

RESOLUTION 22-08

RESOLUTION TO ADOPT VARIOUS INTERNATIONAL CODES

WHEREAS, on October 21, 1999, the Hamblen County Board of Commissioners adopted the 1997 edition of various Standard Building Codes as published by the Southern Building Code Congress International, Inc.; and

WHEREAS, the Hamblen County Board of Commissioners adopted an Amended Resolution on December 16, 1999 to include various appendices to the previously adopted building codes; and

WHEREAS, on December 20, 2001 Hamblen County Board of Commissioners restated its previous resolution by clarifying under which of the adopted codes inspections would be performed; and

WHEREAS, on October 18, 2007, the Hamblen County Board of Commissioners updated its building codes by adopting the 2006 Edition of various codes as published by the International Code Council; and

WHEREAS, on April 23, 2015, the Hamblen County Board of Commissioners adopted the 2012 Edition of various codes as published by the International Code Council; and

WHEREAS, a copy of this Resolution has been published in a newspaper having general circulation in Hamblen County as required by Tennessee Code Annotated § 5-20-102 (c);

WHEREAS, on February 7, 2022 the Hamblen County Planning Commission reviewed and recommended the adoption of the 2018 Edition of various codes as published by the International Code Council to the Board of Commissioners; and

NOW, THEREFORE, BE IT RESOLVED that the Hamblen County Board of Commissioners, meeting in regular session on March 24, 2022, hereby adopts the following **2018 Edition of various codes published by the International Code Council**:

-2018 International Building Codes
-2018 International Residential Codes
-2018 International Energy Conservation Code
-2018 International Fire Code

-2018 International Plumbing Code
-2018 International Mechanical Code
-2018 International Fuel Gas Code
-2018 Swimming Pool & Spa Code

BE IT FURTHER RESOLVED that the Hamblen County Board of Commissioners hereby further re-adopts the attached: Exhibit A-Supplemental Information; Exhibit B-International Code Description; Exhibit C-Required Inspections and Permit Requirements; and Exhibit D-Fee Schedules, which Exhibits are hereby incorporated herein by reference in their entirety.

BE IT FURTHER RESOLVED that this Resolution shall become effective April 1, 2022 following the adoption of this Resolution by the Hamblen County Board of Commissioners.

WHEREFORE, it was moved by Tim Goins and seconded by

Chris Cutshaw that this Resolution be adopted.

Voting Aye: 14

Voting Nay: 0

Pass: yes

The Chair declared the Resolution adopted this 24 day of MARCH 2022.

Hamblen County Board of Commissioners

By: Howard Shipley
Howard Shipley, Chairman

Approved:

Bill Brittain

Bill Brittain
Hamblen County Mayor

Attest:

Penny Petty

Penny Petty
Hamblen County Clerk



MEMORANDUM

To: Hamblen County Board of Commissioners

From: Tina Whitaker, Department Manager
Darrell Chase, Building Inspector

Date: March 14, 2022

Re: 2018 International Code Adoption

2018 International Building Code
2018 International Energy Conservation Code
2018 International Plumbing Code
2018 International Fuel Gas Code

2018 International Residential Code
2018 International Fire Code
2018 International Mechanical Code
2018 Swimming Pool & Spa Code

An audit has been conducted and approved contingent on the adoption of the 2018 International Building Codes.

This code adoption is required to keep the Hamble County Building and Inspection Department in compliance with State Regulations, per Tenn. Comp. R & Regs.

Code Changes and Amendments

2018 International Building Code (IBC)

Include the following appendixes:

- Appendix B
- Appendix C
- Appendix D
- Appendix F
- Appendix I

Section 101.1 Title, insert "Hamblen County" where indicated

Section 105.1 Permits Required, add "This work must be completed by a licensed contractor"

2018 International Residential Code (IRC)

Include the following appendixes:

- Appendix E
- Appendix F as "Radon control methods as optional or required by the Building Official"
- Appendix G
- Appendix H
- Appendix J

Section R101.1 Title, insert "Hamblen County" where indicated

Section R105.2 under sub-heading Building:

1. Replace the number 200 with the number 120
2. Delete all words after fences
3. Delete all words after retaining walls
4. Delete all words after tanks
10. Delete exemption entirely

Section R105.2 under sub-heading Electrical: Delete entirely

Table R301.2(1) Climate & Geographic Design Criteria (See Attachment), delete Manual J Design Criteria

Section R313 add the words "Optional see TCA 68-120-101(a)(8) for details" under the title. Also, delete the first sentence in the two subtitles and insert "When automatic fire sprinkler systems are installed the following shall apply"

Section R403.1.1 insert "Unless permitted otherwise by the Building Official...shall be 24 inches wide by 12 inches thick...", Also, insert two footnotes at the bottom of Figure 403.1(1) about a monolithic floor slab with a perimeter footing and, the minimum foundation depth below finished grade.

Section R502.11.4 delete "to the building official" and insert "for review and approval when required by the building official" in the first sentence

Section R802.10.1 delete "to the building official and approved" and insert "for review and approval when required by the building official" in the first sentence

Table N1102.1.2 Insulation for Zone 4 except marine: (make the following changes)

- Replace R-49 with R-38 in the ceiling
- Replace R-20 or R-13+5 with R-13 in walls
- Replace R-8/13 with R-5/10 in mass walls

Table N1102.1.4 U-Factors for Zone 4 except marine: (make the following changes)

- Replace .026 to ~~.030~~ in the ceiling
- Replace ~~.057~~ to .082 in the walls
- Replace .098 to .141 in the mass walls

Section N1102.2.6 after the first occurrence of the word "of" insert "Table N1102.1.2 or."

Section N1102.4.1.1 after the word "Installation" in title add the words "and visual inspection option", and after the word "construction" add the words "and be field verified"

Section N1102.4.1.2 after the word "Testing" in title insert "Optional" and, insert the words "when implemented by the Building Official"

Section N1102.4.4 Rooms containing fuel burning appliances, delete the entire section

Section N1103.1.1 after the word "Thermostat" in the title insert "Optional" and, insert the words "when implemented by the Building Official"

Section N1103.3.3 delete "(Mandatory)" and add "(Optional)" in the title

Section N1103.3.4 delete "(Prescriptive)" and add "(Optional)" in the title

Section N1103.6 delete "(Mandatory)" and add "(Optional)" in the title and, delete "The building shall be provided with ventilation that complies" and insert "when buildings are provided with ventilation shall comply"

Section N1103.7 delete "(Mandatory)" and add "(Optional)" and "(When implemented by the Building Official)" in the title

Section P2503.5.1 delete the words "for piping systems other than plastic" in the first sentence and insert the words, "except when specifically allowed by the Building Official" after the word "leakage" in the first sentence

Section P2603.5.1 insert twelve (12) in two places where indicated

Section P2904 add "When ~~required~~ ^{installed}" before the title and shall meet the following requirements" after the title

Part VIII-Electrical – Delete this section entirely (Chapters 34 thru 43)

TABLE R301.2(1)
CLIMATIC AND GEOGRAPHIC DESIGN CRITERIA

GROUND SNOW LOAD ^a	WIND DESIGN			SEISMIC DESIGN CATEGORY ^f	SUBJECT TO DAMAGE FROM			WINTER DESIGN TEMP ^g	ICE BARRIER UNDERLAYMENT REQUIRED ^h	FLOOD HAZARDS ⁹	AIR FREEZING INDEX ⁱ	MEAN ANNUAL TEMP ^j
	Speed ^d (mph)	Topographic effects ^k	Special wind region ^l		Weathering ^a	Frost line depth ^b	Termites ^e					
10	90	No	No	C	Severe	12	Mod- Heavy	18°F	No	7-3-2004	500	57°F
MANUAL J DESIGN CRITERIA ⁿ												
Elevation			Latitude	Winter heating	Summer cooling	Altitude correction factor	Indoor design temperature	Design temperature cooling	Heating temperature difference			
			—	—	—	—	—	—	—			
Cooling temperature difference			Wind velocity heating	Wind velocity cooling	Coincident wet bulb	Daily range	Winter humidity	Summer humidity				
			—	—	—	—	—	—				

For SI: 1 pound per square foot = 0.0479 kPa, 1 mile per hour = 0.447 m/s.

- a. Where weathering requires a higher strength concrete or grade of masonry than necessary to satisfy the structural requirements of this code, the frost line depth strength required for weathering shall govern. The weathering column shall be filled in with the weathering index, "negligible," "moderate" or "severe" for concrete as determined from Figure R301.2(4). The grade of masonry units shall be determined from ASTM C34, C55, C62, C73, C90, C129, C145, C216 or C652.
- b. Where the frost line depth requires deeper footings than indicated in Figure R403.1(1), the frost line depth strength required for weathering shall govern. The jurisdiction shall fill in the frost line depth column with the minimum depth of footing below finish grade.
- c. The jurisdiction shall fill in this part of the table to indicate the need for protection depending on whether there has been a history of local subterranean termite damage.
- d. The jurisdiction shall fill in this part of the table with the wind speed from the basic wind speed map [Figure R301.2(5)A]. Wind exposure category shall be determined on a site-specific basis in accordance with Section R301.2.1.4.
- e. The outdoor design dry-bulb temperature shall be selected from the columns of 97 1/2-percent values for winter from Appendix D of the *International Plumbing Code*. Deviations from the Appendix D temperatures shall be permitted to reflect local climates or local weather experience as determined by the building official. [Also see Figure R301.2(1).]
- f. The jurisdiction shall fill in this part of the table with the seismic design category determined from Section R301.2.2.1.
- g. The jurisdiction shall fill in this part of the table with (a) the date of the jurisdiction's entry into the National Flood Insurance Program (date of adoption of the first code or ordinance for management of flood hazard areas), (b) the date(s) of the Flood Insurance Study and (c) the panel numbers and dates of the currently effective FIRMs and FBEMs or other flood hazard map adopted by the authority having jurisdiction, as amended.
- h. In accordance with Sections R905.1.2, R905.4.3.1, R905.5.3.1, R905.6.3.1, R905.7.3.1 and R905.8.3.1, where there has been a history of local damage from the effects of ice damming, the jurisdiction shall fill in this part of the table with "YES." Otherwise, the jurisdiction shall fill in this part of the table with "NO."
- i. The jurisdiction shall fill in this part of the table with the 100-year return period air freezing index (BF-days) from Figure R403.3(2) or from the 100-year (99 percent) value on the National Climatic Data Center data table "Air Freezing Index-USA Method (Base 32°F)."
- j. The jurisdiction shall fill in this part of the table with the mean annual temperature from the National Climatic Data Center data table "Air Freezing Index-USA Method (Base 32°F)."
- k. In accordance with Section R301.2.1.5, where there is local historical data documenting structural damage to buildings due to topographic wind speed-up effects, the jurisdiction shall fill in this part of the table with "YES." Otherwise, the jurisdiction shall indicate "NO" in this part of the table.
- l. In accordance with Figure R301.2(5)A, where there is local historical data documenting unusual wind conditions, the jurisdiction shall fill in this part of the table with "YES" and identify any specific requirements. Otherwise, the jurisdiction shall indicate "NO" in this part of the table.
- m. In accordance with Section R301.2.1.2 the jurisdiction shall indicate the wind-borne debris wind zone(s). Otherwise, the jurisdiction shall indicate "NO" in this part of the table.
- n. The jurisdiction shall fill in these sections of the table to establish the design criteria using Table 1a or 1b from ACCA Manual J or established criteria determined by the jurisdiction.
- o. The jurisdiction shall fill in this section of the table using the Ground Snow Loads in Figure R301.2(6).

Exhibit A

Supplemental Information to the International Code Text

Where referenced in the International Codes, the following provision shall apply:

Board of Appeals shall mean the Hamblen County Construction Board of Adjustments and Appeals, except; where flood plain construction management and property maintenance issues are involved, in those cases the Hamblen County Board of Zoning and the Hamblen County Property Maintenance board shall act upon such issues.

All Electrical requirements referenced shall be deleted and the following inserted; *Compliance* with the current Rules and Regulations of the State of Tennessee as found in Chapter 0780-02-01 (Electrical Installations), as well as those of the appropriate local authority having jurisdiction, shall be considered *compliance* with all sections of the codes which reference electrical provisions.

All septic and Sewer requirements referenced shall be deleted and the following inserted; Compliance with the current Rules and Regulations of the State of Tennessee as found in Chapter 0400-048-01) Subsurface Sewage Disposal Systems), as well as those of the local authority having jurisdiction, shall be considered compliance with all sections of the codes which reference septic system or sanitary sewer provisions.

All Stormwater requirements referenced shall be deleted and the following inserted; Compliance with the rules and regulations of the Hamblen county Zoning, Subdivision and Stormwater Control Resolutions, as well as the appropriate state authority having jurisdiction, shall be considered in compliance with all sections of the codes which reference storm water provision.

Storm Water Permit and Inspection requirements: It shall be the responsibility of the owner or his authorized agent, or both, to ensure that a storm water permit is obtained and that all storm water run-off protective measures are properly installed and maintained in an adequate condition at all times prior to, and during, the construction process. At a minimum, a permit must be obtained and inspections shall be performed; 1) prior to any earth moving or land disturbance activities taking place, 2) once all protective measures are initially installed, 3) after significant rainfall event and every 72 hours when a State CGP is involved, and 4) after the site is properly stabilized but prior to the protective measures being removed.

These minimum inspections shall either be performed by Hamblen County authorized inspectors at the requests of the owner or his authorized agent or by the state-authorized certified inspector when a State CGP is involved. In case where a state-authorized certified inspector conducts the inspections, the documented inspection records shall be kept on the site and made readily available to county, state, or federal officials upon request. For additional information and/or requirement concerning storm water permitting and inspections, see Hamblen County's Zoning, Subdivision, and Storm Water Control Resolutions or the TN Department of Environment and Conservation (TDEC) regulations, as applicable.

Exhibit A (2)

Code Violations-Penalties: In accordance with Tennessee Code Annotated (TCA) 5-30-105; any person, firm, corporation or agent who violates a provision of any code or fails to comply therewith, or with any of the provisions thereof, or violates a detailed statement or plan submitted and approved thereunder, commits a Class C Misdemeanor. Each such person, firm, corporation or agent commits a separate offense of each and every day or portion thereof during which any violation of any provisions of a code are committed or continued. In addition, TCA 5-1-121 provides that a monetary penalty of up to five hundred (\$500.00) may be imposed for each violation of a rule or regulation that the county legislative body is authorized to adopt. Furthermore, in addition to any fines and/or penalties which may be levied hereunder a person, firm, corporation or agent found to be in violation may also be required to pay any reasonable attorney fees and all related court costs.

Exhibit B

International Code Descriptions

International Building Code (IBC)-Applies to the construction, alteration, movement, enlargement, replacement, repair, equipment, use and occupancy, location, maintenance, removal and demolition of every building or structure or any appurtenance connection or attached to such building or structure.

The purpose of this code is to establish the minimum requirements to safeguard the public health, safety and general welfare through structural strength, means of egress facilities, sanitation, adequate light and ventilation, energy conservation, and safety to life and property from fire and other hazards attributed to the built environment and to provide safety to fire fighters and emergency responders during emergency operations.

International Residential Code (IRC) - Applies to the construction, alteration, movement, enlargement, replacement, repair, equipment, use and occupancy, location, removal and demolition of detached one and two family dwellings and townhouses not more than three stories above-grade in height with a separate means of egress and their accessory structures.

The purpose of this code is to provide the minimum requirements to safeguard the public health, safety and general welfare through affordability, structural strength, means of egress facilities, stability, sanitation, adequate light and ventilation, energy conservation, and safety to life and property from fire and other hazards attributed to the building environment.

Exhibit C

Requirement Inspections to Comply with the ICC Technical Codes

The following code inspections will be conducted by Hamblen County, excluding septic/sewer and electric.

Building Code

(See section 110.3 for complete listing)

Residential Code

(See section R109.1 for a complete listing)

- 1. Foundation inspection:** To be made after trenches are excavated and any reinforcement bars or rods are in place and forms erected, if applicable, and prior to concrete being poured.
- 2. Frame inspection:** To be made after the roof, all framing, fire blocking and bracing is in place; and after all electrical wiring, plumbing pipes, drains, chimneys, ducts and vents are completed.
- 3. Final inspection:** To be made after the building is completed and ready for occupancy.

Plumbing Code

- 1. Underground inspection:** To be made after trenches or ditches are excavated and bedded, piping installed, and before any backfill is put in place.
- 2. Rough-in inspection:** To be made after the roof, framing, fire blocking, fire stopping, draft stopping and bracing is in place and all sanitary water distribution piping is completely roughed in, and prior to the installation of wall or ceiling membranes. This inspection shall include pressure tests.
- 3. Final Inspection:** To be made after the building is complete, all plumbing fixtures are in place and properly connected, and the structure is ready for occupancy.

Note: See Plumbing Code for required tests.

Mechanical Code

- 1. Underground inspection:** To be made after trenches or ditches are excavated, underground duct and fuel piping installed and before any back fill is put in place.
- 2. Rough-in inspection:** To be made after the roof, framing, fire blocking and bracing is in place and all ducting, and other concealed components are completed, and prior to the installation of wall or ceiling membranes.
- 3. Final inspection:** To be made after the building is complete, the mechanical system is in place and properly connected, and the structure is ready for occupancy.

Gas Code

- 1. Rough piping inspection:** To be made after all new piping authorized by a permit has been installed, and before any such piping has been covered or concealed or any fixed or gas appliances have been connected. This inspection may include a pressure test.
- 2. Final piping inspection:** To be made after all piping authorized by the permit has been installed and after all portions which are to be concealed by plastering or otherwise have been so concealed, and before any fixtures or gas appliances have been connected. This inspection shall include a pressure test.
- 3. Final inspection:** to be made on all new gas work authorized by the permit and such portions of existing systems as may be affected by new work or any changes, to insure compliance with all the requirements of the code and to assure that the installation and construction of the gas system is in accordance with the approved permit.

Septic/Sewer and Electrical

- 1.** To comply with state laws concerning permitting and inspection requirements: Contact the local sewer system and electrical service provider(s) and/or TDEC, as may be appropriate, for details.

Exhibit D
Technical Code Permits

When Required:

Any owner, authorized agent, or contractor who desires to construct, enlarge, alter, repair, move, demolish, or change the occupancy of a building or structure, or to erect, install, enlarge, alter, repair, remove, convert or replace any gas, mechanical or plumbing system, the installation of which is regulated by the technical codes, or cause any such work to be done, shall first make contact with the code official and obtain the required permit for the work.

Building Exemption: (See Section 105.2 of the International Building Code and International Residential Code)

Plumbing Exemption:

The following work shall be exempt from the requirement for a permit:

1. The stopping of leaks in drains, water, soil, waste or vent pipe, provided, however, that if any concealed trap, drain pipe, water, soil, waste or vent pipe becomes defective and it becomes necessary to remove and replace the same with new material, such work shall be considered as new work and a permit shall be obtained and inspection made as provided in this code.
2. The clearing of stoppages or the repairing of leaks in pipes, valves or fixtures, and the removal and re-installation of water closets, provided such repairs do not involve or require the replacement or re-arrangement of valves, pipes or fixtures.

Mechanical Exemption:

Permits shall not be required for the following work:

1. Any portable heating appliance;
2. Any portable ventilation equipment;
3. Any portable cooling unit;
4. Any steam, hot or chilled water piping within any heating or cooling equipment regulated by this code;
5. Replacement of any part which does not alter its approval or make it unsafe;
6. Any portable evaporative cooler;
7. Any self-contained refrigeration system containing 10 lbs or less of refrigerant and activated by motors of 1 horsepower or less.

Fuel Gas Exemptions:

1. Portable heating appliances
2. Replacement of any minor part that does not alter approval of equipment or make such equipment unsafe.
3. Portable fuel-cell appliances that are not connected to a fixed piping system.

Minor Repairs:

Ordinary minor repairs may be made with the approval of the building official without a permit, provided that such repairs shall not violate any of the provisions of the technical codes.

Exemption from the permit requirement of the technical codes shall not be deemed to grant authorization for any work to be done in violation of the provisions of the code or any other laws or regulations of this jurisdiction.

Fee

A permit shall not be issued until the fees prescribed have been paid, and an amendment to a permit shall not be released until the additional fee, if any due to an increase of the specific systems, has been paid.

Exhibit D (2)

Work Commencing Before Permit Issuance:

A person who commences any work on a building, plumbing, mechanical or gas system before obtaining the necessary permits shall be subject to 100 percent of the usual permit fee in addition to the required permit fees.

Fee Refunds:

The code official may authorize the refunding of fees as follows:

1. The full amount of any fee paid hereunder that was erroneously paid or collected.
2. If a written request is made within thirty (30) days of the payment date based on extreme circumstances occurring to the applicant or the applicant's immediate family.

Contractor's Responsibilities:

It shall be the duty of every contractor who enters into contracts for the constructing, installation or repair of a building, plumbing, mechanical or gas system or which a permit is required, to comply with adopted state and local rules and regulations, concerning licensing.

Technical Code Permit Requirements

Permits in General:

When applying for a permit, an applicant shall first complete the application form as prescribed by the Planning Commission Office, submitted both a site plan and a floor plan of the proposed work. In addition, an applicant must present any license or permit required by state law or local resolution and have proof of septic or sewer availability. Once the application is processed (normally 24 hours) the applicant shall then present payment and pick up the building permit.

All permits, once issued, are non-transferable. All work done under such permits shall be subject to regular inspection requirements and fees as well as other applicable laws and regulations. The permit shall become void if the authorized work is not commenced within 180 days after its issuance, or if the permitted work is suspended or abandoned for a period of 180 days thereafter. The building official is authorized to grant one or more extensions of time, not exceeding 180 days each, provided a written request is submitted by the permit holder and justifiable cause is demonstrated.

Contractor's Responsibilities:

It shall be the duty of every contractor who enters into contracts for the installation or repair of building, plumbing, mechanical or gas systems for which a permit is required to comply with adopted state and local rules and regulations concerning licensing. No building permit shall be issued until a copy either of a certificate of insurance or a workers' compensation policy is provided as evidence of the existence of workers' compensation insurance. This insurance requirement does not apply to persons not required by TCA 50-6-405 and 406 to obtain workers' compensation coverage.

Property Owner's Permit:

The insurance requirements mentioned above do not apply to any person who performs, or supervises; work on such person's own property in such person's own county of residence, provided such person shall present or sign an affidavit which attests to their exemption from the requirement. Pursuant to 68-6-103 an individual may obtain only one (1) property owner's permit within a twenty four (24) month period.

When Required:

Any owner, authorized agent, or contractor who desires to construct, enlarge, alter, repair, move, demolish, or change the occupancy of a building or structure; or to erect, install, enlarge, alter, repair, remove, convert, or replace any gas, mechanical or plumbing system; the installation of which is regulated by the technical codes, or cause any such work to be done, shall first make contact with the code official and obtain the required permit prior to initiation of the work.

The following allowed exception from the permit requirement of a code shall not be deemed to grant authorization of any work to be done in violation of the provisions of the code or any other laws or regulations of this state or local jurisdiction.

Ordinary Minor Repairs:

Ordinary minor household repairs may be made with the approval of the building official without a permit, provided that such repairs shall not violate any of the provisions of the technical codes.

Technical Code Permit Requirements (2)

es:

A permit shall not be issued until the required fee prescribed has been paid, and an amendment to the permit shall not be released until the additional fee (if any) has been paid.

Work Commencing Before Permit Issuance:

Any person who commences any work on building, plumbing, mechanical or gas system before obtaining the necessary permit(s) shall be subject to a double fee of the required building permit.

Refund Policy:

Any monetary fee paid to the Planning Commission office such as those for a permit, subdivision plat approval, rezoning, variance request, etc. are non-refundable once paid. Exceptions: the full amount of any fee may be refunded if the fee was erroneously paid or collected or if a written request is made within 30 days of the payment date based on an extreme circumstance occurring to the applicant or the applicant's immediate family.

Exhibit D-Part 1
Building Permit Fee Chart and Administrative Charges

<u>Activity/Type of Structure</u>	<u>Charge</u>
New Const. Commercial/Industrial..... (Includes churches)	55¢ sq. ft. of area under roof up to 10,000 sq. ft. (Plus) 25¢/sq. ft. over 10,000 sq. ft.
New Const. Residential w/Basement..... (Includes unfinished basement and/or basement garage)	55¢/ sq. ft. of total conditioned space
New Const. Residential w/out Basement.....	50¢/ sq. ft. of total conditioned space (crawl space/slab)
Additions to Existing Structures.....	(See above New Construction charges, as applicable)
Remodeling of Existing Structures..... (Includes interior space only with no structural support alterations allowed, otherwise renovation below)	10¢ /sq. ft. (\$25.00 minimum charge)
Renovations of Existing Structures.....	25¢/sq. ft.
Stick-built or Prefab Storage Building/Garages	25¢/sq. ft. (less than 120 sq. ft. only setbacks apply)
Decks and Covered Porches with or w/out sidewalls.....	25¢/ sq. ft. (\$25.00 min)
Free-Standing Metal Carports or similar structures.....	\$25.00 each
Double Wide Mobile Homes Placement Permit.....	\$350.00 each
Single Wide Mobile Homes Placement Permit.....	\$100.00 each
Modular Homes (includes foundation inspection)..... (Includes decks if constructed when placed or within 60 days of placement)	25¢/ sq. ft. plus SW permit fee
Demolition Permit.....	\$50.00
Moving Fee	\$100.00
Miscellaneous Fee (activity/structures not otherwise listed, including swimming pools >36" deep)	\$50.00
Cell Tower Construction..... (Includes non-refundable application review fee & associated bldg. permit, if approved)	\$2,500.00/tower site
Co-location or swap out of antenna on existing tower...	\$50.0/array or level
Upgrade to tower ground level facilities.....	\$50.00 per occurrence
Drop & Swap of support structure (rebuild/height extended)	\$500.00 per occurrence
Signs -Minimum Fee.....	\$10.00/sign face minimum
Billboards (off premises).....	55¢/sq. ft. of sign face per side
Advertisement (on premises, including billboards).....	55¢/sq. ft. of sign face per side
Subdivision (Residential, Commercial or Industrial).....	\$25.00 per sign face minimum
Stormwater Management Permit.....	\$100.00/lot disturbed (with or w/out building permit)
Land Disturbance/Earth Moving/Site Development Permit (This fee applies to all major subdivision development plats when they are approved)	\$100.00/lot disturbed
Administrative Charges:	
Subdivision Plat Approval.....	\$167.00/plat and recording
Variance Request.....	\$50.00/request
Use-On-Review Determination.....	\$50.00/request
Rezoning Request.....	\$75.00
Other Permits & Fees.....	(See Plumbing, Mechanical, and Gas Fee Charts & notes)

Exhibit D-Part 2
Plumbing Permit Fee Schedule

Permit Issuance

For issuing each permit.....	\$10.00
For issuing each supplemental permit.....	\$5.00

Unit Fee Schedule

For each plumbing fixture or trap..... (Includes water and drainage pipe)	\$5.00
For each building water main..... (Includes installation, alteration and repair)	\$10.00
For each building drain/sewer.....	\$10.00
For each water heater.....	\$5.00
For each floor drain.....	\$5.00
For each waste pre-treatment interceptor (outside) Comm. only	\$10.00
For each waste pre-treatment interceptor (inside) Comm. only	\$5.00
For repair or alteration of drainage or vent.....	\$5.00
For atmospheric type vacuum breaker (1 to 5)..... (Over 5-\$1.00 each)	\$5.00
For reduced pressure-type backflow preventer.....	\$10.00
For each private sewage disposal system.....	N/A
For each rainwater system (per drain).....	N/A
For each lawn sprinkler system on any one meter.....	N/A

Other Inspections and Fees

Inspections outside of normal business hours.....	\$20.00
Re-inspection fee, after 2 nd failure to pass.....	\$25.00
Inspection for which no fee is specifically indicated.....	\$10.00
Additional fee required by changes, additions or revision to approve permit	\$10.00

Notes:

-If any person commences any work before obtaining the necessary permit and/or inspection, the fee shall be doubled.

-N/A means "not applicable at this time"

Exhibit D-Part 3
Gas Permit Fee Schedule

Permit Issuance

For issuing each permit.....	\$10.00
For issuing each supplemental permit.....	\$5.00

Unit Fee Schedule

For each consumer's gas piping at one location..... (including 1 to 4 gas outlets)	\$10.00
For each additional gas outlets.....	\$2.50
For first appliance hook-up to piping system.....	\$5.00
For each additional hoop-up.....	\$2.50
For first venting system installation.....	\$5.00
For each additional venting system.....	\$2.50

Other Inspections and Fees

Inspection outside of normal business hours.....	\$20.00
Re-inspection fee, after 2 nd failure to pass.....	\$25.00
Inspection for which no fee is specifically indicated.....	\$10.00
Additional fee required by changes, additions or revisions to approved permit.....	\$10.00

Notes:

-If any person commences any work before obtaining the necessary permit and/or inspections, fee shall be doubled.

-Any and all fees shall be paid by the person to whom the permit is issued.

Exhibit D-Part 4
Mechanical Permit Fee Schedule

Permit Issuance

For issuing each permit..... \$10.00
For issuing each supplemental permit..... \$5.00

Unit Fee Schedule

For each heating, ventilating, duct work, air conditioning and/or refrigeration system:
(1 to 2 ton capacity)..... \$5.00 each
(2 o 5 ton capacity)..... \$5.00 additional
(>5 ton capacity)..... \$5.00 additional

For repairs, alterations and additions to an existing system..... \$10.00

For boiler installations (State inspected-see State of TN for requirements)

Other Inspections and Fee

Inspection outside of normal business hours..... \$20.00
Re-inspection fee, after 2nd failure to pass..... \$25.00
Inspection for which no fee is specifically indicated..... \$10.00
Additional fee required by changes, additions or revisions to approved permit..... \$10.00

Notes:

-If any person commences any work before obtaining the necessary permit and/or inspection, fees shall be doubled.

-Any and all fees shall be paid by the person to whom the permit is issued.

Public Notice

The Hamblen County Legislative Body will hold a public hearing on March 24, 2022 at 5:00 p.m. to consider resolutions to adopt the 2018 International Building, Residential, Energy Conservation, Fire, Plumbing, Mechanical, Fuel Gas, & Swimming Pool & Spa Codes.

The meeting will be held in the Hamblen County Courthouse, Large Courtroom, located at 511 W. 2nd North Street Morristown, TN. All interested parties are invited to attend.

For further information concerning this matter, please contact the Hamblen County Planning Office at (423) 581-1373.

Citizen Tribune:

Please run this Public Notice in the Sunday, February 27, 2022 issue
Bill to: Hamblen County Planning Commission

Attn: Tina Whitaker
511 W. 2nd North Street
Morristown, TN. 37814
423-581-1373

Page : 1 of 1 02/23/2022 13:42:15

Order Number : 22194668
PO Number :
Customer : 21875818 Hamblen County Planning Commission
Contact :
Address1 : Attn: Tina Whitaker
Address2 : 511 W. 2ND NORTH ST.
City St Zip : MORRISTOWN TN 37814
Phone : (423) 581-1373
Fax :
Printed By : ctadtaker1
Entered By : ctadtaker2
Keywords : Public Hearing
Notes :
Zones :

Ad Number : 22289535
Ad Key :
Salesperson : 03 - Class Rep 03
Publication : Citizen Tribune
Section : Classified Section
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Category : Public Notices-130
Dates Run : 02/27/2022-02/27/2022
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Words : 89
Ad Rate : Open
Ad Price : 46.03
Amount Paid : 0.00
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Published:
02/27/2022

Part I—Administrative

CHAPTER 1

SCOPE AND ADMINISTRATION

User note:

About this chapter: Chapter 1 establishes the limits of applicability of this code and describes how the code is to be applied and enforced. Chapter 1 is in two parts: Part 1—Scope and Application (Sections R101–R102) and Part 2—Administration and Enforcement (Sections R103–R114). Section R101 identifies which buildings and structures come under its purview and references other I-Codes as applicable. Standards and codes are scoped to the extent referenced (see Section R102.4).

The one- and two-family dwelling code is intended to be adopted as a legally enforceable document, and it cannot be effective without adequate provisions for its administration and enforcement. The provisions of Chapter 1 establish the authority and duties of the building official appointed by the authority having jurisdiction and also establish the rights and privileges of the design professional, contractor and property owner.

PART 1—SCOPE AND APPLICATION

SECTION R101 GENERAL

R101.1 Title. These provisions shall be known as the *Residential Code for One- and Two-family Dwellings of [NAME OF JURISDICTION]*, and shall be cited as such and will be referred to herein as “this code.”

R101.2 Scope. The provisions of this code shall apply to the construction, *alteration*, movement, enlargement, replacement, repair, *equipment*, use and occupancy, location, removal and demolition of detached one- and two-family dwellings and *townhouses* not more than three stories above *grade plane* in height with a separate means of egress and their *accessory structures* not more than three stories above *grade plane* in height.

Exception: The following shall be permitted to be constructed in accordance with this code where provided with a residential fire sprinkler system complying with Section P2904:

1. Live/work units located in *townhouses* and complying with the requirements of Section 419 of the *International Building Code*.
2. Owner-occupied lodging houses with five or fewer guestrooms.
3. A care facility with five or fewer persons receiving custodial care within a dwelling unit.
4. A care facility with five or fewer persons receiving medical care within a dwelling unit.
5. A care facility for five or fewer persons receiving care that are within a single-family dwelling.

R101.3 Intent. The purpose of this code is to establish minimum requirements to safeguard the public safety, health and general welfare through affordability, structural strength,

means of egress facilities, stability, sanitation, light and ventilation, energy conservation and safety to life and property from fire and other hazards attributed to the built environment, and to provide safety to fire fighters and emergency responders during emergency operations.

SECTION R102 APPLICABILITY

R102.1 General. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall be applicable. Where, in any specific case, different sections of this code specify different materials, methods of construction or other requirements, the most restrictive shall govern.

R102.2 Other laws. The provisions of this code shall not be deemed to nullify any provisions of local, state or federal law.

R102.3 Application of references. References to chapter or section numbers, or to provisions not specifically identified by number, shall be construed to refer to such chapter, section or provision of this code.

R102.4 Referenced codes and standards. The codes and standards referenced in this code shall be considered part of the requirements of this code to the prescribed extent of each such reference and as further regulated in Sections R102.4.1 and R102.4.2.

Exception: Where enforcement of a code provision would violate the conditions of the *listing* of the *equipment* or *appliance*, the conditions of the *listing* and manufacturer's instructions shall apply.

R102.4.1 Conflicts. Where conflicts occur between provisions of this code and referenced codes and standards, the provisions of this code shall apply.

R102.4.2 Provisions in referenced codes and standards. Where the extent of the reference to a referenced code or standard includes subject matter that is within the scope of

SCOPE AND ADMINISTRATION

until the final termination of the proceedings. The *building official* or any subordinate shall not be liable for cost in any action, suit or proceeding that is instituted in pursuance of the provisions of this code.

R104.9 Approved materials and equipment. Materials, *equipment* and devices *approved* by the *building official* shall be constructed and installed in accordance with such approval.

R104.9.1 Used materials and equipment. Used materials, *equipment* and devices shall not be reused unless *approved* by the *building official*.

R104.10 Modifications. Where there are practical difficulties involved in carrying out the provisions of this code, the *building official* shall have the authority to grant modifications for individual cases, provided the *building official* shall first find that special individual reason makes the strict letter of this code impractical and the modification is in compliance with the intent and purpose of this code and that such modification does not lessen health, life and fire safety or structural requirements. The details of action granting modifications shall be recorded and entered in the files of the department of building safety.

R104.10.1 Flood hazard areas. The *building official* shall not grant modifications to any provisions required in flood hazard areas as established by Table R301.2(1) unless a determination has been made that:

1. There is good and sufficient cause showing that the unique characteristics of the size, configuration or topography of the site render the elevation standards of Section R322 inappropriate.
2. Failure to grant the modification would result in exceptional hardship by rendering the lot undevelopable.
3. The granting of modification will not result in increased flood heights, additional threats to public safety, extraordinary public expense, cause fraud on or victimization of the public, or conflict with existing laws or ordinances.
4. The modification is the minimum necessary to afford relief, considering the flood hazard.
5. Written notice specifying the difference between the design flood elevation and the elevation to which the building is to be built, stating that the cost of flood insurance will be commensurate with the increased risk resulting from the reduced floor elevation and stating that construction below the design flood elevation increases risks to life and property, has been submitted to the applicant.

R104.11 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code. The *building official* shall have the authority to approve an alternative material, design or method of construction upon application of the owner or the owner's authorized agent. The *building official* shall first find that the proposed design is satisfactory and complies with the

intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety. Compliance with the specific performance-based provisions of the International Codes shall be an alternative to the specific requirements of this code. Where the alternative material, design or method of construction is not *approved*, the *building official* shall respond in writing, stating the reasons why the alternative was not *approved*.

R104.11.1 Tests. Where there is insufficient evidence of compliance with the provisions of this code, or evidence that a material or method does not conform to the requirements of this code, or in order to substantiate claims for alternative materials or methods, the *building official* shall have the authority to require tests as evidence of compliance to be made at no expense to the *jurisdiction*. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized and accepted test methods, the *building official* shall approve the testing procedures. Tests shall be performed by an *approved* agency. Reports of such tests shall be retained by the *building official* for the period required for retention of public records.

SECTION R105
PERMITS

R105.1 Required. Any owner or owner's authorized agent who intends to construct, enlarge, alter, repair, move, demolish or change the occupancy of a building or structure, or to erect, install, enlarge, alter, repair, remove, convert or replace any electrical, gas, mechanical or plumbing system, the installation of which is regulated by this code, or to cause any such work to be performed, shall first make application to the *building official* and obtain the required *permit*.

R105.2 Work exempt from permit. Exemption from *permit* requirements of this code shall not be deemed to grant authorization for any work to be done in any manner in violation of the provisions of this code or any other laws or ordinances of this *jurisdiction*. *Permits* shall not be required for the following:

Building:

1. One-story detached *accessory structures*, provided that the floor area does not exceed 200 square feet (18.58 m²). **120**
2. Fences ~~not over 7 feet (2134 mm) high.~~ **Delete**
3. Retaining walls ~~that are not over 4 feet (1219 mm) in height measured from the bottom of the footing to the top of the wall, unless supporting a surcharge.~~ **Delete**
4. Water tanks ~~supported directly upon grade if the capacity does not exceed 5,000 gallons (18 927 L) and the ratio of height to diameter or width does not exceed 2 to 1.~~ **Delete**
5. Sidewalks and driveways.

SCOPE AND ADMINISTRATION

6. Painting, papering, tiling, carpeting, cabinets, counter tops and similar finish work.
7. Prefabricated swimming pools that are less than 24 inches (610 mm) deep.
8. Swings and other playground equipment.
9. Window awnings supported by an exterior wall that do not project more than 54 inches (1372 mm) from the exterior wall and do not require additional support.

- ~~10. Decks not exceeding 200 square feet (18.58 m²) in area, that are not more than 30 inches (762 mm) above grade at any point, are not attached to a dwelling and do not serve the exit door required by Section R311.4.~~

Electrical:

1. ~~Listed cord-and-plug connected temporary decorative lighting.~~
2. ~~Reinstallation of attachment plug receptacles but not the outlets therefor.~~
3. ~~Replacement of branch circuit overcurrent devices of the required capacity in the same location.~~
4. ~~Electrical wiring, devices, appliances, apparatus or equipment operating at less than 25 volts and not capable of supplying more than 50 watts of energy.~~
5. ~~Minor repair work, including the replacement of lamps or the connection of approved portable electrical equipment to approved permanently installed receptacles.~~

Gas:

1. Portable heating, cooking or clothes drying appliances.
2. Replacement of any minor part that does not alter approval of equipment or make such equipment unsafe.
3. Portable-fuel-cell appliances that are not connected to a fixed piping system and are not interconnected to a power grid.

Mechanical:

1. Portable heating appliances.
2. Portable ventilation appliances.
3. Portable cooling units.
4. Steam, hot- or chilled-water piping within any heating or cooling equipment regulated by this code.
5. Replacement of any minor part that does not alter approval of equipment or make such equipment unsafe.
6. Portable evaporative coolers.
7. Self-contained refrigeration systems containing 10 pounds (4.54 kg) or less of refrigerant or that are actuated by motors of 1 horsepower (746 W) or less.

8. Portable-fuel-cell appliances that are not connected to a fixed piping system and are not interconnected to a power grid.

Plumbing:

1. The stopping of leaks in drains, water, soil, waste or vent pipe; provided, however, that if any concealed trap, drainpipe, water, soil, waste or vent pipe becomes defective and it becomes necessary to remove and replace the same with new material, such work shall be considered as new work and a permit shall be obtained and inspection made as provided in this code.
2. The clearing of stoppages or the repairing of leaks in pipes, valves or fixtures, and the removal and reinstallation of water closets, provided such repairs do not involve or require the replacement or rearrangement of valves, pipes or fixtures.

R105.2.1 Emergency repairs. Where equipment replacements and repairs must be performed in an emergency situation, the permit application shall be submitted within the next working business day to the building official.

R105.2.2 Repairs. Application or notice to the building official is not required for ordinary repairs to structures, replacement of lamps or the connection of approved portable electrical equipment to approved permanently installed receptacles. Such repairs shall not include the cutting away of any wall, partition or portion thereof, the removal or cutting of any structural beam or load-bearing support, or the removal or change of any required means of egress, or rearrangement of parts of a structure affecting the egress requirements; nor shall ordinary repairs include addition to, alteration of, replacement or relocation of any water supply, sewer, drainage, drain leader, gas, soil, waste, vent or similar piping, electric wiring or mechanical or other work affecting public health or general safety.

R105.2.3 Public service agencies. A permit shall not be required for the installation, alteration or repair of generation, transmission, distribution, metering or other related equipment that is under the ownership and control of public service agencies by established right.

R105.3 Application for permit. To obtain a permit, the applicant shall first file an application therefor in writing on a form furnished by the department of building safety for that purpose. Such application shall:

1. Identify and describe the work to be covered by the permit for which application is made.
2. Describe the land on which the proposed work is to be done by legal description, street address or similar description that will readily identify and definitely locate the proposed building or work.
3. Indicate the use and occupancy for which the proposed work is intended.
4. Be accompanied by construction documents and other information as required in Section R106.1.
5. State the valuation of the proposed work.

2018 INTERNATIONAL RESIDENTIAL CODE®

Delete

- a. Where weathering requires a high strength concrete or grade of masonry than necessary to satisfy the structural requirements of this code, the frost line depth strength required for weathering shall govern. The weathering column shall be filled in with the weathering index, "negligible," "moderate" or "severe" for concrete as determined from Figure R301.2(4). The grade of masonry units shall be determined from ASTM C34, C55, C62, C73, C90, C129, C145, C216 or C652.
- b. Where the frost line depth requires deeper footings than indicated in Figure R403.1(1), the frost line depth strength required for weathering shall govern. The jurisdiction shall fill in the frost line depth column with the minimum depth of footing below finish grade.
- c. The jurisdiction shall fill in this part of the table to indicate the need for protection depending on whether there has been a history of local subterranean termite damage.
- d. The jurisdiction shall fill in this part of the table with the wind speed from the basic wind speed map [Figure R301.2(5)A]. Wind exposure category shall be determined on a site-specific basis in accordance with Section R301.2.1.4.
- e. The outdoor design dry-bulb temperature shall be selected from the columns of 97¹/₂-percent values for winter from Appendix D of the *International Plumbing Code*. Deviations from the Appendix D temperatures shall be permitted to reflect local climates or local weather experience as determined by the building official. [Also see Figure R301.2(1).]
- f. The jurisdiction shall fill in this part of the table with the seismic design category determined from Section R301.2.2.1.
- g. The jurisdiction shall fill in this part of the table with (a) the date of the jurisdiction's entry into the National Flood Insurance Program (date of adoption of the first code or ordinance for management of flood hazard areas), (b) the date(s) of the Flood Insurance Study and (c) the panel numbers and dates of the currently effective FIRMs and FBFMs or other flood hazard map adopted by the authority having jurisdiction, as amended.
- h. In accordance with Sections R905.1.2, R905.4.3.1, R905.5.3.1, R905.6.3.1, R905.7.3.1 and R905.8.3.1, where there has been a history of local damage from the effects of ice damming, the jurisdiction shall fill in this part of the table with "YES." Otherwise, the jurisdiction shall fill in this part of the table with "NO."
- i. The jurisdiction shall fill in this part of the table with the 100-year return period air freezing index (BF-days) from Figure R403.3(2) or from the 100-year (99 percent) value on the National Climatic Data Center data table "Air Freezing Index-USA Method (Base 32°F)."
- j. The jurisdiction shall fill in this part of the table with the mean annual temperature from the National Climatic Data Center data table "Air Freezing Index-USA Method (Base 32°F)."
- k. In accordance with Section R301.2.1.5, where there is local historical data documenting structural damage to buildings due to topographic wind speed-up effects, the jurisdiction shall fill in this part of the table with "YES." Otherwise, the jurisdiction shall indicate "NO" in this part of the table.
- l. In accordance with Figure R301.2(5)A, where there is local historical data documenting unusual wind conditions, the jurisdiction shall fill in this part of the table with "YES" and identify any specific requirements. Otherwise, the jurisdiction shall indicate "NO" in this part of the table.
- m. In accordance with Section R301.2.1.2 the jurisdiction shall indicate the wind-borne debris wind zone(s). Otherwise, the jurisdiction shall indicate "NO" in this part of the table.
- n. The jurisdiction shall fill in these sections of the table to establish the design criteria using Table 1a or 1b from ACCA Manual J or established criteria determined by the jurisdiction.
- o. The jurisdiction shall fill in this section of the table using the Ground Snow Loads in Figure R301.2(6).

BUILDING PLANNING

other surface below on the exterior of the building, the operable window shall comply with one of the following:

1. Operable window openings will not allow a 4-inch-diameter (102 mm) sphere to pass through where the openings are in their largest opened position.
2. Operable windows are provided with window fall prevention devices that comply with ASTM F2090.
3. Operable windows are provided with window opening control devices that comply with Section R312.2.2.

R312.2.2 Window opening control devices. Window opening control devices shall comply with ASTM F2090. The window opening control device, after operation to release the control device allowing the window to fully open, shall not reduce the net clear opening area of the window unit to less than the area required by Section R310.2.1.

"optional see TCA 68-120-101(a)(8) for details"

SECTION R313

AUTOMATIC FIRE SPRINKLER SYSTEMS

R313.1 Townhouse automatic fire sprinkler systems. ~~An automatic residential fire sprinkler system shall be installed in townhouses.~~ "when automatic fire sprinkler systems are installed the following shall apply"

Exception: An automatic residential fire sprinkler system shall not be required where additions or alterations are made to existing townhouses that do not have an automatic residential fire sprinkler system installed.

R313.1.1 Design and installation. Automatic residential fire sprinkler systems for townhouses shall be designed and installed in accordance with Section P2904 or NFPA 13D.

R313.2 One- and two-family dwellings automatic fire sprinkler systems. ~~An automatic residential fire sprinkler system shall be installed in one- and two-family dwellings.~~ "when automatic fire sprinkler systems are installed the following shall apply"

Exception: An automatic residential fire sprinkler system shall not be required for additions or alterations to existing buildings that are not already provided with an automatic residential sprinkler system.

R313.2.1 Design and installation. Automatic residential fire sprinkler systems shall be designed and installed in accordance with Section P2904 or NFPA 13D.

SECTION R314
SMOKE ALARMS

R314.1 General. Smoke alarms shall comply with NFPA 72 and Section R314.

R314.1.1 Listings. Smoke alarms shall be listed in accordance with UL 217. Combination smoke and carbon monoxide alarms shall be listed in accordance with UL 217 and UL 2034.

R314.2 Where required. Smoke alarms shall be provided in accordance with this section.

R314.2.1 New construction. Smoke alarms shall be provided in dwelling units.

R314.2.2 Alterations, repairs and additions. Where alterations, repairs or additions requiring a permit occur, the individual dwelling unit shall be equipped with smoke alarms located as required for new dwellings.

Exceptions:

1. Work involving the exterior surfaces of dwellings, such as the replacement of roofing or siding, the addition or replacement of windows or doors, or the addition of a porch or deck.
2. Installation, alteration or repairs of plumbing or mechanical systems.

R314.3 Location. Smoke alarms shall be installed in the following locations:

1. In each sleeping room.
2. Outside each separate sleeping area in the immediate vicinity of the bedrooms.
3. On each additional story of the dwelling, including basements and habitable attics and not including crawl spaces and uninhabitable attics. In dwellings or dwelling units with split levels and without an intervening door between the adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full story below the upper level.
4. Smoke alarms shall be installed not less than 3 feet (914 mm) horizontally from the door or opening of a bathroom that contains a bathtub or shower unless this would prevent placement of a smoke alarm required by this section.

R314.3.1 Installation near cooking appliances. Smoke alarms shall not be installed in the following locations unless this would prevent placement of a smoke alarm in a location required by Section R314.3.

1. Ionization smoke alarms shall not be installed less than 20 feet (6096 mm) horizontally from a permanently installed cooking appliance.
2. Ionization smoke alarms with an alarm-silencing switch shall not be installed less than 10 feet (3048 mm) horizontally from a permanently installed cooking appliance.
3. Photoelectric smoke alarms shall not be installed less than 6 feet (1828 mm) horizontally from a permanently installed cooking appliance.

R314.4 Interconnection. Where more than one smoke alarm is required to be installed within an individual dwelling unit in accordance with Section R314.3, the alarm devices shall be interconnected in such a manner that the actuation of one alarm will activate all of the alarms in the individual dwelling unit. Physical interconnection of smoke alarms shall not be required where listed wireless alarms are installed and all alarms sound upon activation of one alarm.

R314.5 Combination alarms. Combination smoke and carbon monoxide alarms shall be permitted to be used in lieu of smoke alarms.

FOUNDATIONS

R402.1.1 Fasteners. Fasteners used below *grade* to attach plywood to the exterior side of exterior *basement* or crawl-space wall studs, or fasteners used in knee wall construction, shall be of Type 304 or 316 stainless steel. Fasteners used above *grade* to attach plywood and all lumber-to-lumber fasteners except those used in knee wall construction shall be of Type 304 or 316 stainless steel, silicon bronze, copper, hot-dipped galvanized (zinc coated) steel nails, or hot-tumbled galvanized (zinc coated) steel nails. Electro-galvanized steel nails and galvanized (zinc coated) steel staples shall not be permitted.

R402.1.2 Wood treatment. Lumber and plywood shall be pressure-preservative treated and dried after treatment in accordance with AWP A U1 (Commodity Specification A, Special Requirement 4.2), and shall bear the *label* of an accredited agency. Where lumber or plywood is cut or drilled after treatment, the treated surface shall be field treated with copper naphthenate, the concentration of which shall contain not less than 2-percent copper metal, by repeated brushing, dipping or soaking until the wood cannot absorb more preservative.

R402.2 Concrete. Concrete shall have a minimum specified compressive strength of f'_c , as shown in Table R402.2. Concrete subject to moderate or severe weathering as indicated in Table R301.2(1) shall be air entrained as specified in Table R402.2. The maximum weight of fly ash, other pozzolans, silica fume, slag or blended cements that is included in concrete mixtures for garage floor slabs and for exterior porches, carport slabs and steps that will be exposed to deicing chemicals shall not exceed the percentages of the total weight of cementitious materials specified in Section 19.3.3.4 of ACI 318. Materials used to produce concrete and testing thereof shall comply with the applicable standards listed in Chapters 19 and 20 of ACI 318 or ACI 332.

R402.2.1 Materials for concrete. Materials for concrete shall comply with the requirements of Section R608.5.1.

R402.3 Precast concrete. Precast concrete foundations shall be designed in accordance with Section R404.5 and shall be installed in accordance with the provisions of this code and the manufacturer's instructions.

R402.3.1 Precast concrete foundation materials. Materials used to produce precast concrete foundations shall meet the following requirements.

1. All concrete used in the manufacture of precast concrete foundations shall have a minimum compressive strength of 5,000 psi (34 470 kPa) at 28 days. Concrete exposed to a freezing and thawing environment shall be air entrained with a minimum total air content of 5 percent.
2. Structural reinforcing steel shall meet the requirements of ASTM A615, A706 or A996. The minimum yield strength of reinforcing steel shall be 40,000 psi (Grade 40) (276 MPa). Steel reinforcement for precast concrete foundation walls shall have a minimum concrete cover of $\frac{3}{4}$ inch (19.1 mm).
3. Panel-to-panel connections shall be made with Grade II steel fasteners.
4. The use of nonstructural fibers shall conform to ASTM C1116.
5. Grout used for bedding precast foundations placed on concrete footings shall meet ASTM C1107.

R402.4 Masonry. Masonry systems shall be designed and installed in accordance with this chapter and shall have a minimum specified compressive strength of 1,500 psi (10.3 MPa).

SECTION R403 FOOTINGS

R403.1 General. All exterior walls shall be supported on continuous solid or fully grouted masonry or concrete footings, crushed stone footings, wood foundations, or other approved structural systems that shall be of sufficient design to accommodate all loads according to Section R301 and to transmit the resulting loads to the soil within the limitations as determined from the character of the soil. Footings shall be supported on undisturbed natural soils or engineered fill. Concrete footing shall be designed and constructed in accordance with the provisions of Section R403 or in accordance with ACI 332.

TABLE R402.2
MINIMUM SPECIFIED COMPRESSIVE STRENGTH OF CONCRETE

TYPE OR LOCATION OF CONCRETE CONSTRUCTION	MINIMUM SPECIFIED COMPRESSIVE STRENGTH ^a (f'_c)		
	Weathering Potential ^b		
	Negligible	Moderate	Severe
Basement walls, foundations and other concrete not exposed to the weather	2,500	2,500	2,500 ^c
Basement slabs and interior slabs on grade, except garage floor slabs	2,500	2,500	2,500 ^c
Basement walls, foundation walls, exterior walls and other vertical concrete work exposed to the weather	2,500	3,000 ^d	3,000 ^d
Porches, carport slabs and steps exposed to the weather, and garage floor slabs	2,500	3,000 ^{d, e, f}	3,500 ^{d, e, f}

For SI: 1 pound per square inch = 6.895 kPa.

a. Strength at 28 days psi.

b. See Table R301.2(1) for weathering potential.

c. Concrete in these locations that is subject to freezing and thawing during construction shall be air-entrained concrete in accordance with Footnote d.

d. Concrete shall be air-entrained. Total air content (percent by volume of concrete) shall be not less than 5 percent or more than 7 percent.

e. See Section R402.2 for maximum cementitious materials content.

f. For garage floors with a steel-troweled finish, reduction of the total air content (percent by volume of concrete) to not less than 3 percent is permitted if the specified compressive strength of the concrete is increased to not less than 4,000 psi.

"Unless permitted otherwise by the Building Official... shall be 24 inches wide by 12 inches thick"

R403.1.1 Minimum size. The minimum width, W , and thickness, T , for concrete footings shall be in accordance with Tables R403.1(1) through R403.1(3) and Figure R403.1(1) or R403.1.3, as applicable. The footing width shall be based on the load-bearing value of the soil in accordance with Table R401.4.1. Footing projections, P , shall be not less than 2 inches (51 mm) and shall not exceed the thickness of the footing. Footing thickness and projection for fireplaces shall be in accordance with Section R1001.2. The size of footings supporting piers and columns shall be based on the tributary load and allowable soil pressure in accordance with Table R401.4.1. Footings for wood foundations shall be in accordance with the details set forth in Section R403.2, and Figures R403.1(2) and R403.1(3). Footings for precast foundations shall be in accordance with the details set forth in Section R403.4, Table R403.4, and Figures R403.4(1) and R403.4(2).

R403.1.2 Continuous footing in Seismic Design Categories D_0 , D_1 and D_2 . Exterior walls of buildings located in Seismic Design Categories D_0 , D_1 and D_2 shall be supported by continuous solid or fully grouted masonry or concrete footings. Other footing materials or systems shall be designed in accordance with accepted engineering practice. Required interior *braced wall panels* in buildings located in Seismic Design Categories D_0 , D_1 and D_2 with plan dimensions greater than 50 feet (15 240 mm) shall be supported by continuous solid or fully grouted masonry or concrete footings in accordance with Section R403.1.3.4, except for two-story buildings in Seismic Design Category D_2 , in which all *braced wall panels*, interior and exterior, shall be supported on continuous foundations.

Exception: Two-story buildings shall be permitted to have interior *braced wall panels* supported on continuous foundations at intervals not exceeding 50 feet (15 240 mm) provided that:

1. The height of cripple walls does not exceed 4 feet (1219 mm).
2. First-floor braced wall panels are supported on doubled floor joists, continuous blocking or floor beams.
3. The distance between bracing lines does not exceed twice the building width measured parallel to the braced wall line.

R403.1.3 Footing and stem wall reinforcing in Seismic Design Categories D_0 , D_1 , and D_2 . Concrete footings located in Seismic Design Categories D_0 , D_1 and D_2 , as established in Table R301.2(1), shall have minimum reinforcement in accordance with this section and Figure R403.1.3. Reinforcement shall be installed with support and cover in accordance with Section R403.1.3.5.

R403.1.3.1 Concrete stem walls with concrete footings. In Seismic Design Categories D_0 , D_1 and D_2 where a construction joint is created between a concrete footing and a concrete stem wall, not fewer than one No. 4 vertical bar shall be installed at not more than 4 feet (1219 mm) on center. The vertical bar shall have a standard hook and extend to the bottom of the footing and shall have support and cover as specified in Section

R403.1.3.5.3 and extend not less than 14 inches (357 mm) into the stem wall. Standard hooks shall comply with Section R608.5.4.5. Not fewer than one No. 4 horizontal bar shall be installed within 12 inches (305 mm) of the top of the stem wall and one No. 4 horizontal bar shall be located 3 to 4 inches (76 mm to 102 mm) from the bottom of the footing.

R403.1.3.2 Masonry stem walls with concrete footings. In Seismic Design Categories D_0 , D_1 and D_2 where a masonry stem wall is supported on a concrete footing, not fewer than one No. 4 vertical bar shall be installed at not more than 4 feet (1219 mm) on center. The vertical bar shall have a standard hook and extend to the bottom of the footing and shall have support and cover as specified in Section R403.1.3.5.3 and extend not less than 14 inches (357 mm) into the stem wall. Standard hooks shall comply with Section R608.5.4.5. Not fewer than one No. 4 horizontal bar shall be installed within 12 inches (305 mm) of the top of the wall and one No. 4 horizontal bar shall be located 3 to 4 inches (76 mm to 102 mm) from the bottom of the footing. Masonry stem walls shall be solid grouted.

R403.1.3.3 Slabs-on-ground with turned-down footings. In Seismic Design Categories D_0 , D_1 and D_2 , slabs-on-ground cast monolithically with turned-down footings shall have not fewer than one No. 4 bar at the top and the bottom of the footing or one No. 5 bar or two No. 4 bars in the middle third of the footing depth.

Where the slab is not cast monolithically with the footing, No. 3 or larger vertical dowels with standard hooks on each end shall be installed at not more than 4 feet (1219 mm) on center in accordance with Figure R403.1.3, Detail 2. Standard hooks shall comply with Section R608.5.4.5.

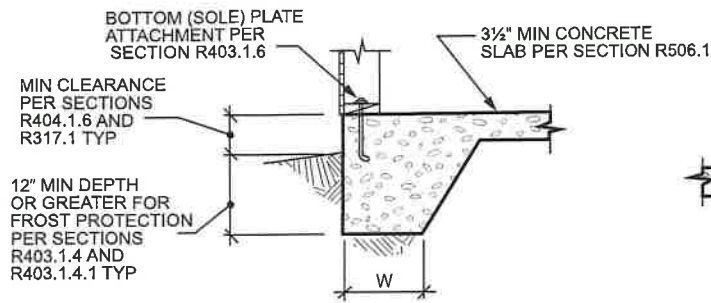
R403.1.3.4 Interior bearing and braced wall panel footings in Seismic Design Categories D_0 , D_1 and D_2 . In Seismic Design Categories D_0 , D_1 and D_2 , interior footings supporting bearing walls or *braced wall panels*, and cast monolithically with a slab on grade, shall extend to a depth of not less than 12 inches (305 mm) below the top of the slab.

R403.1.3.5 Reinforcement. Footing and stem wall reinforcement shall comply with Sections R403.1.3.5.1 through R403.1.3.5.4.

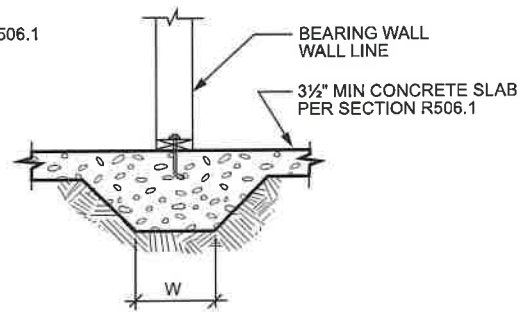
R403.1.3.5.1 Steel reinforcement. Steel reinforcement shall comply with the requirements of ASTM A615, A706 or A996. ASTM A996 bars produced from rail steel shall be Type R. The minimum yield strength of reinforcing steel shall be 40,000 psi (Grade 40) (276 MPa).

R403.1.3.5.2 Location of reinforcement in wall. The center of vertical reinforcement in stem walls shall be located at the centerline of the wall. Horizontal and vertical reinforcement shall be located in footings and stem walls to provide the minimum cover required by Section R403.1.3.5.3.

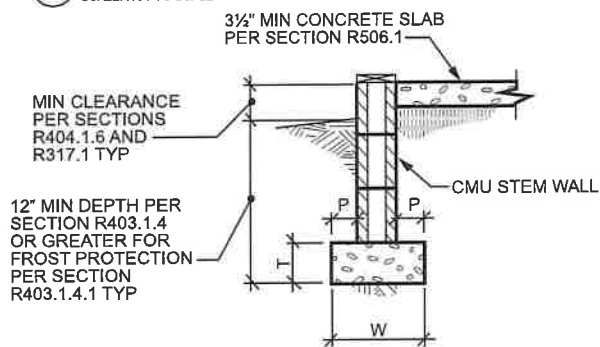
FOUNDATIONS



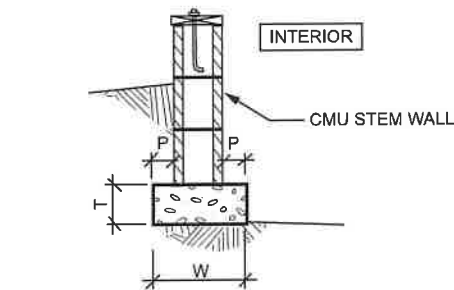
1 MONOLITHIC SLAB-ON-GROUND WITH TURNED-DOWN FOOTING
SCALE: NOT TO SCALE



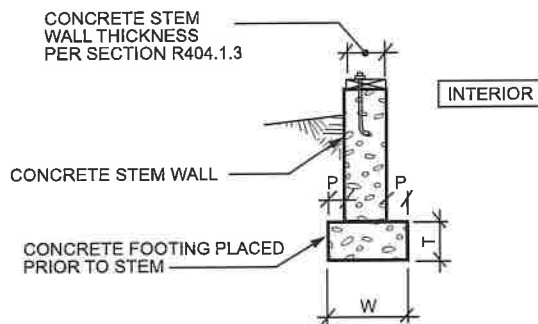
2 THICKENED SLAB-ON-GROUND FOOTING AT BEARING WALLS OR BRACED WALL LINES
SCALE: NOT TO SCALE



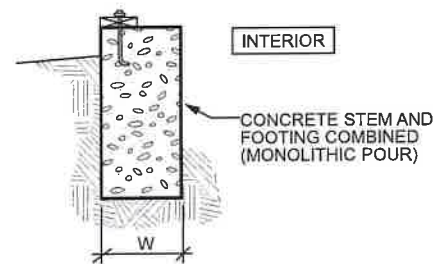
3 SLAB-ON-GROUND WITH MASONRY STEM WALL AND SPREAD FOOTING
SCALE: NOT TO SCALE



4 BASEMENT OR CRAWL SPACE WITH MASONRY WALL AND SPREAD FOOTING
SCALE: NOT TO SCALE



5 BASEMENT OR CRAWL SPACE WITH CONCRETE WALL AND SPREAD FOOTING
SCALE: NOT TO SCALE



6 BASEMENT OR CRAWL SPACE WITH FOUNDATION WALL BEARING DIRECTLY ON SOIL
SCALE: NOT TO SCALE

For SI: 1 inch = 25.4 mm.

W = Width of footing, T = Thickness of footing and P = Projection per Section R403.1.1

NOTES:

- See Section R404.3 for sill requirements.
- See Section R403.1.6 for sill attachment.
- See Section R506.2.3 for vapor barrier requirements.
- See Section R403.1 for base.
- See Figure R403.1.3 for additional footing requirements for structures in SDC D₀, D₁ and D₂ and townhouses in SDC C.
- See Section R408 for under-floor ventilation and access requirements.

FIGURE R403.1(1)

PLAIN CONCRETE FOOTINGS WITH MASONRY AND CONCRETE STEM WALLS IN SDC A, B AND C^{a, b, c, d, e, f}

FLOORS

"for review and approval when required by the building official"

R502.11.4 Truss design drawings. Truss design drawings, prepared in compliance with Section R502.11.1, shall be submitted to the building official and approved prior to installation. Truss design drawings shall be provided with the shipment of trusses delivered to the job site. Truss design drawings shall include, at a minimum, the information specified as follows:

1. Slope or depth, span and spacing.
2. Location of all joints.
3. Required bearing widths.
4. Design loads as applicable:
 - 4.1. Top chord live load.
 - 4.2. Top chord dead load.
 - 4.3. Bottom chord live load.
 - 4.4. Bottom chord dead load.
 - 4.5. Concentrated loads and their points of application.
 - 4.6. Controlling wind and earthquake loads.
5. Adjustments to lumber and joint connector design values for conditions of use.
6. Each reaction force and direction.
7. Joint connector type and description, such as size, thickness or gage, and the dimensioned location of each joint connector except where symmetrically located relative to the joint interface.
8. Lumber size, species and grade for each member.
9. Connection requirements for:
 - 9.1. Truss-to-girder-truss.
 - 9.2. Truss ply-to-ply.
 - 9.3. Field splices.
10. Calculated deflection ratio, maximum description for live and total load, or both.
11. Maximum axial compression forces in the truss members to enable the building designer to design the size, connections and anchorage of the permanent continuous lateral bracing. Forces shall be shown on the truss drawing or on supplemental documents.
12. Required permanent truss member bracing location.

R502.12 Draftstopping required. Draftstopping shall be provided in accordance with Section R302.12.

R502.13 Fireblocking required. Fireblocking shall be provided in accordance with Section R302.11.

SECTION R503 FLOOR SHEATHING

R503.1 Lumber sheathing. Maximum allowable spans for lumber used as floor sheathing shall conform to Tables R503.1, R503.2.1.1(1) and R503.2.1.1(2).

**TABLE R503.1
MINIMUM THICKNESS OF LUMBER FLOOR SHEATHING**

JOIST OR BEAM SPACING (inches)	MINIMUM NET THICKNESS	
	Perpendicular to joist	Diagonal to joist
24	$1\frac{1}{16}$	$\frac{3}{4}$
16	$\frac{5}{8}$	$\frac{5}{8}$
48 ^a	$1\frac{1}{2}$ T & G	N/A
54 ^b		
60 ^c		

For SI: 1 inch = 25.4 mm, 1 pound per square inch = 6.895 kPa.

N/A = Not Applicable.

- a. For this support spacing, lumber sheathing shall have a minimum F_b of 675 and minimum E of 1,100,000 (see ANSI AWC NDS).
- b. For this support spacing, lumber sheathing shall have a minimum F_b of 765 and minimum E of 1,400,000 (see ANSI AWC NDS).
- c. For this support spacing, lumber sheathing shall have a minimum F_b of 855 and minimum E of 1,700,000 (see ANSI AWC NDS).

R503.1.1 End joints. End joints in lumber used as subflooring shall occur over supports unless end-matched lumber is used, in which case each piece shall bear on not less than two joists. Subflooring shall be permitted to be omitted where joist spacing does not exceed 16 inches (406 mm) and a 1-inch (25 mm) nominal tongue-and-groove wood strip flooring is applied perpendicular to the joists.

R503.2 Wood structural panel sheathing.

R503.2.1 Identification and grade. Wood structural panel sheathing used for structural purposes shall conform to CSA O325, CSA O437 DOC PS 1 or DOC PS 2. Panels shall be identified for grade, bond classification and Performance Category by a grade mark or certificate of inspection issued by an approved agency. The Performance Category value shall be used as the "nominal panel thickness" or "panel thickness" wherever referenced in this code.

R503.2.1.1 Subfloor and combined subfloor underlayment. Where used as subflooring or combination subfloor underlayment, wood structural panels shall be of one of the grades specified in Table R503.2.1.1(1). Where sanded plywood is used as combination subfloor underlayment, the grade, bond classification, and Performance Category shall be as specified in Table R503.2.1.1(2).

**TABLE R503.2.1.1(2)
ALLOWABLE SPANS FOR SANDED
PLYWOOD COMBINATION SUBFLOOR UNDERLAYMENT^a**

IDENTIFICATION	SPACING OF JOISTS (inches)		
	16	20	24
Species group ^b	—	—	—
1	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$
2, 3	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$
4	$\frac{3}{4}$	$\frac{7}{8}$	1

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa.

- a. Plywood continuous over two or more spans and face grain perpendicular to supports. Unsupported edges shall be tongue-and-groove or blocked except where nominal $\frac{1}{4}$ -inch-thick wood panel-type underlayment, fiber-cement underlayment or $\frac{3}{4}$ -inch wood finish floor is used. Fiber-cement underlayment shall comply with ASTM C1288 or ISO 8336 Category C. Allowable uniform live load at maximum span based on deflection of $\frac{1}{360}$ of span is 100 psf.
- b. Applicable to all grades of sanded exterior-type plywood.

ROOF-CEILING CONSTRUCTION

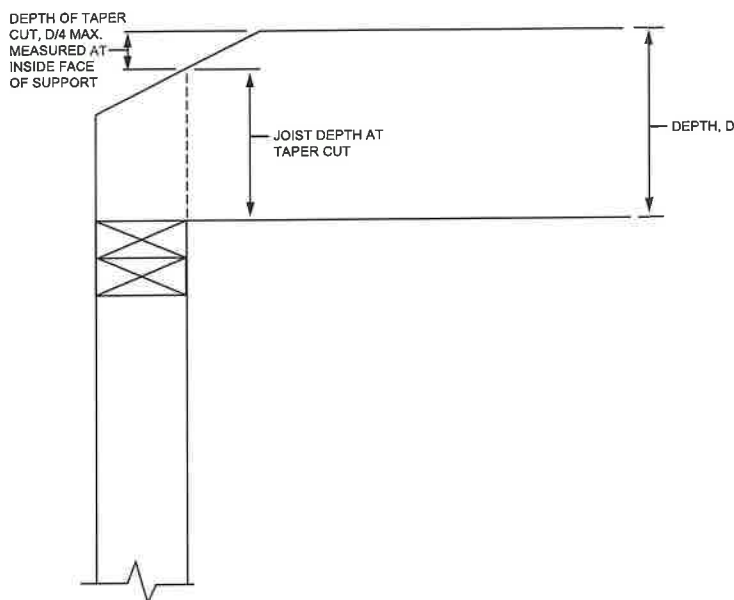


FIGURE R802.7.1.2
CEILING JOIST TAPER CUT

ters with ceiling joists attached in accordance with Table R602.3(1), the depth-to-thickness ratio for the total assembly shall be determined using the combined thickness of the rafter plus the attached ceiling joist.

Exception: Roof trusses shall be braced in accordance with Section R802.10.3.

R802.8.1 Bridging. Rafters and ceiling joists having a depth-to-thickness ratio exceeding 6 to 1 based on nominal dimensions shall be supported laterally by solid blocking, diagonal bridging (wood or metal) or a continuous 1-inch by 3-inch (25 mm by 76 mm) wood strip nailed across the rafters or ceiling joists at intervals not exceeding 8 feet (2438 mm).

R802.9 Framing of openings. Openings in roof and ceiling framing shall be framed with header and trimmer joists. Where the header joist span does not exceed 4 feet (1219 mm), the header joist shall be permitted to be a single member the same size as the ceiling joist or rafter. Single trimmer joists shall be permitted to be used to carry a single header joist that is located within 3 feet (914 mm) of the trimmer joist bearing. Where the header joist span exceeds 4 feet (1219 mm), the trimmer joists and the header joist shall be doubled and of sufficient cross section to support the ceiling joists or rafter framing into the header. *Approved* hangers shall be used for the header joist to trimmer joist connections where the header joist span exceeds 6 feet (1829 mm). Tail joists over 12 feet (3658 mm) long shall be supported at the header by framing anchors or on ledger strips not less than 2 inches by 2 inches (51 mm by 51 mm).

R802.10 Wood trusses.

R802.10.1 Truss design drawings. Truss design drawings, prepared in conformance to Section R802.10.1, shall be provided to the building official and approved prior to

"for review and approval when required by the building official"

installation. Truss design drawings shall be provided with the shipment of trusses delivered to the job site. Truss design drawings shall include, at a minimum, the following information:

1. Slope or depth, span and spacing.
2. Location of all joints.
3. Required bearing widths.
4. Design loads as applicable.
 - 4.1. Top chord live load (as determined from Section R301.6).
 - 4.2. Top chord dead load.
 - 4.3. Bottom chord live load.
 - 4.4. Bottom chord dead load.
 - 4.5. Concentrated loads and their points of application.
 - 4.6. Controlling wind and earthquake loads.
5. Adjustments to lumber and joint connector design values for conditions of use.
6. Each reaction force and direction.
7. Joint connector type and description such as size, thickness or gage and the dimensioned location of each joint connector except where symmetrically located relative to the joint interface.
8. Lumber size, species and *grade for each member*.
9. Connection requirements for:
 - 9.1. Truss to girder-truss.
 - 9.2. Truss ply to ply.
 - 9.3. Field splices.

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TABLE N1102.1.2 (R402.1.2)
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT^a

CLIMATE ZONE	FENESTRATION U-FACTOR ^b	SKYLIGHT ^b U-FACTOR	GLAZED FENESTRATION SHGC ^{b,c}	CEILING R-VALUE	WOOD FRAME WALL R-VALUE	MASS WALL R-VALUE ^e	FLOOR R-VALUE	BASEMENT ^c WALL R-VALUE	SLAB ^d R-VALUE & DEPTH	CRAWL SPACE ^e WALL R-VALUE
1	NR	0.75	0.25	30	13	3/4	13	0	0	0
2	0.40	0.65	0.25	38	13	4/6	13	0	0	0
3	0.32	0.55	0.25	38	20 or 13 + 5 ^h	8/13	19	5/13 ⁱ	0	5/13
4 except Marine	0.32	0.55	0.40	49 38	20 or 13 + 5^h 13	8/13 5/10	19	10/13	10, 2 ft	10/13
5 and Marine 4	0.30	0.55	NR	49	20 or 13 + 5 ^h	13/17	30 ^g	15/19	10, 2 ft	15/19
6	0.30	0.55	NR	49	20 + 5 ^h or 13 + 10 ^h	15/20	30 ^g	15/19	10, 4 ft	15/19
7 and 8	0.30	0.55	NR	49	20 + 5 ^h or 13 + 10 ^h	19/21	38 ^g	15/19	10, 4 ft	15/19

For SI: 1 foot = 304.8 mm.

NR = Not Required.

- R*-values are minimums. *U*-factors and SHGC are maximums. Where insulation is installed in a cavity that is less than the label or design thickness of the insulation, the installed *R*-value of the insulation shall be not less than the *R*-value specified in the table.
- The fenestration *U*-factor column excludes skylights. The SHGC column applies to all glazed fenestration.
Exception: In Climate Zones 1 through 3, skylights shall be permitted to be excluded from glazed fenestration SHGC requirements provided that the SHGC for such skylights does not exceed 0.30.
- "10/13" means R-10 continuous insulation on the interior or exterior of the home or R-13 cavity insulation on the interior of the basement wall. "15/19" means R-15 continuous insulation on the interior or exterior of the home or R-19 cavity insulation on the interior of the basement wall. Alternatively, compliance with "15/19" shall be R-13 cavity insulation on the interior of the basement wall plus R-5 continuous insulation on the interior or exterior of the home.
- R-5 insulation shall be provided under the full slab area of a heated slab in addition to the required slab edge insulation *R*-value for slabs, as indicated in the table. The slab edge insulation for heated slabs shall not be required to extend below the slab.
- There are no SHGC requirements in the Marine Zone.
- Basement wall insulation shall not be required in warm-humid locations as defined by Figure N1101.7 and Table N1101.7.
- Alternatively, insulation sufficient to fill the framing cavity providing not less than an *R*-value of R-19.
- The first value is cavity insulation, the second value is continuous insulation. Therefore, as an example, "13+5" means R-13 cavity insulation plus R-5 continuous insulation.
- Mass walls shall be in accordance with Section N1102.2.5. The second *R*-value applies where more than half of the insulation is on the interior of the mass wall.

TABLE N1102.1.4 (R402.1.4)
EQUIVALENT U-FACTORS^a

CLIMATE ZONE	FENESTRATION U-FACTOR	SKYLIGHT U-FACTOR	CEILING U-FACTOR	FRAME WALL U-FACTOR	MASS WALL U-FACTOR ^b	FLOOR U-FACTOR	BASEMENT WALL U-FACTOR	CRAWL SPACE WALL U-FACTOR
1	0.50	0.75	0.035	0.084	0.197	0.064	0.360	0.477
2	0.40	0.65	0.030	0.084	0.165	0.064	0.360	0.477
3	0.32	0.55	0.030	0.060	0.098	0.047	0.091 ^c	0.136
4 except Marine	0.32	0.55	0.030 0.026	0.084 0.060	0.141 0.098	0.047	0.059	0.065
5 and Marine 4	0.30	0.55	0.026	0.060	0.082	0.033	0.050	0.055
6	0.30	0.55	0.026	0.045	0.060	0.033	0.050	0.055
7 and 8	0.30	0.55	0.026	0.045	0.057	0.028	0.050	0.055

- Nonfenestration *U*-factors shall be obtained from measurement, calculation or an approved source.
- Mass walls shall be in accordance with Section N1102.2.5. Where more than half the insulation is on the interior, the mass wall *U*-factors shall not exceed 0.17 in Climate Zone 1, 0.14 in Climate Zone 2, 0.12 in Climate Zone 3, 0.087 in Climate Zone 4 except Marine, 0.065 in Climate Zone 5 and Marine 4, and 0.057 in Climate Zones 6 through 8.
- In warm-humid locations as defined by Figure N1101.7 and Table N1101.7, the basement wall *U*-factor shall not exceed 0.360.

N1102.2.5 (R402.2.5) Mass walls. Mass walls where used as a component of the building thermal envelope shall be one of the following:

- Above-ground walls of concrete block, concrete, insulated concrete form, masonry cavity, brick but not brick veneer, adobe, compressed earth block, rammed earth, solid timber or solid logs.
- Any wall having a heat capacity greater than or equal to 6 Btu/ft² • °F (123 kJ/m² • K).

"Table N1102.1.2 or"

N1102.2.6 (R402.2.6) Steel-frame ceilings, walls, and floors. Steel-frame ceilings, walls, and floors shall comply with the insulation requirements of Table N1102.2.6 or the *U*-factor requirements of Table N1102.1.4. The calculation of the *U*-factor for a steel-frame envelope assembly shall use a series-parallel path calculation method.

N1102.2.7 (R402.2.7) Walls with partial structural sheathing. Where Section N1102.1.2 requires continuous insulation on exterior walls and structural sheathing covers 40 percent or less of the gross area of all exterior

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room with a thermal isolation from conditioned space shall comply with the building thermal envelope requirements of this code.

N1102.3 (R402.3) Fenestration (Prescriptive). In addition to the requirements of Section N1102, fenestration shall comply with Sections N1102.3.1 through N1102.3.5.

N1102.3.1 (R402.3.1) U-factor. An area-weighted average of fenestration products shall be permitted to satisfy the U-factor requirements.

N1102.3.2 (R402.3.2) Glazed fenestration SHGC. An area-weighted average of fenestration products more than 50-percent glazed shall be permitted to satisfy the SHGC requirements.

Dynamic glazing shall be permitted to satisfy the SHGC requirements of Table N1102.1.2 provided that the ratio of the higher to lower labeled SHGC is greater than or equal to 2.4, and the dynamic glazing is automatically controlled to modulate the amount of solar gain into the space in multiple steps. Dynamic glazing shall be considered separately from other fenestration, and area-weighted averaging with other fenestration that is not dynamic glazing shall be prohibited.

Exception: Dynamic glazing shall not be required to comply with this section where both the lower and higher labeled SHGC comply with the requirements of Table N1102.1.2.

N1102.3.3 (R402.3.3) Glazed fenestration exemption. Not greater than 15 square feet (1.4 m²) of glazed fenestration per dwelling unit shall be exempt from the U-factor and SHGC requirements in Section N1102.1.2. This exemption shall not apply to the U-factor alternative in Section N1102.1.4 and the Total UA alternative in Section N1102.1.5.

N1102.3.4 (R402.3.4) Opaque door exemption. One side-hinged opaque door assembly not greater than 24 square feet (2.22 m²) in area shall be exempt from the U-factor requirement in Section N1102.1.2. This exemption shall not apply to the U-factor alternative in Section N1102.1.4 and the Total UA alternative in Section N1102.1.5.

N1102.3.5 (R402.3.5) Sunroom fenestration. Sunrooms enclosing conditioned space shall comply with the fenestration requirements of this code.

New fenestration separating the sunroom with thermal isolation from conditioned space shall comply with the building thermal envelope requirements of this code.

Exception: In Climate Zones 2 through 8, for sunrooms with thermal isolation and enclosing conditioned space, the fenestration U-factor shall not exceed 0.45 and the skylight U-factor shall not exceed 0.70.

N1102.4 (R402.4) Air leakage (Mandatory). The building thermal envelope shall be constructed to limit air leakage in accordance with the requirements of Sections N1102.4.1 through N1102.4.5.

N1102.4.1 (R402.4.1) Building thermal envelope. The building thermal envelope shall comply with Sections N1102.4.1.1 and N1102.4.1.2. The sealing methods

between dissimilar materials shall allow for differential expansion and contraction. "and visual inspection option"

N1102.4.1.1 (R402.4.1.1) Installation. The components of the building thermal envelope as indicated in Table N1102.4.1.1 shall be installed in accordance with the manufacturer's instructions and the criteria indicated in Table N1102.4.1.1, as applicable to the method of construction. Where required by the building official, an approved third party shall inspect all components and verify compliance.

N1102.4.1.2 (R402.4.1.2) Testing. The building or dwelling unit shall be tested and verified as having an air leakage rate of not exceeding five air changes per hour in Climate Zones 1 and 2, and three air changes per hour in Climate Zones 3 through 8. Testing shall be conducted in accordance with RESNET/ICC 380, ASTM E779 or ASTM E1827 and reported at a pressure of 0.2 inch w.g. (50 Pascals). Where required by the building official, testing shall be conducted by an approved third party. A written report of the results of the test shall be signed by the party conducting the test and provided to the building official. Testing shall be performed at any time after creation of all penetrations of the building thermal envelope.

During testing:

1. Exterior windows and doors, fireplace and stove doors shall be closed, but not sealed, beyond the intended weatherstripping or other infiltration control measures.
2. Dampers including exhaust, intake, makeup air, backdraft and flue dampers shall be closed, but not sealed beyond intended infiltration control measures.
3. Interior doors, where installed at the time of the test, shall be open.
4. Exterior or interior terminations for continuous ventilation systems shall be sealed.
5. Heating and cooling systems, where installed at the time of the test, shall be turned off.
6. Supply and return registers, where installed at the time of the test, shall be fully open.

N1102.4.2 (R402.4.2) Fireplaces. New wood-burning fireplaces shall have tight-fitting flue dampers or doors, and outdoor combustion air. Where using tight-fitting doors on factory-built fireplaces listed and labeled in accordance with UL 127, the doors shall be tested and listed for the fireplace.

N1102.4.3 (R402.4.3) Fenestration air leakage. Windows, skylights and sliding glass doors shall have an air infiltration rate of not greater than 0.3 cfm per square foot (1.5 L/s/m²), and for swinging doors not greater than 0.5 cfm per square foot (2.6 L/s/m²), when tested in accordance with NFRC 400 or AAMA/WDMA/CSA 101/I.S.2/A440 by an accredited, independent laboratory and listed and labeled by the manufacturer.

Exception: Site-built windows, skylights and doors.

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N1102.4.4 (R402.4.4) Rooms containing fuel-burning appliances. In *Climate Zones* 3 through 8, where open combustion air ducts provide combustion air to open combustion fuel-burning appliances, the appliances and combustion air opening shall be located outside the *building thermal envelope* or enclosed in a room that is isolated from inside the thermal envelope. Such rooms shall be sealed and insulated in accordance with the envelope requirements of Table N1102.1.2, where the walls, floors and ceilings shall meet a minimum of the *basement wall* R-value requirement. The door into the room shall be fully gasketed and any water lines and ducts in the room insulated in accordance with Section N1103. The combustion air duct shall be insulated where it passes through *conditioned space* to an R-value of not less than R-8.

Exceptions:

1. Direct vent appliances with both intake and exhaust pipes installed continuous to the outside.
2. Fireplaces and stoves complying with Sections N1102.4.2 and R1006.

N1102.4.5 (R402.4.5) Recessed lighting. Recessed luminaires installed in the *building thermal envelope* shall be sealed to limit air leakage between conditioned and *unconditioned spaces*. Recessed luminaires shall be IC-rated and labeled as having an air leakage rate of not greater than 2.0 cfm (0.944 L/s) when tested in accordance with ASTM E283 at a pressure differential of 1.57 psf (75 Pa). Recessed luminaires shall be sealed with a gasket or caulked between the housing and the interior wall or ceiling covering.

N1102.5 (R402.5) Maximum fenestration U-factor and SHGC (Mandatory). The area-weighted average maximum fenestration U-factor permitted using tradeoffs from Section N1102.1.5 or N1105 shall be 0.48 in *Climate Zones* 4 and 5 and 0.40 in *Climate Zones* 6 through 8 for vertical fenestration, and 0.75 in *Climate Zones* 4 through 8 for skylights. The area-weighted average maximum fenestration SHGC permitted using tradeoffs from Section N1105 in *Climate Zones* 1 through 3 shall be 0.50.

SECTION N1103 (R403) SYSTEMS

N1103.1 (R403.1) Controls (Mandatory). Not less than one thermostat shall be provided for each separate heating and cooling system.

N1103.1.1 (R403.1.1) Programmable thermostat. The thermostat controlling the primary heating or cooling system of the dwelling unit shall be capable of controlling the heating and cooling system on a daily schedule to maintain different temperature set points at different times of the day. This thermostat shall include the capability to set back or temporarily operate the system to maintain *zone* temperatures of not less than 55°F (13°C) to not greater than 85°F (29°C). The thermostat shall be programmed initially by the manufacturer with a heating temperature setpoint of not

greater than 70°F (21°C) and a cooling temperature setpoint of not less than 78°F (26°C).

N1103.1.2 (R403.1.2) Heat pump supplementary heat (Mandatory). Heat pumps having supplementary electric-resistance heat shall have controls that, except during defrost, prevent supplemental heat operation when the heat pump compressor can meet the heating load.

N1103.2 (R403.2) Hot water boiler outdoor temperature setback. Hot water boilers that supply heat to the *building* through one- or two-pipe heating systems shall have an outdoor setback control that decreases the boiler water temperature based on the outdoor temperature.

N1103.3 (R403.3) Ducts. Ducts and air handlers shall be installed in accordance with Sections N1103.3.1 through N1103.3.8.

N1103.3.1 (R403.3.1) Insulation (Prescriptive). Supply and return ducts in attics shall be insulated to an R-value of not less than R-8 for ducts 3 inches (76 mm) in diameter and larger and not less than R-6 for ducts smaller than 3 inches (76 mm) in diameter. Supply and return ducts in other portions of the *building* shall be insulated to not less than R-6 for ducts 3 inches (76 mm) in diameter and to not less than R-4.2 for ducts smaller than 3 inches (76.2 mm) in diameter.

Exception: Ducts or portions thereof located completely inside the *building thermal envelope*.

N1103.3.2 (R403.3.2) Sealing (Mandatory). Ducts, air handlers and filter boxes shall be sealed. Joints and seams shall comply with Section M1601.4.1.

N1103.3.2.1 (R403.3.2.1) Sealed air handler. Air handlers shall have a manufacturer's designation for an air leakage of not greater than 2 percent of the design airflow rate when tested in accordance with ASHRAE 193.

N1103.3.3 (R403.3.3) Duct testing (Mandatory). Ducts shall be pressure tested to determine air leakage by one of the following methods:

1. Rough-in test: Total leakage shall be measured with a pressure differential of 0.1 inch w.g. (25 Pa) across the system, including the manufacturer's air handler enclosure if installed at the time of the test. Registers shall be taped or otherwise sealed during the test.
2. Postconstruction test: Total leakage shall be measured with a pressure differential of 0.1 inch w.g. (25 Pa) across the entire system, including the manufacturer's air handler enclosure. Registers shall be taped or otherwise sealed during the test.

Exceptions:

1. A duct air-leakage test shall not be required where the ducts and air handlers are located entirely within the *building thermal envelope*.
2. A duct air-leakage test shall not be required for ducts serving heat or energy recovery ventilators that are not integrated with ducts serving heating or cooling systems.

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A written report of the results of the test shall be signed by the party conducting the test and provided to the *building official*.

N1103.3.4 (R403.3.4) Duct leakage ^{Optional} ~~(Prescriptive)~~. The total leakage of the ducts, where measured in accordance with Section R403.3.3, shall be as follows:

1. Rough-in test: The total leakage shall be less than or equal to 4 cubic feet per minute (113.3 L/min) per 100 square feet (9.29 m²) of conditioned floor area where the air handler is installed at the time of the test. Where the air handler is not installed at the time of the test, the total leakage shall be less than or equal to 3 cubic feet per minute (85 L/min) per 100 square feet (9.29 m²) of conditioned floor area.
2. Postconstruction test: Total leakage shall be less than or equal to 4 cubic feet per minute (113.3 L/min) per 100 square feet (9.29 m²) of conditioned floor area.

N1103.3.5 (R403.3.5) Building cavities (Mandatory). *Building* framing cavities shall not be used as ducts or plenums.

N1103.3.6 (R403.3.6) Ducts buried within ceiling insulation. Where supply and return air ducts are partially or completely buried in ceiling insulation, such ducts shall comply with all of the following:

1. The supply and return duct shall have an insulation *R*-value not less than *R*-8.
2. At all points along each duct, the sum of the ceiling insulation *R*-values against and above the top of the duct, and against and below the bottom of the duct shall be not less than *R*-19, excluding the *R*-value of the duct insulation.
3. In *Climate Zones* 1A, 2A and 3A, the supply ducts shall be completely buried within ceiling insulation, insulated to an *R*-value of not less than *R*-13 and in compliance with the vapor retarder requirements of Section M1601.4.6.

Exception: Sections of the supply duct that are less than 3 feet (914 mm) from the supply outlet shall not be required to comply with these requirements.

N1103.3.6.1 (R403.3.6.1) Effective *R*-value of deeply buried ducts. Where using a simulated energy performance analysis, sections of ducts that are installed in accordance with Section N1103.3.6, located directly on, or within 5.5 inches (140 mm) of the ceiling, surrounded with blown-in attic insulation having an *R*-value of *R*-30 or greater and located such that the top of the duct is not less than 3.5 inches (89 mm) below the top of the insulation, shall be considered as having an effective duct insulation *R*-value of *R*-25.

N1103.3.7 (R403.3.7) Ducts located in conditioned space. For ducts to be considered as inside a *conditioned space*, such ducts shall comply with either of the following:

1. The duct system is located completely within the *continuous air barrier* and within the *building thermal envelope*.
2. The ducts are buried within ceiling insulation in accordance with Section N1103.3.6 and all of the following conditions exist:
 - 2.1. The air handler is located completely within the *continuous air barrier* and within the *building thermal envelope*.
 - 2.2. The duct leakage, as measured either by a rough-in test of the ducts or a post-construction total system leakage test to outside the *building thermal envelope* in accordance with Section N1103.3.4, is less than or equal to 1.5 cubic feet per minute (42.5 L/min) per 100 square feet (9.29 m²) of conditioned floor area served by the duct system.
 - 2.3. The ceiling insulation *R*-value installed against and above the insulated duct is greater than or equal to the proposed ceiling insulation *R*-value, less the *R*-value of the insulation on the duct.

N1103.4 (R403.4) Mechanical system piping insulation (Mandatory). Mechanical system piping capable of carrying fluids greater than 105°F (41°C) or less than 55°F (13°C) shall be insulated to an *R*-value of not less than *R*-3.

N1103.4.1 (R403.4.1) Protection of piping insulation. Piping insulation exposed to weather shall be protected from damage, including that caused by sunlight, moisture, equipment maintenance and wind. The protection shall provide shielding from solar radiation that can cause degradation of the material. Adhesive tape shall be prohibited.

N1103.5 (R403.5) Service hot water systems. Energy conservation measures for service hot water systems shall be in accordance with Sections N1103.5.1 through N1103.5.4.

N1103.5.1 (R403.5.1) Heated water circulation and temperature maintenance systems (Mandatory). Heated water circulation systems shall be in accordance with Section N1103.5.1.1. Heat trace temperature maintenance systems shall be in accordance with Section N1103.5.1.2. Automatic controls, temperature sensors and pumps shall be *accessible*. Manual controls shall be readily *accessible*.

N1103.5.1.1 (R403.5.1.1) Circulation systems. Heated water circulation systems shall be provided with a circulation pump. The system return pipe shall be a dedicated return pipe or a cold water supply pipe. Gravity and thermosyphon circulation systems shall be prohibited. Controls for circulating hot water system pumps shall start the pump based on the identification of a demand for hot water within the occupancy. The controls shall automatically turn off the pump when the water in the circulation loop is at the desired temperature and when there is no demand for hot water.

N1103.5.1.2 (R403.5.1.2) Heat trace systems. Electric heat trace systems shall comply with IEEE 515.1 or UL 515. Controls for such systems shall automatically adjust the energy input to the heat tracing to maintain

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the desired water temperature in the piping in accordance with the times when heated water is used in the occupancy.

N1103.5.2 (R403.5.2) Demand recirculation water systems. Demand recirculation water systems shall have controls that comply with both of the following:

1. The controls shall start the pump upon receiving a signal from the action of a user of a fixture or appliance, sensing the presence of a user of a fixture or sensing the flow of hot or tempered water to a fixture fitting or appliance.
2. The controls shall limit the temperature of the water entering the cold water piping to not greater than 104°F (40°C).

N1103.5.3 (R403.5.3) Hot water pipe insulation (Prescriptive). Insulation for hot water piping with a thermal resistance, *R*-value, of not less than *R*-3 shall be applied to the following:

1. Piping $\frac{3}{4}$ inch (19 mm) and larger in nominal diameter.
2. Piping serving more than one dwelling unit.
3. Piping located outside the conditioned space.
4. Piping from the water heater to a distribution manifold.
5. Piping located under a floor slab.
6. Buried piping.
7. Supply and return piping in recirculation systems other than demand recirculation systems.

N1103.5.4 (R403.5.4) Drain water heat recovery units. Drain water heat recovery units shall comply with CSA B55.2. Drain water heat recovery units shall be tested in accordance with CSA B55.1. Potable water-side pressure loss of drain water heat recovery units shall be less than 3 psi (20.7 kPa) for individual units connected to one or two showers. Potable water-side pressure loss of drain water heat recovery units shall be less than 2 psi (13.8 kPa) for individual units connected to three or more showers.

N1103.6 (R403.6) Mechanical ventilation (Mandatory). The building shall be provided with ventilation that complies with the requirements of Section M1505 or with other approved means of ventilation. Outdoor air intakes and exhausts shall have automatic or gravity dampers that close when the ventilation system is not operating.

N1103.6.1 (R403.6.1) Whole-house mechanical ventilation system fan efficacy. Fans used to provide whole-house mechanical ventilation shall meet the efficacy requirements of Table N1103.6.1.

Exception: Where an air handler that is integral to tested and listed HVAC equipment is used to provide whole-house mechanical ventilation, the air handler shall be powered by an electronically commutated motor. "When implemented by the Building official"

N1103.7 (R403.7) Equipment sizing and efficiency rating (Mandatory). Heating and cooling equipment shall be sized in accordance with ACCA Manual S based on building loads calculated in accordance with ACCA Manual J or other approved heating and cooling calculation methodologies. New or replacement heating and cooling equipment shall have an efficiency rating equal to or greater than the minimum required by federal law for the geographic location where the equipment is installed.

N1103.8 (R403.8) Systems serving multiple dwelling units (Mandatory). Systems serving multiple dwelling units shall comply with Sections C403 and C404 of the *International Energy Conservation Code*—Commercial Provisions instead of Section N1103.

N1103.9 (R403.9) Snow melt system controls (Mandatory). Snow- and ice-melting systems, supplied through energy service to the building, shall include automatic controls capable of shutting off the system when the pavement temperature is greater than 50°F (10°C) and precipitation is not falling, and an automatic or manual control that will allow shutoff when the outdoor temperature is greater than 40°F (4.8°C).

N1103.10 (R403.10) Pools and permanent spa energy consumption (Mandatory). The energy consumption of pools and permanent spas shall be in accordance with Sections N1103.10.1 through N1103.10.3.

N1103.10.1 (R403.10.1) Heaters. The electric power to heaters shall be controlled by a readily accessible on-off switch that is an integral part of the heater mounted on the exterior of the heater, or external to and within 3 feet (914 mm) of the heater. Operation of such switch shall not change the setting of the heater thermostat. Such switches shall be in addition to a circuit breaker for the power to the heater. Gas-fired heaters shall not be equipped with continuously burning ignition pilots.

TABLE N1103.6.1 (R403.6.1)
WHOLE-HOUSE MECHANICAL VENTILATION SYSTEM FAN EFFICACY*

FAN LOCATION	AIR FLOW RATE MINIMUM (CFM)	MINIMUM EFFICACY (CFM/WATT)	AIR FLOW RATE MAXIMUM (CFM)
HRV or ERV	Any	1.2 cfm/watt	Any
Range hoods	Any	2.8 cfm/watt	Any
In-line fan	Any	2.8 cfm/watt	Any
Bathroom, utility room	10	1.4 cfm/watt	< 90
Bathroom, utility room	90	2.8 cfm/watt	Any

For SI: 1 cubic foot per minute = 28.3 L/min.

a. When tested in accordance with HVI Standard 916.

Part VII—Plumbing

CHAPTER 25

PLUMBING ADMINISTRATION

User notes:

About this chapter: Chapter 25 covers regulations for existing plumbing installations and testing of new or repaired systems. These general requirements can be superseded by more specific requirements for certain applications in Chapters 26 through 33.

Code development reminder: Code change proposals to this chapter will be considered by the IRC—Mechanical/Plumbing Code Development Committee during the 2018 (Group A) Code Development Cycle. See explanation on page iv.

SECTION P2501 GENERAL

P2501.1 Scope. The provisions of this chapter shall establish the general administrative requirements applicable to plumbing systems and inspection requirements of this code.

P2501.2 Application. In addition to the general administration requirements of Chapter 1, the administrative provisions of this chapter shall apply to the plumbing requirements of Chapters 25 through 33.

SECTION P2502 EXISTING PLUMBING SYSTEMS

P2502.1 Existing building sewers and building drains. Where the entire sanitary drainage system of an existing building is replaced, existing *building drains* under concrete slabs and existing *building sewers* that will serve the new system shall be internally examined to verify that the piping is sloping in the correct direction, is not broken, is not obstructed and is sized for the drainage load of the new plumbing drainage system to be installed.

P2502.2 Additions, alterations or repairs. Additions, *alterations*, renovations or repairs to any plumbing system shall conform to that required for a new plumbing system without requiring the existing plumbing system to comply with the requirements of this code. Additions, *alterations* or repairs shall not cause an existing system to become unsafe, unsanitary or overloaded.

Minor additions, *alterations*, renovations and repairs to existing plumbing systems shall be permitted in the same manner and arrangement as in the existing system, provided that such repairs or replacement are not hazardous and are *approved*.

SECTION P2503 INSPECTION AND TESTS

P2503.1 Inspection required. New plumbing work and parts of existing systems affected by new work or *alterations* shall

be inspected by the *building official* to ensure compliance with the requirements of this code.

P2503.2 Concealment. A plumbing or drainage system, or part thereof, shall not be covered, concealed or put into use until it has been tested, inspected and *approved* by the *building official*.

P2503.3 Responsibility of permittee. Test equipment, materials and labor shall be furnished by the permittee.

P2503.4 Building sewer testing. The *building sewer* shall be tested by insertion of a test plug at the point of connection with the public sewer, filling the *building sewer* with water and pressurizing the sewer to not less than a 10-foot (3048 mm) head of water. The test pressure shall not decrease during a period of not less than 15 minutes. The *building sewer* shall be watertight at all points.

A forced sewer test shall consist of pressurizing the piping to a pressure of not less than 5 psi (34.5 kPa) greater than the pump rating and maintaining such pressure for not less than 15 minutes. The forced sewer shall be watertight at all points.

P2503.5 Drain, waste and vent systems testing. Rough-in and finished plumbing installations of drain, waste and vent systems shall be tested in accordance with Sections P2503.5.1 and P2503.5.2.

P2503.5.1 Rough plumbing. DWV systems shall be tested on completion of the rough piping installation by water or, for piping systems other than plastic, by air, without evidence of leakage. Either test shall be applied to the drainage system in its entirety or in sections after rough-in piping has been installed, as follows:

1. Water test. Each section shall be filled with water to a point not less than 5 feet (1524 mm) above the highest fitting connection in that section, or to the highest point in the completed system. Water shall be held in the section under test for a period of 15 minutes. The system shall prove leak free by visual inspection.
2. Air test. The portion under test shall be maintained at a gauge pressure of 5 pounds per square inch (psi) (34 kPa) or 10 inches of mercury column (34 kPa).

"except when specifically allowed by the Building Official"

GENERAL PLUMBING REQUIREMENTS

protected by steel shield plates. Such shield plates shall have a thickness of not less than 0.0575 inch (1.463 mm) (No. 16 Gage). Such plates shall cover the area of the pipe where the member is notched or bored, and shall extend not less than 2 inches (51 mm) above sole plates and below top plates.

P2603.3 Protection against corrosion. Metallic piping, except for cast iron, ductile iron and galvanized steel, shall not be placed in direct contact with steel framing members, concrete or masonry. Metallic piping shall not be placed in direct contact with corrosive soil. Where sheathing is used to prevent direct contact, the sheathing material thickness shall be not less than 0.008 inch (8 mil) (0.203 mm) and shall be made of plastic. Where sheathing protects piping that penetrates concrete or masonry walls or floors, the sheathing shall be installed in a manner that allows movement of the piping within the sheathing.

P2603.4 Pipes through foundation walls. A pipe that passes through a foundation wall shall be provided with a relieving arch, or a pipe sleeve shall be built into the foundation wall. The sleeve shall be two pipe sizes greater than the pipe passing through the wall.

P2603.5 Freezing. In localities having a winter design temperature of 32°F (0°C) or lower as shown in Table R301.2(1) of this code, a water, soil or waste pipe shall not be installed outside of a building, in exterior walls, in attics or crawl spaces, or in any other place subjected to freezing temperature unless adequate provision is made to protect it from freezing by insulation or heat or both. Water service pipe shall be installed not less than 12 inches (305 mm) deep and not less than 6 inches (152 mm) below the frost line.

P2603.5.1 Sewer depth. Building sewers that connect to private sewage disposal systems shall be not less than 12 [NUMBER] inches (mm) below finished grade at the point of septic tank connection. Building sewers shall be not less than [NUMBER] inches (mm) below grade.

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SECTION P2604 TRENCHING AND BACKFILLING

P2604.1 Trenching and bedding. Where trenches are excavated such that the bottom of the trench forms the bed for the pipe, solid and continuous load-bearing support shall be provided between joints. Where over-excavated, the trench shall be backfilled to the proper grade with compacted earth, sand, fine gravel or similar granular material. Piping shall not be supported on rocks or blocks at any point. Rocky or unstable soil shall be over-excavated by two or more pipe diameters and brought to the proper grade with suitable compacted granular material.

P2604.2 Water service and building sewer in same trench. Where the water service piping and building sewer piping is installed in same trench, the installation shall be in accordance with Section P2906.4.1.

P2604.3 Backfilling. Backfill shall be free from discarded construction material and debris. Backfill shall be free from rocks, broken concrete and frozen chunks until the pipe is covered by

not less than 12 inches (305 mm) of tamped earth. Backfill shall be placed evenly on both sides of the pipe and tamped to retain proper alignment. Loose earth shall be carefully placed in the trench in 6-inch (152 mm) layers and tamped in place.

P2604.4 Protection of footings. Trenching installed parallel to footings and walls shall not extend into the bearing plane of a footing or wall. The upper boundary of the bearing plane is a line that extends downward, at an angle of 45 degrees (0.79 rad) from horizontal, from the outside bottom edge of the footing or wall.

SECTION P2605 SUPPORT

P2605.1 General. Piping shall be supported in accordance with the following:

1. Piping shall be supported to ensure alignment and prevent sagging, and allow movement associated with the expansion and contraction of the piping system.
2. Piping in the ground shall be laid on a firm bed for its entire length, except where support is otherwise provided.
3. Hangers and anchors shall be of sufficient strength to maintain their proportional share of the weight of pipe and contents and of sufficient width to prevent distortion to the pipe. Hangers and strapping shall be of approved material that will not promote galvanic action.
4. Where horizontal pipes 4 inches (102 mm) and larger convey drainage or waste, and where a pipe fitting changes the flow direction greater than 45 degrees (0.79 rad), rigid bracing or other rigid support arrangements shall be installed to resist movement of the upstream pipe in the direction of flow. A change of flow direction into a vertical pipe shall not require the upstream pipe to be braced.
5. Piping shall be supported at distances not to exceed those indicated in Table P2605.1.

SECTION P2606 PENETRATIONS

P2606.1 Sealing of annular spaces. The annular space between the outside of a pipe and the inside of a pipe sleeve or between the outside of a pipe and an opening in a building envelope wall, floor, or ceiling assembly penetrated by a pipe shall be sealed with caulking material or foam sealant or closed with a gasketing system. The caulking material, foam sealant or gasketing system shall be designed for the conditions at the penetration location and shall be compatible with the pipe, sleeve and building materials in contact with the sealing materials. Annular spaces created by pipes penetrating fire-resistance-rated assemblies or membranes of such assemblies shall be sealed or closed in accordance with the building portion of this code.

WATER SUPPLY AND DISTRIBUTION

TABLE P2903.6(1)—continued
CONVERSIONS FROM WATER SUPPLY FIXTURE UNIT TO GALLON PER MINUTE FLOW RATES

SUPPLY SYSTEMS PREDOMINANTLY FOR FLUSH TANKS			SUPPLY SYSTEMS PREDOMINANTLY FOR FLUSHOMETER VALVES		
Load	Demand		Load	Demand	
(Water supply fixture units)	(Gallons per minute)	(Cubic feet per minute)	(Water supply fixture units)	(Gallons per minute)	(Cubic feet per minute)
25	21.5	2.87412	25	38.0	5.07984
30	23.3	3.114744	30	42.0	5.61356
35	24.9	3.328632	35	44.0	5.88192
40	26.3	3.515784	40	46.0	6.14928
45	27.7	3.702936	45	48.0	6.41664
50	29.1	3.890088	50	50.0	6.684

For SI: 1 gallon per minute = 3.785 L/m, 1 cubic foot per minute = 0.4719 L/s.

P2903.9.2 Water heater valve. A readily accessible full-open valve shall be installed in the cold-water supply pipe to each water heater at or near the water heater.

P2903.9.3 Fixture valves and access. Shutoff valves shall be required on each fixture supply pipe to each plumbing appliance and to each plumbing fixture other than bathtubs and showers. Valves serving individual plumbing fixtures, plumbing appliances, risers and branches shall be accessible.

P2903.9.4 Valve requirements. Valves shall be compatible with the type of piping material installed in the system. Valves shall conform to one of the standards indicated in Table P2903.9.4 or shall be *approved*. Valves intended to supply drinking water shall meet the requirements of NSF 61.

P2903.9.5 Valves and outlets prohibited below grade. Potable water outlets and combination stop-and-waste valves shall not be installed underground or below grade. Freezeproof yard hydrants that drain the riser into the ground are considered to be stop-and-waste valves.

Exception: Installation of freezeproof yard hydrants that drain the riser into the ground shall be permitted if the potable water supply to such hydrants is protected upstream of the hydrants in accordance with Section P2902 and the hydrants are permanently identified as nonpotable outlets by *approved* signage that reads as follows: "CAUTION, NONPOTABLE WATER. DO NOT DRINK."

P2903.10 Hose bibb. Hose bibbs subject to freezing, including the "frostproof" type, shall be equipped with an accessible stop-and-waste-type valve inside the building so that they can be controlled and drained during cold periods.

Exception: Frostproof hose bibbs installed such that the stem extends through the building insulation into an open heated or semiconditioned space need not be separately valved (see Figure P2903.10).

P2903.11 Drain water heat recovery units. Drain water heat recovery units shall be in accordance with Section N1103.5.4.

"When installed" "shall meet the following requirements"

SECTION P2904 DWELLING UNIT FIRE SPRINKLER SYSTEMS

P2904.1 General. The design and installation of residential fire sprinkler systems shall be in accordance with NFPA 13D or Section P2904, which shall be considered to be equivalent to NFPA 13D. Partial residential sprinkler systems shall be permitted to be installed only in buildings not required to be equipped with a residential sprinkler system. Section P2904 shall apply to stand-alone and multipurpose wet-pipe sprinkler systems that do not include the use of antifreeze. A multipurpose fire sprinkler system shall provide domestic water to both fire sprinklers and plumbing fixtures. A stand-alone sprinkler system shall be separate and independent from the water distribution system. A backflow preventer shall not be required to separate a sprinkler system from the water distribution system, provided that the sprinkler system complies with all of the following:

1. The system complies with NFPA 13D or Section P2904.
2. The piping material complies with Section P2906.
3. The system does not contain antifreeze.
4. The system does not have a fire department connection.

P2904.1.1 Required sprinkler locations. Sprinklers shall be installed to protect all areas of a *dwelling unit*.

Exceptions:

1. Attics, crawl spaces and normally unoccupied concealed spaces that do not contain fuel-fired appliances do not require sprinklers. In attics, crawl spaces and normally unoccupied concealed spaces that contain fuel-fired equipment, a sprinkler shall be installed above the equipment; however, sprinklers shall not be required in the remainder of the space.
2. Clothes closets, linen closets and pantries not exceeding 24 square feet (2.2 m²) in area, with the smallest dimension not greater than 3 feet (915 mm) and having wall and ceiling surfaces of gypsum board.