buildings on a site and mixed use buildings. Where there is more than one building on a site and where a building has more than one use in the building, each building or each portion of a building associated with a particular use shall comply with Sections 601.5.1 or 601.5.2 or a combination of both.

601.5.1 Multiple buildings on a site. For building sites with multiple buildings, the energy use associated with the building site shall be assigned on a proportional basis to each building based on total gross floor area of each building in relation to the total gross floor area of all buildings on the building site.

Where energy is derived from either renewable or waste energy, or both sources located on the building site, within individual buildings, or on individual buildings and delivered to multiple buildings, the energy so derived shall be assigned on a proportional basis to the buildings served based on building gross floor area. Energy delivered from renewable and waste energy sources located on or within a building shall be assigned to that building.

Exception: Where it can be shown that energy to be used at the building site is associated with a specific building, that energy use shall be assigned to that specific building.

601.5.2 Mixed use buildings. Where buildings have more than one use, the energy use requirements shall be based on each individual occupancy.

602 MODELED PERFORMANCE PATHWAY REQUIREMENTS

603 ENERGY METERING, MONITORING AND REPORTING

604 AUTOMATED DEMAND-RESPONSE (AUTO-DR) INFRASTRUCTURE

605 BUILDING ENVELOPE SYSTEMS

606 BUILDING MECHANICAL SYSTEMS

607 BUILDING SERVICE WATER HEATING SYSTEMS

608 BUILDING ELECTRICAL POWER AND LIGHTING SYSTEMS

609 SPECIFIC APPLIANCES AND EQUIPMENT

610 BUILDING RENEWABLE ENERGY SYSTEMS

611 ENERGY SYSTEMS COMMISSIONING AND COMPLETION

Revise as follows:

302.1 Requirements determined by the jurisdiction. The jurisdiction shall indicate the following information in Table 302.1 for inclusion in its code adopting ordinance:

- The jurisdiction shall indicate whether requirements for residential buildings, as indicated in Exception 1 to Section 101.3, are applicable by selecting "Yes" or "No" in Table 302.1. Where "Yes" is selected, the provisions of ICC 700 shall apply and the remainder of this code shall not apply.
- Where the jurisdiction requires enhanced energy performance for buildings designed on a performance basis, the jurisdiction shall indicate a zEPI of 46 or less the required improvement compared to ASHRAE 189.1 in Table 302.1 for each occupancy required to have enhanced energy performance.
- 3. Where "Yes" or "No" boxes are provided, the jurisdiction shall check the box to indicate "Yes" where that section is to be enforced as a mandatory requirement in the jurisdiction, or "No" where that section is not to be enforced as a mandatory requirement in the jurisdiction.

Section	Section Title or Description and Directives	Jurisdictional Requirements					
CHAPTER 6. ENERGY CONSERVATION, EFFICIENCY AND CO2e EMISSION REDUCTION							
302.1, 302.1.1, 602.1	zEPI <u>Improvement compared to ASHRAE 189.1</u> of Jurisdictional Choice – The jurisdiction shall indicate a zEPI of 46 or less <u>the required energy cost improvement compared to ASHRAE 189.1</u> in each occupancy for which it intends to require enhanced energy performance.	Occupancy: zEPI Improvement compared to ASHRAE 189.1:					
604.1	Automated demand response infrastructure	□ Yes	🗆 No				
CHAPTER 10. EXISTING BUILDINGS							
1007.2	Evaluation of existing buildings	□ Yes	🗆 No				
1007.3	Post Certificate of Occupancy zEPI, energy demand, and CO ₂ e emissions reporting	<mark>⊟ Yes</mark>	<mark>⊣ No</mark>				

TABLE 302.1 REQUIREMENTS DETERMINED BY THE JURISDICTION

(Portions of table not shown remain unchanged)

302.1.1 <u>zEPI of 46 or less. Improvement compared to ASHRAE 189.1</u> Where <u>a zEPI of 46 or less an</u> <u>improvement compared to ASHRAE 189.1</u> is indicated by the jurisdiction in Table 302.1, buildings shall comply on a performance-basis in accordance with Section 601.3.1.

Exception: Buildings less than 25,000 square feet (2323 m²) in *total building floor area* pursuing compliance on a prescriptive basis shall be deemed to have a zEPI of 51 comply with <u>ASHRAE 189.1</u> and shall not be required to comply with the <u>zEPI improvement compared to</u> <u>ASHRAE 189.1</u> of Jurisdictional Choice indicated by the jurisdiction in Table 302.1.

Revise as follows:

903.1 General. Where application is made for construction as described in this section, the registered design professional in responsible charge or approved agency shall perform commissioning during construction and after occupancy as required by Table 903.1. Where Table 903.1 specifies that commissioning is to be done on a periodic basis, the registered design professional in responsible charge shall provide a schedule of periodic commissioning with the submittal documents that shall be reviewed and *approved* by the *code official*.

The approved agency shall be qualified and shall demonstrate competence, to the satisfaction of the *code official*, for the commissioning of the particular type of construction or operation. The registered design professional in responsible charge and engineers of record involved in the design of the project are permitted to act as the approved agency provided those personnel meet the qualification requirements of this section to the satisfaction of the *code official*. The approved agency shall provide written documentation to the *code official* demonstrating competence and relevant experience or training. Experience or training shall be considered relevant where the documented experience or training is related in complexity to the same type of commissioning activities for projects of similar complexity and material qualities.

CONSTRUCTION				OCCURRENCE		
OR SYSTEM REQUIRING VERIFICATION	PREOCCUPANC	POST- OCCUPANC	METHOD	Preoccupancy	Post- occupanc	SECTION/ REFERENCE D STANDARD
			Chapter			
	E	nergy consump	otion, monitoring, t	argeting and reporting	g	
a. Monitoring system	x	None	Inspection and verification	During constructior and prior to occupancy	None	603, 610.5 Section 10.3 <u>of</u> <u>ASHRAE</u>
b. Calibration	x	х	Testing and review and evaluation or test reports	During commissioning	Annually	603, 610.5 <u>Section 10.3</u> <u>of</u>
Mechanical systems completion – all buildings						
a. Air system balancing – provide the means for system balancing	x	None	Inspection and verification	During constructior and prior to occupancy	None	611.1.2.1 and through reference to IECC Section 10.3 of ASHRAE

TABLE 903.1 COMMISSIONING PLAN

CONSTRUCTION				OCCURRENCE		
OR SYSTEM REQUIRING VERIFICATION	PREOCCUPANC	POST- OCCUPANC	METHOD	Preoccupancy	Post- occupanc	SECTION/ REFERENCE D STANDARD
b. Hydronic system balancing – provide means for system balancing	x	None	Inspection and verification	During construction and prior to occupancy	None	611.1.2.2 and through reference to IECC Section 10.3 <u>of</u> ASHRAE
c. Mechanical system manuals – construction documents to require O&M	x	None	Verification of construction documents	Plan review	None	611.1.5. 2 Section 10.3 of
	Mechanical	systems – build	dings over 5,000 s	square feet total buildir	ng floor area	
a. Commissioning required and noted in plans and specifications	x	None	Verification of construction documents	Plan review	None	611. 1 Section 10.3
b. Documentation of required commissioning outcomes	x	None	Verification with the building owner	Subsequent to completion of all commissioning	None	611. 1 Section 10.3 of
c. Preparation and availability of a commissioning plan	x	None	Verification with the RDP or commissioning agent	Between plan review and commissioning initiation	None	611.1. 1 <u>Section 10.3</u> <u>of</u> ASHRAE
d. Balance HVAC systems (both air and hydronic)	x	х	HVAC system installer/contract or or commissioning agent	After installation of HVAC systems and prior to occupancy	TB D	611.1. 2 Section 10.3 of ASHRAE
e. Functional performance testing of HVAC equipment	x	х	HVAC system installer/contract or or commissioning agent	After installation of HVAC systems and prior to occupancy	TB D	611.1. 3 Section 10.3 of
f. Functional performance testing of HVAC controls and control systems	x	х	HVAC system installer/contract or or commissioning agent	After installation of HVAC systems and prior to occupancy	TB D	611.1.3. 2 Section 10.3 of
g. Preparation of preliminary commissioning report	Non e	x	HVAC system installer/contract or or commissioning agent	Non e	Subsequent to commissionir g	611.1. 4 <u>Section 10.3</u> <u>of</u>
h. Acceptance of HVAC systems and equipment/syste	None	х	Building owner	Non e	Letter verifying receipt of the commissioni g report	611.1.4. e 1 n <u>Section 10.3</u> <u>of</u>

CONSTRUCTION				OCCURRENCE			
OR SYSTEM REQUIRING VERIFICATION	PREOCCUPANC	POST- OCCUPANC	METHOD	Preoccupancy	Post- occupanc	SECTION/ REFERENCE D STANDARD	
i. Preparation and distribution of final HVAC system completion— Documentation that construction documents require drawings, manuals, balancing reports and commissioning report be provided	None	x	RDP, contractor or commissioning authority	None	90 days after final certificate of occupancy	611.1. 5 Section 10.3 <u>of</u> <u>ASHRAE</u> <u>189.1</u>	
			Chapter 6:				
Auto demand reduction control system functionality	x	х	Functional testing	Final inspection	18-24 months	604. 4 <u>Section 10.3</u> <u>of</u>	
Plug load contro	ls X	None	Functional testing	Final inspection	None	608. 6 Section 10.3 of	
Connection of appliances to switched receptacles	-	х	Field inspection	No ne	18-24 months	608. 6 Section 10.3	
Specified transformer nameplate efficiency	x	None	Field inspection	Final inspection	None	608.8.1. 4 Section 10.3 <u>of</u>	
Verification of lamp	x	х	Field inspection	Final inspection	18-24 months	608.1 θ Section 10.3	
Verification of ballast	x	None	Field inspection	Final inspection	None	608.1 θ <u>Section 10.3</u> <u>of</u>	
Lighti							
a. Installation	X	None	Field inspection	Post-installation	None	608.1 4 Section 10.3 <u>of</u>	
b. Calibration	x	x	System installer/contracto r or commissioning agent	Post-installation	18-24 months	611.3. 3 <u>Section 10.3</u> <u>of</u> ASHRAE	

For SI: 1 square foot = 0.0929 m^2 .

Revise as follows:

1003.2.2 Heating, ventilating and air-conditioning. Heating, ventilating and air-conditioning systems and equipment shall be in accordance with the following:

1. Time clock and automatic time switch controls that can turn systems off and on according to building occupancy requirements shall be provided and connected to the following HVAC equipment: chillers and other space-cooling equipment, chilled water

pumps, boilers and other space-heating devices, hot water pumps, heat exchanger circulation pumps, supply fans, return fans, and exhaust fans. Where occupant override is provided, it shall be designed with a timer to automatically revert to time clock and automatic time switch controls in not longer than 12 hours.

Exception: A time clock or automatic time switch controls shall not be required for spaces where any of the following conditions exist:

- 1. A time clock is not required by Section C403.2.4.3 of the *International Energy Conservation Code*.
- 2. There is 24-hour occupancy materials with special atmospheric requirements dependent on 24-hour space conditioning.
- 3. A majority of the areas of the building served by the system are under setback thermostat control.
- 4. Manufacturer's specifications stipulate that the system must not be shut off.
- 2. Functional outside air economizers shall be provided on all cooling systems or more than 4 ½ tons cooling capacity, 54,000 Btu/h, or more than 1800 cfm (9.144 m³/s x m²) air flow, provided manufactures' guidelines are available for adding the economizer to the existing system.

Exception: An outside air economizer shall not be required for buildings or special uses where 100 percent outside air for ventilation is required or where any of the following conditions exist:

- 1. Section C403.3.1 of the *International Energy Conservation Code* would not require an economizer.
- 2. The existing system has a water-based economizer.
- 3. The existing system does not have an outside air intake.
- 4. Special economizer operations such as, but not limited to, carefully controlled humidity would require more energy use than is conserved.
- 5. There is insufficient space to install necessary equipment.
- 6. Installation of an economizer would require major modifications to the building's life safety system.
- 7. The existing system is a multi-zone system where the same intake air is used at the same time for either heating or cooling in different parts of the building.

3. HVAC piping and ducts, including those located above suspended ceilings, shall comply with Sections 606.3 and 606.4 Section 7 of ASHRAE 189.1.

Exception: Additional insulation shall not be required for piping where any of the following conditions exist:

- 1. Additional insulation shall not be required for piping where any of the following conditions exist:
 - 1.1. It is located within HVAC equipment;
 - 1.2. It is located within conditioned space that conveys fluids between 60°F (15.6°C) and 105°F (40.6°C);
 - 1.3. Piping that is already insulated and the insulation is in good condition; or
- 2. Where HVAC ducts and piping are installed in a building cavity or interstitial framing space of insufficient width to accommodate the

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duct or pipe and the insulation required by Section 606.3 and Table 606.4 Section 7 of ASHRAE 189.1, the insulation thickness shall be permitted to have the maximum thickness that the wall can accommodate, but shall not be less than 1/2 -inch (12.7 mm) thick.

- 4. Where central heat is intended to be replaced with individual electric space heaters, the application for the electrical permit shall include documentation demonstrating that the new electric heaters will not consume more energy than the existing nonelectric heaters.
- 5. Boiler systems shall have been cleaned and tuned within one year prior to the alteration. Boilers shall be equipped with an outdoor air lock-out thermostat or a temperature reset control.
- 6. Chillers shall be equipped with an outdoor air lockout thermostat and chilled water reset control.
- 7. A maximum 5-year phase out plan shall be provided for buildings with existing systems that use CFC-based refrigerants.
- 8. Where mechanical and electrical systems and equipment are joined with microprocessors that communicate with each other or to a computer, a properly integrated building automation system shall be installed to optimize energy, operations, and indoor comfort. The building automation system shall:
 - 8.1. Allow the owner to set up schedules of operation for the equipment and provide equipment optimal start with adaptive learning;
 - 8.2. Provide trim and respond capabilities based on zone demand;
 - 8.3. Offer the ability to monitor energy usage, including the ability to meter electric, gas, water, steam, hot water, chilled water, and fuel oil services;
 - 8.4. Offer economizing based on enthalpy calculation and/or CO₂ set point control;
 - 8.5. Offer load shedding when power companies are at peak demand and need; and
 - 8.6. Offer the ability to send alarms to alert building owner, manager, or operator when problems occur due to system failures.

1003.2.3 Service water systems. Service water systems and equipment shall be in accordance with the following:

1. Water heater and hot water storage tanks shall have a combined minimum total of external and internal insulation value of R-16.

2. Accessible hot and cold water supply and distribution pipes shall comply with Section 607.6 <u>Section 7 of ASHRAE 189.1</u>. The insulation shall not be required to extend beyond the *building thermal envelope*.

- 3. Circulating pump systems for hot water supply purposes other than comfort heating shall be controlled as specified in Section 607.7 Section 7 of ASHRAE 189.1.
- 4. Showerhead, toilet, urinal and faucet flow rates shall be in accordance with this code.

1007.3 Post certificate of occupancy **zEPI** <u>annual energy cost</u>, energy demand, and CO2e emissions reporting. Where the jurisdiction indicates in Table 302.1 that ongoing post certificate of occupancy **zEPI** <u>annual energy cost</u>, energy demand and CO2e emissions reporting is required, and where the jurisdiction has indicated in Table 302.1 that enhanced energy performance in accordance with Section 302.1 or CO2e emissions in accordance with Section 602.2 <u>Section 7 of ASHRAE 189.1</u> are required, zEPI <u>annual energy cost</u>, energy demand, and CO2e emissions reporting shall be provided in accordance with this section.

1007.3.2 Intent. The intent of these requirements is to provide for the ongoing reporting and display of the total annual net energy use energy cost, peak energy demand and emissions associated with operation of the building and its systems to document ongoing compliance with the provisions of Sections 601 and 602 Section 7 of ASHRAE 189.1.

1007.3.1 Purpose. The purpose of this section is to provide for the uniform reporting and display of the total annual net energy use <u>energy cost</u>, peak demand for each energy form and emissions associated with building operations and building sites.

1007.3.3 Reporting. Reports in accordance with Sections 1007.3.3.1 through 1007.3.3.3 shall be generated.

1007.3.3.1 Annual <u>net energy use energy cost</u>. The <u>zEPI</u> <u>annual energy cost</u> associated with the operation of the building and the buildings on the site, as determined in accordance with <u>Section 602.1</u> <u>Section 7 of ASHRAE 189.1</u>, shall be reported by the building owner or the owner's registered agent to the [INSERT NAME OF APPROPRIATE STATE OR LOCAL GOVERNMENT AGENCY RESPONSIBLE FOR COLLECTING REPORTED INFORMATION].

Where there are multiple buildings on a building site, each building shall have its zEPI <u>annual energy</u> <u>cost</u> reported separately. Where there are energy uses associated with the building site other than the buildings on the site, the zEPI <u>energy cost</u> for the building site shall be reported separately.

Energy use <u>cost</u> for the previous year shall cover the complete calendar year and be reported on, or before, March 1st of the following year.

1007.3.3.2 Peak monthly energy demand reporting. The peak demand of all energy forms serving each building and the building site shall be reported by the building owner or the owner's registered agent to the [INSERT NAME OF APPROPRIATE STATE OR LOCAL GOVERNMENT AGENCY RESPONSIBLE FOR COLLECTING REPORTED INFORMATIO N].

Where there are multiple buildings on a building site, each building shall have its energy demand reported separately. Where there are energy uses associated with the building site other than the buildings on the site, the energy demand for the building site shall be reported separately.

Monthly energy demand data for the previous year shall cover the complete calendar year and be reported on, or before, March 1st of the following year.

1007.3.3.3 Annual CO₂e emissions reporting. The annual emissions associated with the operation of the building and its systems, as determined in accordance with Section 602.2 Section 7 of ASHRAE 189.1, shall be reported by the building owner or the owner's registered agent to the [INSERT NAME OF APPROPRIATE STATE OR LOCAL GOVERNMENT AGENCY RESPONSIBLE FOR COLLECTING REPORTED INFORMATION].

Where there are multiple buildings on a building site, each building shall have its annual emissions reported separately. Where there are energy uses associated with the building site other than the buildings on the site, the annual CO2e emissions for the building site shall be reported separately.

Emissions reported for the previous year shall cover the complete calendar year and be reported on, or before, March 1st of the following year.

Revise as follows:

-	ENERGY CONSERVATION AND EFFICIENCY	1
SECTION	DESCRIPTION	MINIMUM NUMBER OF ELECTIVES REQUIRED AND ELECTIVES SELECTED
A102.2	The jurisdiction shall indicate a number between and including 0 and up to and including 10 to establish the minimum total number of project electives that must be satisfied.	_
A106.1	zEPI Energy cost reduction project electives	🗆 Yes 🛛 No
A106.1	Project zEPI <u>Energy cost</u> is at least 5 points <u>3 percent</u> lower than required by Table 302.1	□ 1 elective
A106.1	Project zEPI <u>Energy cost</u> is at least 10 points <u>6 percent</u> lower than required by Table 302.1	2 electives
A106.1	Project zEPI <u>Energy cost</u> is at least 15 points <u>9 percent</u> lower than required by Table 302.1	□ 3 electives
A106.1	Project zEPI Energy cost is at least 20 points 12 percent lower than required by Table 302.1	□ 4 electives
A106.1	Project zEPI <u>Energy cost</u> is at least 25 points <u>15 percent</u> lower than required by Table 302.1	5 electives
A106.1	Project zEPI <u>Energy cost</u> is at least 30 points <u>18 percent</u> lower than required by Table 302.1	□ 6 electives
A106.1	Project zEPI <u>Energy cost</u> is at least 35 points <u>21 percent</u> lower than required by Table 302.1	□ 7 electives
A106.1	Project zEPI <u>Energy cost</u> is at least 40 points <u>24 percent</u> lower than required by Table 302.1	8 electives
A106.1	Project zEPI Energy cost is at least 45 points 27 percent lower than required by Table 302.1	9 electives
A106.1	Project zEPI Energy cost is at least 51 points 30 percent lower than required by Table 302.1	□ 10 electives
A106.2	Mechanical systems project elective	🗆 Yes 🛛 No
A106.3	Service water heating	🗆 Yes 🛛 No
A106.4	Lighting systems	🗆 Yes 🗆 No
A106.5	Passive design	🗆 Yes 🛛 No
A106.6	Renewable energy systems—5 percent	□ Yes □ No
A106.6	Renewable energy systems—10 percent	□ Yes □ No
A106.6	Renewable energy systems—20 percent	🗆 Yes 🛛 No

TABLE A106 ENERGY CONSERVATION AND EFFICIENCY

A106.1 <u>zEPI Energy cost</u> reduction project electives. Project electives for buildings pursuing performance-based compliance in accordance with <u>Section 601.3.1</u> <u>Section 7 of ASHRAE 189.1</u> shall be in accordance with the portions of Table A106 that reference Section A106.1, <u>Equation 6-1</u> and the calculation procedures specified in <u>Section 602.1.2.1</u> <u>Section 7 of ASHRAE 189.1</u>.

A106.5.1 Performance path. The building shall be designed using the performance path in accordance with Section 601.3.1 Section 7 of ASHRAE 189.1.

A106.5.2 Passive design provisions. The simulation of energy use performed pursuant to Section 602 Section 7 of ASHRAE 189.1 shall document that not less than 40 percent of the annual energy

use cost reduction realized by the proposed design has been achieved through passive heating, cooling, and ventilation design, as compared to the standard reference design. Passive heating and cooling shall use strategies including, but not limited to, building orientation, fenestration provisions, material selection, insulation choices, overhangs, shading means, microclimate vegetation and water use, passive cooling towers, natural heat storage, natural ventilation, and thermal mass.

A106.6 Renewable energy system project electives. Buildings seeking a renewable energy system project elective or electives shall be equipped with one or more renewable energy systems in accordance with Section 610.1 Section 7 of ASHRAE 189.1 that have the capacity to provide the percent of annual energy used within the building as selected in Table A106. Capacity shall be demonstrated in accordance with Section 610.1.1 or 610.1.2. Section 7 of ASHRAE 189.1

Add new standard(s) as follows:

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ASHRAE/IESNA Standard 189.1-2014
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Standard for the Design of High-Performance Green Buildings Except for Low-Rise Residential Buildings

Reason: As currently written, Chapter 6 will be very hard to enforce by code officials. In addition, there are unintended consequences of the current provisions that could result in buildings that use more energy and produce more emissions.

By replacing the current language with Section 7 of ASHRAE 189.1, several goals will be accomplished:

- -The energy efficiency chapter will be based on a consensus-based ANSI process that went through several public reviews and is under continuous maintenance.
- The energy efficiency provisions of the IGCC and ASHRAE 189.1 will be consistent and enforceable.
- -Builders and designers will not face significantly different compliance approaches when comparing ASHRAE Standard 189 with the IGCC. In addition, the authority having jurisdiction will be able to determine compliance with energy efficiency provisions more easily.

Cost Impact: Will not increase the cost of construction.

Analysis: This code change proposal addresses the scope and application of the *International Green Construction Code*. Therefore, the final action taken on this code change proposal will be limited to an advisory recommendation to the ICC Board of Directors who will determine the final disposition of this code change proposal in accordance with Section 1.3 of CP28, which stipulates that the ICC Board of Directors determines the scope of the I-Codes.

GEW3-14: 601.3-ROSENSTOCK458