Code Check® Seventh Edition

By DOUGLAS HANSEN & REDWOOD KARDON

Illustrations & layout by Paddy Morrissey

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Code Check is a field inspection guide to important code requirements and common code violations in the construction of 1- & 2-family dwellings & townhouses. The primary reference is the 2012 edition of the *International Residential Code® for One- and Two-Family Dwellings*, published by the International Code Council (the IRC).

Codes are adopted at different times in different places around the country. New editions come out every three years, and some states make extensive modifications to the model codes prior to adoption. Since the code used in a particular area could vary, we include references to the two most commonly used codes for every item in the book. Significant code changes are highlighted in the text and summarized on the inside back cover. For users in areas still using the 2009 IRC, the "building" section of the book cites both the 2009 and 2012 references. To determine the codes in your area, contact your local building department and check our web site at www.codecheck.com.

For updates to this book, and other valuable news, articles, and information, visit www.codecheck.com.

CODES REFERENCED IN CODE CHECK		
Organization	**Code**	
ICC	2009 & 2012 IRC	International Residential Code
IAPMO	2009 & 2012 UPC	Uniform Plumbing Code
IAPMO	2009 & 2012 UMC	Uniform Mechanical Code
NFPA	2009 & 2011 NEC	National Electrical Code

The code changes referenced on the inside back cover compare the most recent codes in this table to the earlier editions.

ABBREVIATIONS

A = amp(s) (ex: a15A breaker)
ABS = acrylonitrile-butadiene-styrene plastic pipe
ACH = air changes per hour
AHJ = authority having jurisdiction
AMI = in accordance with manufacturer's instructions
ASCE = American Society of Civil Engineers
ASTM = American Society for Testing & Materials
AWG = American Wire Gauge
B (vent) = gas appliance vent, usually double-wall
BO = building official
Btu = British thermal unit
BWL = braced wall line
BWP = braced wall panel
CATV = cable television
cfm = cubic feet per minute
CPVC = chlorinated polyvinyl chloride plastic pipe
CSST = corrugated stainless-steel tubing
cu. = cubic (ex: 24 cu. ft.)
Cu = copper
DFU = drainage fixture unit(s)
DW = dishwasher
DWV = drain, waste & vent
e.g. = for example (exempli gratia)
EGC = equipment grounding conductor
EMT = electrical metallic tubing
ex: = example
FAU = forced-air unit (central furnace)
FLR = flood level rim
FMC = flexible metal conduit
ft. (after number) = foot, feet (ex: 5 ft.)
FVIR = flammable-vapor ignition-resistant
galv = galvanized
GB = gypsum board
GEC = grounding electrode conductor
GPM = gallons per minute
hp = horse power
ICF = insulating concrete forms
IMC = intermediate metal conduit
in. (after number) = inch(es) (ex: 24 in.)
IS = IAPMO Installation Standard
kw = kilowatt
L&L = listed & labeled
lav = lavatory (bathroom sink)
lb. = pound
LFMC = liquidtight flexible metal conduit
LFNC = liquidtight flexible nonmetallic conduit
LL = lot line dividing one lot from another or from a street
manu = manufacturer
max = maximum
min = minimum
mph = miles per hour
n/a = not applicable
NM = nonmetallic sheathed cable
O.C. = on center
PEX = cross-linked polyethylene plastic pipe (water pipe)
psf = pounds per square foot
psi = pounds per square inch
psig = pounds per square inch gauge
PT = Preservative-treated (wood)
PVC = polyvinyl chloride plastic water pipe or electrical conduit
recep = receptacle outlet (electrical)
RMC = rigid metal conduit
SDC = Seismic Design Category
SDC D = SDC D_0, D_1, & D_2
SE = service entrance
sq. = square (ex: 24 sq. in.)
UL = Underwriter's Laboratories, Inc.
W = electrical conductors rated for wet location
w/ = with
w/o = without
WC = water closet (toilet)
WH = water heater
WSFU = water supply fixture unit(s)
Zi = Zinc

MODEL CODE ORGANIZATIONS

ICC = The International Code Council
IAPMO = International Association of Plumbing and Mechanical Officials
NFPA = National Fire Protection Association

The IRC is a prescriptive guide to residential construction. It is intended primarily for wood-frame conventional construction within prescribed height limits and areas of wind and seismic design. When a project has aspects that exceed the prescriptive limits of the IRC, those aspects require an engineered design. Many houses will require design for certain specific portions, while the majority of the construction can be built prescriptively using the IRC. Some projects might be in wind, snow, or seismic areas that require all of the *structural* aspects be built to the International Building Code (IBC), while the *nonstructural* aspects are built to the IRC.

The information in this document is believed to be accurate; however, it is provided for informational purposes only and is not intended as a substitute for the full text of the referenced codes. Publication by The Taunton Press, ICC, and the authors should not be considered by the user to be a substitute for the advice of a registered design professional. Contact the local building department to learn what codes apply in your area as well as any local amendments and procedures.

KEY TO USING CODE CHECK

Each item with a checkbox refers to a **code rule**, and is followed by **code citations**. In the building section, most sections have only one column of code citations and they reference the numbers from the **2009 & 2012 IRC.** Two columns of references are used when the 2009 & 2012 IRC used different numberings. In the plumbing, mechanical, and electrical sections the left citation is from the **2012 IRC**, and the right column is from the **2012 UPC**, **2012 UMC**, or **2011 NEC**. Example from **p.22:**

Indoor Air as Sole Source **12 IRC** **12 UMC**

☐ Min volume of space 50 cu.ft./1kBtu/hr. **T18, F55** ____ [2407.5.1] {701.4.1}

This line says that appliances deriving all their combustion air from indoors must have a space at least 50 cu. ft. for each 1,000 Btu of the appliance rating. The rule is found in section 2407.5.1 of the IRC and 701.4.1 of the UMC. It is also shown in Table 18 and Figure 55.

When the code line text ends in "EXC" an exception follows the main rule, as in this example from **p.18**

☐ Valve ahead of union & ≤ 6 ft. of appliance **F41,42** EXC _ [2420.5.1] {1211.5}
• 50 ft OK if accessible identified valve at manifold ___ [2420.5.3] {Ø}

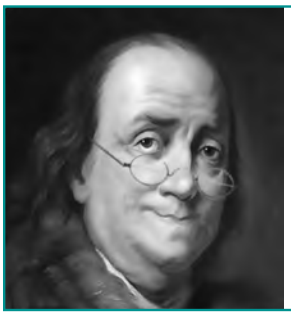
This line says that a gas shutoff valve is required within 6 ft. of each appliance, as shown in figures 41 & 42. The IRC has an exception that allows the valve to be 50 ft. from the appliance at an accessible labeled manifold. The UPC prohibits this practice, so the reference in that column is "Ø."

Code changes from the previous code edition are shown by placing the reference in a different color, and a superscript endnote to the table on **p.31**, as in this example from **p.20**

☐ Pan not req'd under tankless WHs _____ [2801.5][51] {n/a}

*The IRC does not intend to require a drain pan under a tankless water heater. The UPC does not have this rule, so it's reference is "n/a". This change is explained as change #51 on **p.31.***

Lumber dimensions, e.g. "2 x 4", are nominal dimensions unless including a fraction or otherwise stated.



***Benjamin Franklin** was chosen as the main character in our Code Check illustrations for a number of reasons. The "First American's" insatiable curiosity, scientific genius, and civic-mindedness drove him to study fire safety, safe exiting, public sanitation, improved heating methods, and of course, electricity. Franklin made major contributions to each of the four main disciplines of building inspection: Building, Plumbing, Mechanical, and Electrical.*
To find out more, visit:
www.codecheck.com/cc/Ben.html

PLANNING

Plans, Permits & Inspections — 09 & 12 IRC

- ☐ Approved plans & permit card on site _____ [106.3.1]
- ☐ Permits req'd for all work EXC _____ [105.1]
  - 1-story accessory structures ≤ 200 sq. ft., fences ≤ 7 ft.[1] high, retaining walls ≤ 4 ft. from bottom of footing to top of wall, water tanks on grade ≤ 5,000 gallons, sidewalks, driveways, painting, countertops, similar finish work, window awnings projecting ≤ 54 in., decks ≤ 200 sq. ft. & ≤ 30 in. above grade & not serving req'd exit door _____ [105.2][1]
- ☐ Inspection & approval prior to covering any work _____ [109.4]

Design

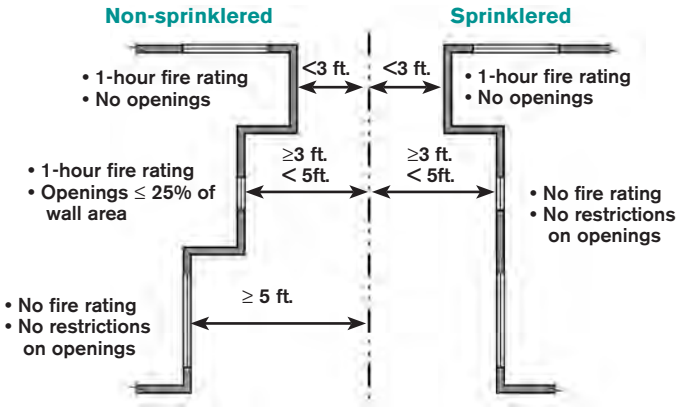
- ☐ Engineered design per IBC OK as alternative to IRC _____ [301.1.3]
- ☐ Determine climatic and geographic design criteria_____ [301.2]
- ☐ AHJ to determine wind speed from maps & topography _____ [T301.2]
- ☐ Special design (e.g. ASCE-7 or ICC-600) where maps indicate special wind regions or basic wind speed > 110 mph _____ [301.2.1.1][2]
- ☐ AHJ to determine seismic design category from IRC maps_____[301.2.2.1]
- ☐ AHJ may allow alternate determination of SDC E if all shear walls extend from foundation to top story & no cantilevers or irregularity_____ [301.2.2.1.2]

BUILDING LOCATION

Setbacks F1

	09 IRC	12 IRC
☐ Verify setbacks – unrated walls min 5 ft. to LL EXC	[T302.1]	{T302.1(1)}
• 3 ft. if compliant automatic sprinkler system present	[n/a]	{T302.1(2)}[3]
☐ No openings in walls < 3 ft. to LL EXC	[T302.1]	{T302.1}
• Openings in walls perpendicular to LL OK	[302.1X1]	{302.1X1}
• Facing dwellings & accessory structures on same lot	[302.1X2]	{302.1X2}
• Accessory structures that are exempt from permits	[302.1X3]	{302.1X3}
• Foundation vents	[302.1X5]	{302.1X5}
☐ Openings up to 25% of wall area OK > 3 ft. & ≤ 5 ft. EXC	[T302.1]	{T302.1}
• No limit > 3 ft. if automatic sprinkler system present	[n/a]	{T302.1(2)}[4]
☐ Projections (eaves) min. 5 ft. from LL EXC	[T302.1]	{T302.1(1)}
• 2 ft. OK if 1-hr. protected on underside	[T302.1]	{T302.1(1)}
• 3 ft. OK unrated if automatic sprinkler system present	[n/a]	{T302.1(2)}[3]
• 4 in. OK in detached garages 2 ft. from LL	[302.1X4]	{302.1X4}

FIG. 1 **Fire Separation Distances & Openings**



WALL FRAMING

Stud Framing — 09 & 12 IRC

- ☐ Size, spacing, notching & boring per tables **T4,F10** _____ [602.3.1]
- ☐ Studs must fully bear on min 2 in. nominal sole plate _____ [602.3.4]
- ☐ Corners req 3 studs min EXC _____ [F602.3(2)]
  - • 2 studs OK w/ cleats for attaching interior surfaces _____ [F602.3(2)]
- ☐ Single members headers allowed w/ spans per IRC T602.7.1 **F11** _ [602.7.1][8]

Top Plates

- ☐ Bearing wall intersections & corners must overlap _____ [602.3.2]
- ☐ End joints must offset 24 in. min (see **T7** for nailing) _____ [602.3.2]
- ☐ Joints need not be over studs _____ [602.3.2]
- ☐ Min 16 gauge 1 1/2 in. strap w /min 8 10d nails each side over notches or holes > 50% of plate width **F10** EXC _____ [602.6.1]
  - • Not req'd when structural panel sheathing covers notch _____ [602.6.1]

Cripple Walls

- ☐ Cripple wall < 14 in. sheathed or solidly blocked _____ [602.9]
- ☐ Studs ≥ studs above them, walls > 4 ft. sized as additional story _____ [602.9]

Wood Structural Panel Sheathing

- ☐ Panels req grade stamp from approved agency _____ [602.3]
- ☐ Fasten direct to framing members in accordance w/ **T7** _____ [602.3]

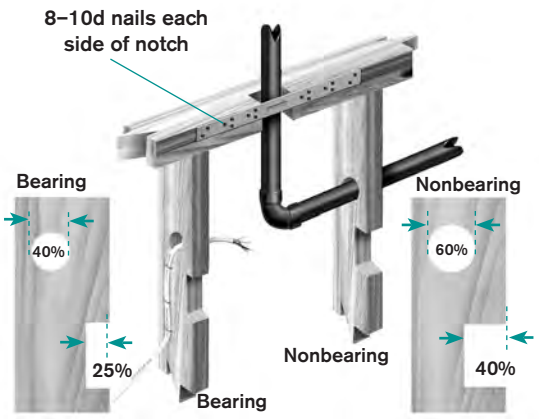
TABLE 4 STUD SIZING, SPACING, NOTCHING & BORING [T602.3(5)] & [602.6]

Stud Size	2×4	3×4	2×6
Bearing Walls (to 10ft. high)			
Supporting roof & ceiling	24 in. O.C.[A]	24 in. O.C.	24 in. O.C.
Roof & ceiling + 1 floor	16 in. O.C.[A]	24 in. O.C.	24 in. O.C.
Roof & ceiling + 2 floors	n/a	16 in. O.C.	16 in. O.C.
Notching **F9**	7/8 in.	7/8 in.	1 3/8 in.
Boring **F9**	1 3/8 in.	1 3/8 in.	2 3/16 in.
Boring 2 doubled consecutive	2 in.	2 in.	3 1/4 in.
Nonbearing Walls			
Notching **F9**	1 3/8 in.	1 3/8 in.	2 3/16 in.
Boring **F9**	2 in.	2 in.	3 1/4 in.

A. Limited to roof spans ≤32 ft.

FIG. 10

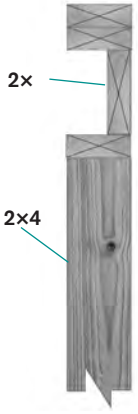
Notching & Boring Studs



60% hole OK on bearing walls if the studs are doubled & the holes do not pass through more than 2 successive studs.

FIG. 11

Single Member Header



WALL BRACING FOR WOOD FRAME BUILDINGS

Locations — 09 IRC / 12 IRC

- ☐ BWL is straight in line in plan view _____ [202] {602.10.1}
- ☐ Exterior walls max offset from braced wall line 4 ft. [602.10.1.4] {602.10.1.2}
- ☐ Max spacing of BWLs 25 ft. SDC D _____ [602.10.1.5] {T602.10.1.3}
- ☐ Max length from end 10 ft. (12.5 combined in 09) [602.10.1.4] {602.10.2.2}[9]
- ☐ Max. 20 ft. between braced wall panel ends in same BWL __ [n/a] {602.10.2.2}[10]

Methods

- ☐ All buildings req bracing by 1 of following methods: ___ [602.10] {602.10}
  - • Intermittent bracing methods _____ [602.10.2] {602.10.4}
  - • Continuous sheathing _____ [602.10.4&5] {602.10.4.2}
  - • Simplified wall bracing method in SDC A, B & C _____ [n/a] {602.12}[11]
- ☐ Intermittent braced wall panels min 48 in. length EXC [602.10.3] {602.10.5}
  - • Alternate braced wall panels _____ [602.10.3.2] {T602.10.5}
  - • Portal frame w/ hold-downs _____ [602.10.3.3] {T602.10.5}
  - • Garage door openings in SDC A, B, or C _____ [602.10.3.4] {T602.10.5}

EXTERIOR WINDOWS & DOORS

Performance & Labeling	09 IRC	12 IRC
☐ Windows & doors installed & flashed AMI	[612.1]	{612.1}
☐ Installation instructions req'd for each window & door	[612.1]	{612.1}
☐ Must be designed to resist wind loads	[612.5]	{612.2}
☐ Anchor glass assemblies AMI for design pressure	[612.10.1]	{612.7.1}
☐ 3rd party performance testing & labeling req'd EXC	[612.6]	{612.3}
• Decorative glazed openings exempt	[612.6X]	{612.3X}
☐ Garage doors to ASTM E 330 ANSI/DASMA 108	[612.7[	[612.4]

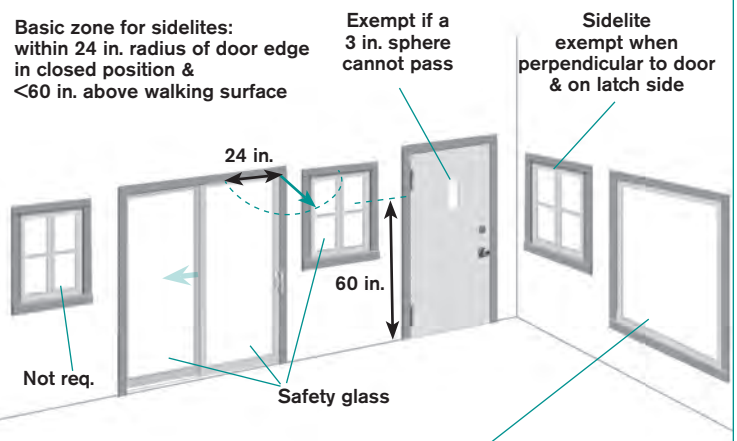
SAFETY GLAZING

Safety Glass Identification	09 & 12 IRC
☐ Tempered glass reqs permanent etched label EXC	[308.1]
• Spandrel glass removable paper label OK	[308.1X2]
☐ Only 1 lite req's full label in multipane windows w/ lites ≤ 1 sq. ft., others marked"CPSC 16 CFR 1201" or "ANSI Z97.1"	[308.1.1]
☐ Laminated glass does not req label	[308.1X1]

Hazardous Locations Requiring Safety Glass	09 IRC	12 IRC
☐ Glass in swinging, bifold, or sliding doors EXC **F22**	[308.4-1]	{308.4.1}
• Decorative glazing or lites w/ < 3 in. least dimension	[308.4-1X]	{308.4.1X}
☐ Sidelites where glass is < 24 in. arc of door edge & any part of glass < 60 in. above floor or walking surface EXC **F22**	[308.4-2]	{308.4.2}
• Decorative glazing	[308.4-2X1]	{308.4.2X1}
• Where separated by wall or intervening barrier	[308.4-2X2]	{308.4.2X2}
• Where door only accesses closet < 3 ft. deep	[308.4-2X3]	{308.4.2X3}
• Perpendicular to door & on latch side **F22**	[308.4-2X4]	{308.4.2X4}
• Adjacent to fixed panel of patio doors **F22**	[308.4-2X5]	{308.4.2X5}
☐ Windows w/ walk-through hazard EXC **F22**	[308.4-3]	{308.4.3}
• Decorative glass	[308.4-3X1]	{308.4.3X1}
• Protection from railing on side w/ walking surface	[308.4-3X2]	{308.4.3X2}
☐ All glazing in railings	[308.4-4]	{308.4.4}
☐ Wet areas (walls & enclosures facing walls of hot tubs, spas, whirlpools, bathtubs, showers, & pools) where lower edge ofglass < 60 in. above standing or walking surface EXC	[308.4-5&6]	{308.4.5}[33]
• Glazing > 60 in. horizontal from water's edge	[308.4-5X]	{308.4.5X}[34]
☐ Glazing ≤ 3 ft. horizontally from stair or ramp EXC	[308.4-7]	{308.4.6X2}[35]
• Intervening rail 34-38 in. high & withstanding 50 psf load w/o touching glass	[308.4-7X1]	{308.4.6X1}
• Guard or handrail > 18 in. horizontal from glass	[308.4-7X2]	{n/a}[36]
• Solid wall 34 in. to 36 in. below glass	[308.4-7X3]	{n/a}[36]
☐ Glazing < 60 in. horizontal of bottom stair landing & < 36 in. above landing EXC	[308.4-8]	{308.4.7}[37]
• Intervening guard min 18 in. from glass	[308.4-8X1]	{308.4.7X}[38]
• Solid wall 34 in. to 36 in. below glass	[308.4-8X2]	{n/a}[38]

FIG. 22

Safety Glass



Safety glass when walk-through hazard exists: all four of (1) >9 sq. ft., (2) lower edge <18 in. above walking surface, (3) upper edge >36 in. above walking surface & (4) within 36 in. horizontal of walking surface

ENERGY EFFICIENCY

Compliance	09 IRC	12 IRC
☐ Software can be approved to demonstate compliance	[n/a]	{1101.5}[39]
☐ Compliance certificate posted on electrical panel	[1101.9]	{1101.16}
☐ Additions & alterations same as new construction EXC	[n/a]	{1101.3}[40]
• Replacement fenestration, glass, up to 50% of luminaires, reroofing if sheathing not exposed & energy use not increased	[n/a]	{1101.3X}[40]

Building Thermal Envelope		
☐ Class I or II vapor retarder req'd interior of frame walls in zones 5,6,7,8 & Marine 4 EXC	[601.3]	{702.7}
• Class III (paint) OK w/ vented cladding or insulated sheathing meeting specified R-values	[601.3.1]	{702.7.1}
☐ Walls, floors & ceilings insulated per climate zone	[1102.1]	{1102.1.1}
☐ Insulate attic hatches & doors **F44**	[1102.2.3]	{1102.2.4}
☐ Air leakage rate max 5 ACH in climate zones 1 &2, 3 ACH in zones 3 - 8 (7 ACH all zones in 09 IRC)	[1102.4.2.1]	{1102.4.1.2}[41]

Systems		
☐ HVAC systems sized per ACCA Manual S & J	[1103.6]	{1103.6}
☐ Programmable thermostat req;d for central FAU heat	[1103.1.1]	{1103.1}
☐ Attic ducts min R-8 insulation, others min R-6	[1103.2.1]	{1103.2.1}
☐ Duct leakage test mandatory	[1103.2.2]	{1103.2.2}
☐ All recessed luminaires type IC airtight & gasketed trim	[1102.4.5]	{1102.4.4}
☐ Min 75% installed lamps high-efficacy (50% in 09)	[1104.1]	{1104.1}[42]

PIPING INSTALLATION & PROTECTION

General

	12 IRC	12 UPC
☐ Max support intervals **T11**	[2605.1]	{312.9}
☐ Min 16 gage steel shield plate if < 1 1/2 in. from edge of framing (18 gage and 1 in. in UPC) **F26**	[2603.2.1]	{312.9}
☐ Extend 2 in. above sole plate & below top plates	[2603.2.1]	{n/a}
☐ Freeze protection req'd for pipes outside building thermal envelope in areas subject to freezing	[2603.5]	{313.6}
☐ Each pipe & fitting must bear manufacturer identification & any markings req'd by applicable standards	[2609.1][45]	{301.1.1}

TABLE 11 MAX. SUPPORT INTERVALS [T2605] {T313.1}

Pipe or Tube	Horizontal	Vertical
CPVC	≤ 1 in. – 3 ft. > 1 in. – 4 ft.	IRC: 10 ft. & midstory guides for ≤ 2 in. UPC: Base & each floor + midstory guides
PEX	≤ 1 in. 32 in. UPC > 1 in. – 4 ft.[46]	
ABS & PVC[A]	4 ft.	
Cast iron w/ no-hub fittings	IRC: 5 ft. (10 ft. for 10 ft. pipes)	IRC: 15 ft. UPC: Base & each floor & max. 15 ft.
	UPC: If > 4 ft. – every joint, ≤ 4 ft. lengths – every other joint.	
Cu Tubing	≤ 1 1/2 in. – 6 ft.	IRC: 10 ft. UPC: Each floor & max. 10 ft.
	> 1 1/2 in. – 10 ft.	

A. UPC: Provide for expansion every 30 ft.

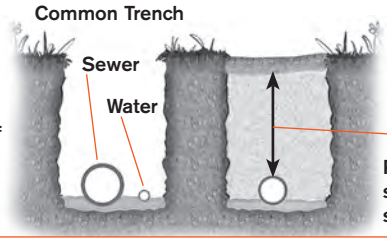
Utility Trenches

	12 IRC	12 UPC
☐ Backfill in layers & tamped in place - no backhoe or grader until 12 in. of tamped earth in place **F25**	[2604.3]	{314.4}
☐ Contact utility re: sharing gas or electric in water trench	[utility]	{utility}
☐ Water service min 12 in. deep (12 in. cover UPC)	[2603.5]	{609.1}
☐ Water service min 6 in. (12 in. UPC) below frost line	[2603.5]	{609.1}
☐ Water in sewer trench if materials OK in house **F25**	[2905.4.2]	{609.2}
☐ If other sewer material, separate trench req'd (5 ft. away IRC) or install water pipe on shelf 12 in. above sewer **F25**	[2905.4.2]	{609.2}
☐ Sewer depth per local BO & utility	[2603.5.1]	{local}
☐ Utility or other trench may not undermine footing	[2604.4]	{314.1}
☐ Pipes through foundation req sleeve or arch	[2603.4]	{313.10.1}

FIG. 25

Pipes in Trench

Water & sewer in same trench only if type of sewer pipe is approved in the building



Fill in layers for first 12 in. with smooth material free of rocks or debris

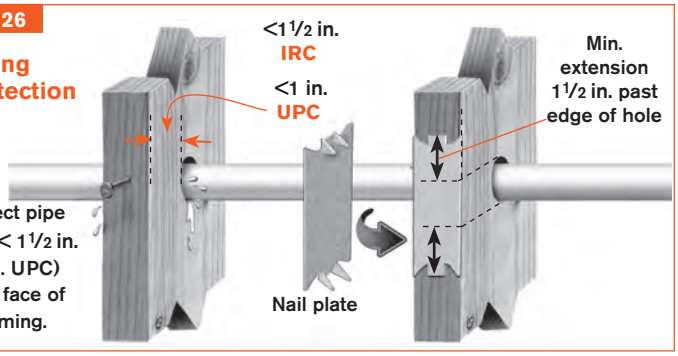
Pipes fully supported on smooth even bed

Piping Under or Encased in Concrete Slabs

	12 IRC	12 UPC
☐ Pipes through concrete wrapped or sheathed	[2603.3]	{312.2}
☐ Gas underground beneath building req's conduit	[2415.12]	{1210.1.6}
☐ Cu water tubing underground beneath building min Type L	[n/a]	{604.2}

FIG. 26

Piping Protection



Underground Gas Pipes

	12 IRC	12 UPC
☐ Min depth (min cover UPC) 12 in. EXC	[2415.12]	{1210.1.1}
• 8 in. OK for individual lines to lights, grills, etc.	[2415.12.1]	{Ø}
• 18 in. cover unless external damage not likely	[n/a]	{1210.1.1}
• Provide sleeve or bridge in conduit if < 12 in. cover	[Ø]	{1210.1.1}
☐ Plastic only OK underground outside building	[2415.17.1]	{1210.1.7}
☐ Tracer wire min 18 AWG (UPC 14 AWG) adjacent to plastic pipe & brought above ground at riser	[2415.17.3]	{1210.1.7.2}
☐ Buried metal factory wrapped EXC	[2415.11.2]	{1210.1.3}
• Field wrapping OK where stripped for threading	[2415.11.2X]	{1210.1.3}

ROUGH INSPECTION - TESTING

Required Pre-Concealment Piping Tests

	12 IRC	12 UPC
☐ Test all piping before cover or concealment	[2503.2]	{103.5.1}
☐ DWV water test min. 10 ft. head for 15 minutes OR	[2503.5.1]	{712.2}
• Air test 5psig (10 in. mercury) for 15 minutes	[2503.5.1]	{712.3}
☐ Water pipe test 15 minutes w/ potable water at working pressure or 50 psig air for nonplastic pipe only	[2503.7]	{609.4}
☐ Gas test min 10 minutes @1 1/2× working pressure & min 3 psig	[2417.4.1]	{1214.3}

TABLE 12 DFUs, TRAPS & TRAP ARMS [T3004.1, 3105.1, & 3201.7] {T702.1 & 1002.2}

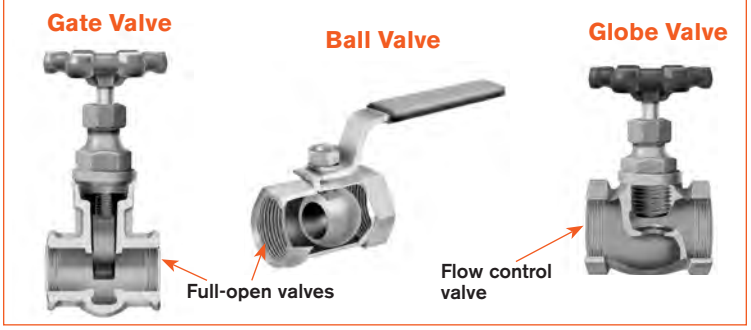
Fixture	Min. Trap Size	DFUs	IRC Length to Vent	UPC Length to Vent
Bathtub	1 1/2 in.	2	6 ft.	3 ft. 6 in.
Bidet	1 1/4 in.	1	5 ft.	2 ft. 6 in.
Clothes Washer	2 in.	3	8 ft.	5 ft.
Floor Drain	2 in.	0[A]	8 ft.	5 ft.
Kitchen Sink[B,C]	1 1/2 in.	2	6 ft.	3 ft. 6 in.
Laundry Tub[C]	1 1/2 in.	2	6 ft.	3 ft. 6 in.
Lavatory[D]	1 1/4 in.	1	5 ft.	2 ft. 6 in.
Shower[E]	2 in.	2	8 ft.	5 ft.
Water Closet	3 in.	3	no limit	6 ft.

A. If used as a receptor, use the DFUs of the fixture; the UPC counts all floor drains as 2 DFUs
B. With or without dishwasher or disposer.
C. After the trap arm the UPC min. drain size is 2 in.
D. UPC 1 1/2 in. for sets of 2 or 3 lavatories
E. IRC shower traps can be 1 1/2 in. for up to 5.7 gpm flow rates.

WATER SUPPLY & DISTRIBUTION (CONT.)

Piping & Valves	12 IRC	12 UPC
☐ Accessible fullway main shutoff req'd **F33,34**	[2903.9.1]	{606.2}
☐ Accessible fullway shutoff req'd at WH **F33,34**	[2903.9.2]	{606.2}
☐ Brass adapter [or dielectric fittings] between galv & Cu	[2905.17.1]	{316.2.1}
☐ Water hammer arrestors req'd if quick-close valves	[2903.5]	{609.10}
☐ Individual shutoff req'd each fixture except tubs & showers	[2903.9.3]	{606.5}
☐ Control valve can be at manifold if identified	[2903.8.5]	{606.5}

FIG. 33 **FIG. 34** **FIG. 35**



Protection of Potable Water Supply	12 IRC	12 UPC
☐ No connections between private & public water supply	[2902.1]	{602.2}
☐ Fixture outlet air gaps min 2X diameter of outlet	[2902.3.1]	{603.3.1}
☐ Backflow protection devices to recognized standards	[T2902.3]	{603.2}

GAS PIPING

General	12 IRC	12 UPC
☐ Locate gas meter in accessible & ventilated space	[utility]	{1208.6.1}
☐ Main shutoff req'd at each meter & building **F36**	[2420.2&3]	{1210.11.2}
☐ Material: steel (galv or black), type K or L Cu, CSST	[2414.4&5]	{1208.5.2&3}
☐ Cu only OK for low sulfur-content gas	[2414.5.2]	{1208.5.2.3}
☐ Size pipe per tables **T16-17**	[2413.3]	{1217.1}
☐ Support pipe & smooth-wall tubing per **T15**	[2424.1]	{1201.2.4}
☐ Interior of pipe or tubing must be deburred	[2414.7]	{1208.5.5}
☐ No gas pipe in duct, clothes chute, or gas vent	[2415.3]	{1210.2.3}
☐ Outdoor piping min 3 1/2 in. above ground or roof	[2415.9]	{n/a}
☐ No unions or bushings in concealed locations	[2415.5]	{1210.3}
☐ Shutoff before each medium-pressure regulator	[2420.4]	{1210.11}

Appliance Shutoffs & Connections	12 IRC	12 UPC
☐ Valve ahead of union & ≤ 6 ft. of appliance **F41,42** EXC	[2420.5.1]	{1211.5}
• 50 ft OK if accessible identified valve at manifold	[2420.5.3]	{Ø}
☐ Max length connector 6 ft.	[2422.1.2.1]	{n/a}
☐ Flex connectors not through walls, floors, ceilings	[2422.1.2.3]	{1211.4.4}
☐ Connector not through appliance housing EXC	[2422.1.2.3]	{n/a}
• Hard pipe, flex connectors protected against damage, & fireplace inserts w/ grommets AMI	[2422.1.2.3X]	{n/a}
☐ Sediment trap close as practical to appliance EXC **F41,42**	[2419.4]	{1211.8}
• Ranges, clothes dryers, fireplaces & gas lights	[2419.4]	{1212.8}

Corrugated Stainless Steel Tubing (CSST)	12 IRC	12 UPC
☐ Install AMI (includes training & qualification)	[2414.5.3]	{1208.5.3.4}
☐ Sizing, support, protection, & connection AMI	[2414.5.3]	{1208.5.3.4}

Electrical Bonding	12 IRC	12 UPC
☐ Gas pipe not OK as grounding electrode in earth	[2410.1]	{1210.15.3}
☐ Electrically bond above-ground metal gas pipes	[2411.1]	{1210.15.1}
☐ Appliance EGC sufficient to bond non-CSST gas pipe	[2411.1]	{1210.15.1}
☐ Bond between electrical service & metal pipe between meter & first downstream CSST fitting **F36**	[2411.1.1][49]	{1210.15.2}[49]
☐ CSST bonding jumper min 6 AWG Cu **F36**	[2411.1.1]	{1210.15.2}

FIG. 36

CSST Bonding

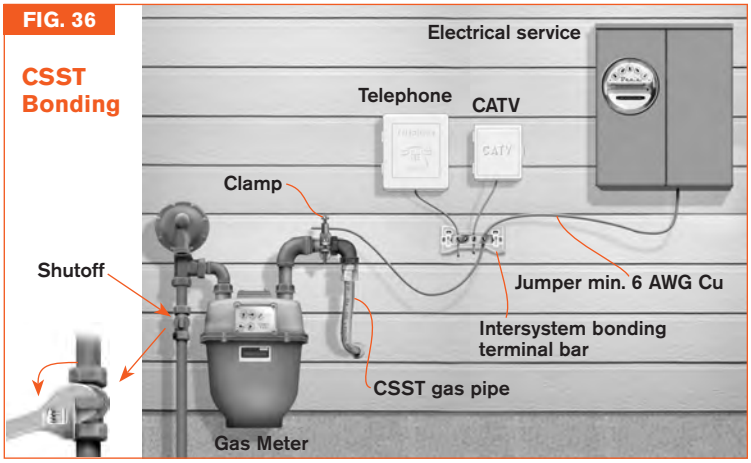


TABLE 15 GAS PIPING & TUBING SUPPORT [T2424.1] {T1210.2.4.1}

Steel Pipe Nominal Size (in.)	Max. Support Spacing (ft.)	Smooth-Wall Tubing Nominal Size (in.)	Max. Support Spacing (ft.)
½	6	½	4
¾ or 1	8	⅝ or ¾	6
≥1¼ (horizontal)	10	⅞ or 1 (horizontal)	8
≥1¼ (vertical)	Every floor level	⅞ or 1 (vertical)	Every floor level

TABLE 16 SIZE PROCEDURES [2413.4.1&2] & {1216.1.1&2}

1. Determine Btu/cu. ft. gas from local supplier (usually 1100).
2. Divide appl Btu by Btu/cu. ft. to obtain appliance demand.
3a. Longest length method: Measure developed length to most remote outlet.
4a. Longest length method: Use column from **T17** for most remote fixture for all outlets.
3b. Branch length method: Measure developed length to each outlet.
4b. Branch length method: Select column from **T17** for load on piping to each outlet.
5. Select row for pipe size equaling or exceeding demand each section.

TABLE 17 GAS PIPING [T2413.4(1)] & {T12-8}

Pipe	Length (in feet)											
	10	20	30	40	50	60	70	80	90	100	125	150
	Demand Capacity (in cu.ft./hr)											
½ in.	172	118	95	81	72	65	60	56	52	50	44	40
¾ in.	360	247	199	170	151	137	126	117	110	104	92	83
1 in.	678	466	374	320	284	257	237	220	207	195	173	157
1¼ in.	1390	957	768	657	583	528	486	452	424	400	355	322
1½ in.	2090	1430	1150	985	873	791	728	677	635	600	532	482

WATER HEATERS

General	12 IRC	12 UPC
☐ Replacement of WH req's permit	[105.1]	{502.1}
☐ Installation & maintenance instructions to be left w/ WH	[1307.1]	{507.24
☐ Full-open valve req'd on cold water supply **F33,34**	[2903.9.2]	{606.2}
☐ Unions req'd within 12 in. of tan} for service and removal	[n/a]	{609.5}
☐ Electric WH req's in-sight or lockable disconnect	[T4101.5]	{NEC**p.28**}

Location		
☐ Fuel-fired WH prohibited in storage closets	[2005.2 & 2406.2]	{local}
☐ Fuel-fired WHs in bedroom, bathroom, req separation by weatherstripped self-close door & exterior combustion air EXC	[2406.2]	{504.1}
• Direct-vent type	[2005.2 & 2406.2]	{504.1}
☐ Watertight pan req'd if leaks would cause damage **F42**	[2801.5]	{507.4}
☐ Pan not req'd under tankless WHs	[2801.5][51]	{n/a}
☐ Pan drain to approved location min 3/4 in. pipe **F42**	[2801.5.1]	{507.4}
☐ Ignition source ≥ 18 in. above garage floor EXC **F42**	[2801.6]	{507.13}
• Flammable Vapor Ignition Resistant (FVIR) WH **F42**	[2801.6X]	{507.13}
☐ Protection from vehicles req'd in garage **F42**	[1307.3.1]	{507.13.1}
☐ WH supported on ground req's 3 in. concrete base	[n/a]	{507.3}
☐ Outdoor enclosure req'd unless WH listed for outdoors	[2005.1]	{507.25}
☐ Seismic restraint upper & lower 1/3rd of tank in SDC D & townhouses in SDC C (all occupancies in SDC C & D in UPC) **F42**	[2801.7]	{507.2}

Access & Working Space		
☐ Access & working space req'd (IRC min. 30 in. x 30 in.)	[2801.3]	{507.26}
☐ Min closet door size 24 in. wide	[1305.1.2]	{local}
☐ Attic: solid passage floor max 20 ft., min 24 in. wide	[1305.1.3]	{508.4}
☐ Attic equipment req's light & recep near WH	[1305.1.3.1]	{508.4.4}

Tankless (On Demand) Water Heaters **F42**		
☐ Size gas line to max Btu rating	[2413.2]	{1215.2}
☐ Install AMI (PRV usually specified)	[2005.1]	{507.24}
☐ Type III vent typically req'd	[2005.1	{507.24}
☐ Direct-vent water heater vent clearances	[2427.8]	{509.8.2}
☐ Not OK to vent in common w/ other appliances	[2427.10.4]	{509.10.3.2}

FIG. 41

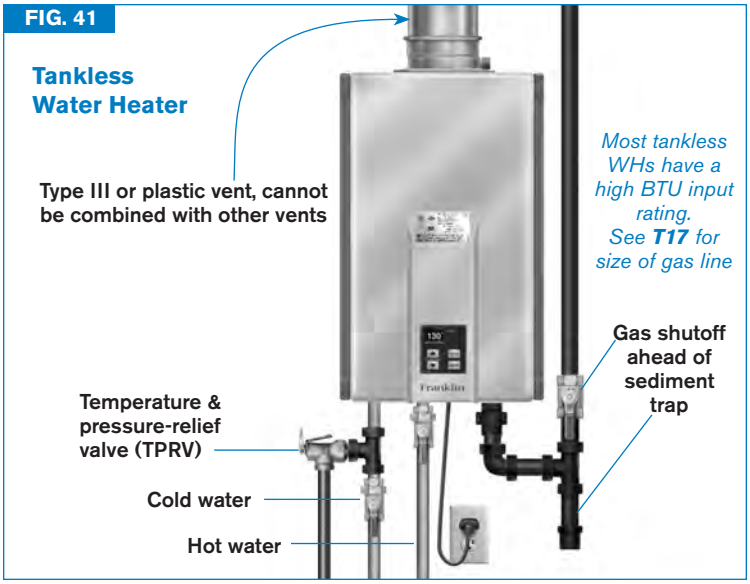


FIG. 42

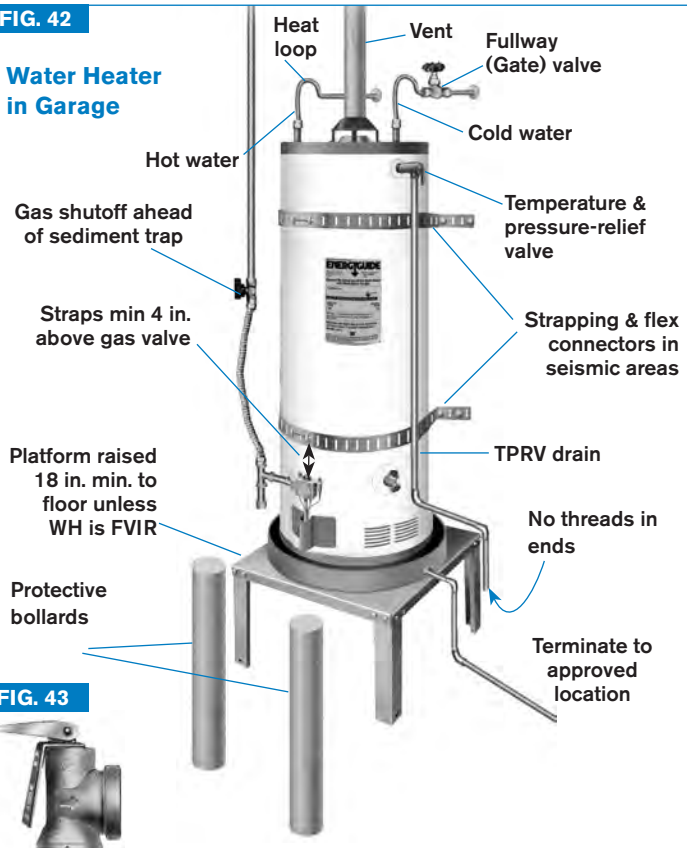


FIG. 43

Temperature & Pressure-Relief Valve

Temperature & Pressure-Relief Valves (TPRV)	12 IRC	12 UPC
☐ Combination TPRV (req'd in UPC) OR **F42,43**	[2803.1]	{608.3}
• Separate TRV (Watts 210 valve) and PRV	[2803.1]	{504.4&5}
☐ Locate TPRV AMI **F42**	[2803.4&5]	{608.3}

TPRV Discharge Pipe		
☐ Size at least same as TPRV outlet	[2803.6.1]	{608.5}
☐ End pointing downward and w/ no threads **F42**	[2803.6.1]	{608.5}
☐ End outside or other approved location ≤ 6 in. (6–24 in. UPC) from ground, floor, or receptor	[2803.6.1]	{608.5}
☐ May not run uphill or be trapped	[2803.6.1]	{608.5}
☐ May discharge to WH pan (not OK in UPC) **F42**	[2803.6.1]	{507.5}

Vents & Flues (also see "Venting" on p.23)		
☐ Draft hood or barometric damper in same space as WH	[1802.1 & 2407.3]	{509.11.4}
☐ Terminate min 5 ft. above draft hood	[1804.2.3, 2427.6.4]	{509.6.2.1}
☐ Only 1 draft hood	[2426.5]	{509.11.1}
☐ Single-wall vents prohibited in dwellings	[n/a]	{509.7.3}
☐ No single-wall outdoors in cold climate	[2427.7.2]	{509.7.1}
☐ No single-wall in concealed space or attic	[2427.7.6]	{509.7.3.2}
☐ Secure vent connector to draft hood & vent w/ screws or other approved means	[2427.10.7]	{509.10.5}

VENTING

General (Gravity Gas)

	12 IRC	12 UMC
☐ Install vents AMI (most appliances ship w/ GAMA venting tables that include limits for size, length & offsets)	[2427.6.1]	{802.1.1}
☐ Induced-draft (Category I) can be "gravity vent" **T19**	[2427.6.1]	{802.1.1}
☐ Vent size ≥ draft hood size & ≤ 7× draft hood size	[2427.6.8.1]	{802.6.3.1}
☐ One 60° offset OK, others max 45° EXC	[2427.6.8.2]	{802.6.1}
• Systems designed using vent sizing tables	[2427.6.8.1]	{802.6.1}
☐ Provide proper support AMI	[2426.6]	{802.6.7}
☐ Insulation shield to min 2 in. above attic insulation	[2426.4]	{manu}
☐ No solid fuel & gas in same chimney flue	[2427.5.6.1]	{802.5.8}
☐ Vents < 1 1/2 in. from face of framing req steel plate protection extending 4 in. beyond edge of framing member	[2426.7]	{manu}

TABLE 19 APPLIANCE VENTING CATEGORIES

Category	Condensation	Static Pressure	Typical vent
I	No	Nonpositive	B Vent
II	Yes	Nonpostive	Per manu
III	No	Positive	Stainless Steel
IV	Yes	Positive	Plastic

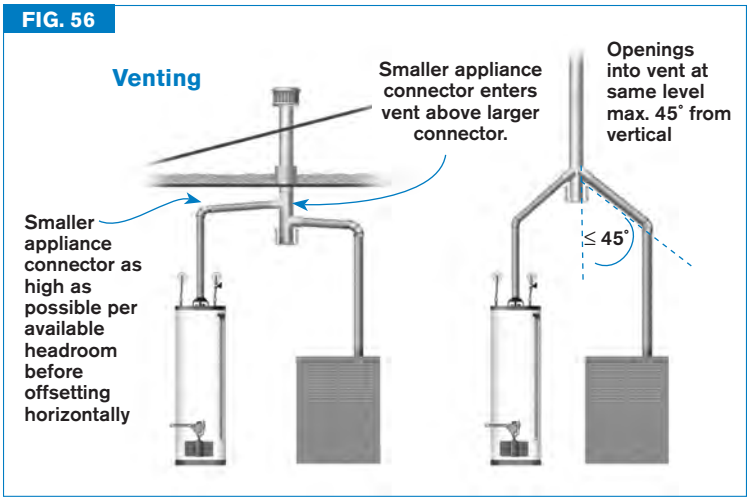
Connectors

	12 IRC	12 UMC
☐ Connectors short & straight as practical	[2427.10.8]	{n/a}[56]
☐ Basic max horizontal length 18 in. per in of diameter	[2428.3.2]	{803.2.1}
☐ Single-wall connector max length 75% of vertical vent	[2427.10.8]	{802.10.7.1}
☐ Type B connector max length 100% of vertical vent	[2427.10.8]	{802.10.7.2}
☐ Max 2× diameter of vent collar or draft hood	[2428.2.11]	{803.1.14}
☐ No single wall in attics or excessively cold areas	[2427.10.2.2]	{802.10.1.2}
☐ No single-wall connector through interior wall	[2427.10.13]	{802.10.12}
☐ Slope min 1/4. in./ft. toward appliance **F56**	[2427.10.7]	{802.10.6}
☐ Connect to appliance vent collar w/ screws or AMI	[2427.10.6]	{802.10.5}

Appliances with Common Venting

☐ 2 draft-hood equipped appliances: common connector ≥ largest connector + 50% of smaller flue collar outlet size	[2427.10.3.4]	{802.10.2.3}
☐ Join smaller connector to common connector at highest level consistent w/ available headroom **F56**	[2427.10.4]	{802.10.3.1}
☐ Connectors ≤ 45° of vertical OK at same level **F56**	[2427.10.4.1]	{802.10.3}

FIG. 56



Gas Vent Entering Masonry Chimney

	12 IRC	12 UMC
☐ Must be lined w/ clay or metal EXC	[2427.5.5.1]	{802.5.4.2}
• Not req'd when replacing appliance of similar type & rating & if chimney inspected for damage	[2427.5.5.1]	{802.5.4.2}
☐ Cross-sectional area not >7× size of gas vent	[2427.5.4]	{802.5.3}

Single-Wall Vent

	12 IRC	12 UMC
☐ Not allowed in dwellings	[n/a]	{802.7.3}
☐ Only for runs from appliance space directly to outside	[2427.7.4]	{802.7.3.1}
☐ May not originate in attic or pass through inside wall	[2427.7.6]	{802.7.3.2}
☐ Min 6 in. clear to combustible for single-wall pipe	[2427.7.8]	{802.7.3.4}

B Vent Termination

☐ Must extend above roof	[2427.6.3]	{802.6.2}
☐ Min 5 ft. vertical height above flue collar **F44**	[2427.6.4]	{802.6.2.1}
☐ If vertical surface within 8 ft. vent must terminate min. 2ft. higher than any part of building within 10 ft. horizontal **F57**	[2427.6.4]	{802.6.2}
☐ Min height above roofs **T20**	[2427.6.3]	{802.6.2}

FIG. 57

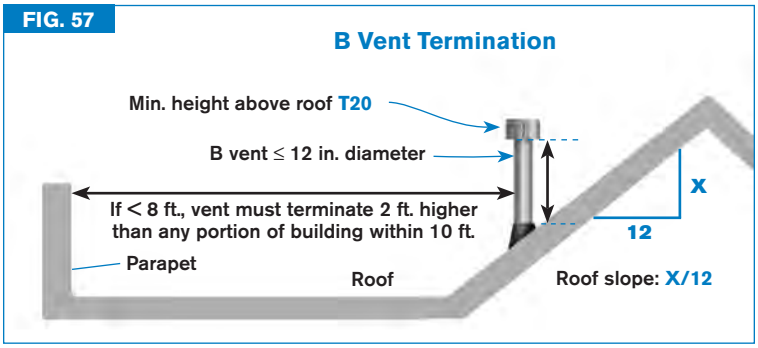


TABLE 20 B VENT TERMINATION (F57) [F2427.6.3] {T802.6.2}

Roof Slope	Min. Height (ft.)	Roof Slope	Min. Height (ft.)
Flat to 6/12	1	> 11/12 to 12/12	4
> 6/12 to 7/12	1 1/4	> 12/12 to 14/12	5
> 7/12 to 8/12	1 1/2	> 14/12 to 16/12	6
> 8/12 to 9/12	2	> 16/12 to 18/12	7
> 9/12 to 10/12	2 1/2	> 18/12 to 20/12	7 1/2
> 10/12 to 11/12	3 1/4	> 20/12 to 21/12	8

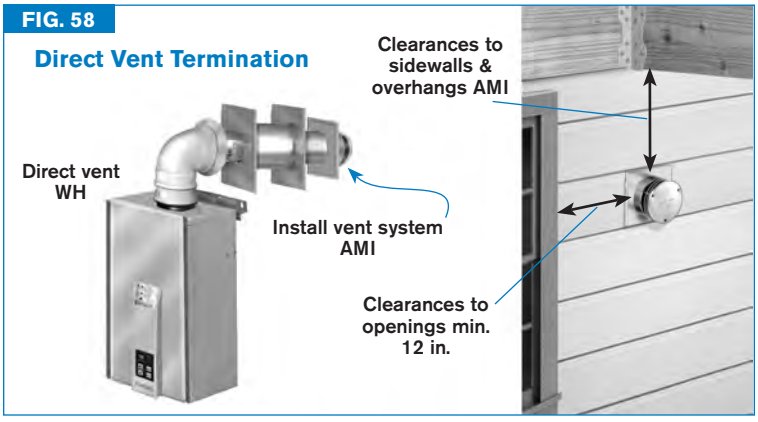
Forced Vents (Category IV)

	12 IRC	12 UMC
☐ All mechanical draft systems L&L & installed AMI	[2427.3.3]	{802.3.4.1}
☐ Forced draft system must be gas tight	[2427.3.3]	{802.3.4.3}
☐ Req'd plastic joint primers must be contrasting color	[2427.1.1]	{802.4.2}
☐ No natural & forced-vent to common flue	[2427.3.3]	{802.3.4.4}
☐ Terminate min 4 ft. to side or below or 1 ft. above building openings & min 1ft. above ground level EXC	[2427.8]	{802.8.1&2}
• Termination can be same as direct vent if AMI	[2427.8]	{802.8.1&2}
☐ Collect & dispose of condensate from vent (**p.24**)	[2427.9]	{802.9}

Direct Vent Termination

☐ Clearances to building openings: 0-10 kBtu/hr min 6 in., 10-50 kBtu/hr min 9 in., > 50 kBtu/hr min 12 in. **F58**	[2427.8]	{802.8.3}
☐ 12 in. min clearance to finished ground level	[2427.8]	{802.8.3}

FIG. 58



PANELBOARDS (LOAD CENTERS)

General	12 IRC	11 NEC
☐ Working space 30 in. wide x 3 ft. deep min F63	[3405.2]	{110.26A1&2}
☐ Working space to floor & min 6 ft. 6 in. height F63	[3405.2]	{110.26A3}
☐ No grounding of neutral after service EXC F65	[3607.2]	{250.24A5}
• Existing separate structure w/ no parallel metal path	[3607.3.2]	{250.32BX}
☐ No bonding subpanel neutral to enclosure F65	[3908.6]	{408.40}
☐ Only 1 wire per breaker unless L&L for 2	[3406.10]	{110.14A}
☐ Each neutral req's individual terminal	[3706.4]	{408.41}
☐ Overcurrent protection req'd per T24	[3705.5]	{240.4}
☐ All terminals torqued per labeling	[3403.3]	{110.3B}
☐ Breaker brand and models L&L for panel	[3403.3]	{110.3B}
☐ Use of each circuit legibly identified w/ sufficient detail to distinguish use from all other circuits	[3706.2]	{408.4}
☐ Circuit description not dependent on temporary conditions, e.g., room color or occupant's name	[3706.2]	{408.4}
☐ Multiwire circuits req handle tie or single handle F65	[3701.5.1]	{210.4B}
☐ Unused openings closed equivalent to original	[3404.6]	{110.12A}
☐ Max height of center of breaker handle 6 ft. 7 in.	[3705.7]	{240.24A}
☐ No panels in clothes closet or bathroom	[3705.7]	{240.24D&E}
☐ Not to be located over steps of a stairway	[3705.7]	{240.24F}
☐ 1/4 in. air space req'd behind surface-mounted metal panel in damp or wet location	[3907.2]	{312.2}

FIG. 64

Service Panel

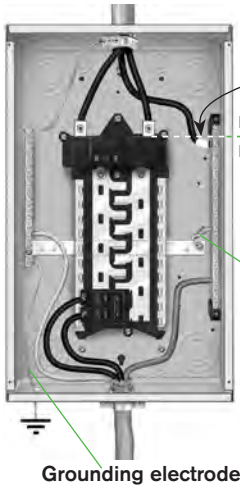
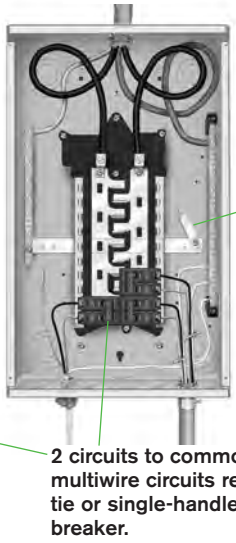


FIG. 65

Subpanel

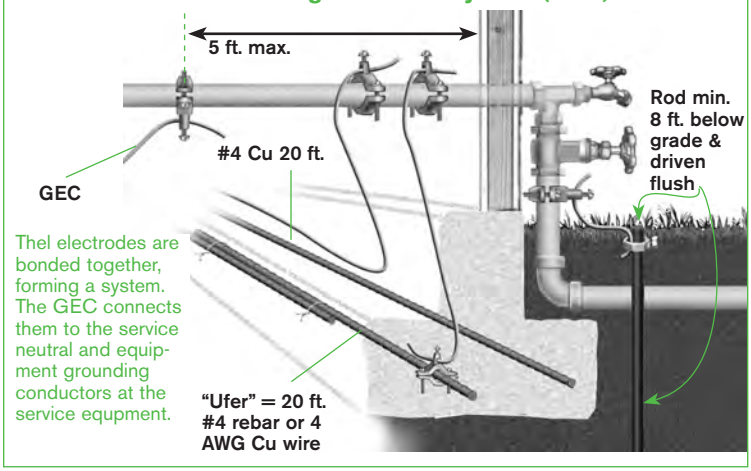


GROUNDING & BONDING

Grounding Electrode System (GES) F66	12 IRC	11 NEC
☐ Use metal underground water pipe if ≥ 10 ft. in earth	[3608.1.1]	{250.52A1}
☐ Connect GEC to pipe not > 5 ft. inside building	[3608.1.1.1]	{250.58C}
☐ Bond around removable equipment (meters, etc.)	[3608.1.1.2]	{250.53D1}
☐ Water pipe cannot be only grounding electrode	[3608.1.1.2]	{250.53D2}
☐ "Ufer" = 20 ft. #4 rebar or 4 AWG Cu wire in concrete footing, foundation, or pier in contact w/ earth EXC	[3608.1.2]	{250.52A3}
• Ufer not req'd in existing buildings where steel not accessible w/o removal of concrete	[3608.1X]	{250.50X}
☐ Ground rod min 8 ft.	[3608.1.4]	{250.52A5}
☐ Ground rod min 8 ft. deep & driven flush	[3608.1.4.1]	{250.53G}
☐ If resistance > 25 ohms, 2nd rod req'd ≥ 6 ft. from 1st	[3608.4]	{250.53A2}
☐ Each structure w/ > 1 branch circuit req's GES	[3607.3]	{250.32A}

FIG. 66

Grounding Electrode System (GES)



Clamps	12 IRC	11 NEC
☐ Ground rod clamps L&L for direct burial	[3611.1]	{250.70}
☐ Clamps accessible unless buried or encased	[3611.2]	{250.68A}

Grounding Electrode Conductor (GEC)		
☐ GEC must connect to incoming service neutral	[3607.2]	{250.24A}
☐ 8 AWG req's protection in raceway or cable armor	[3610.2]	{250.64B}
☐ 6 AWG following building contour OK w/o protection	[3610.2]	{250.64B}
☐ Size GEC to T23 EXC	[T3603.1]	{250.66}
• 6 AWG largest req'd size if dead-ends at rod	[T3603.1]	{250.66A}
• 4 AWG largest req'd size if dead-ends at Ufer	[T3603.1]	{250.66B}

TABLE 23 GROUNDING ELECTRODE CONDUCTOR & EQUIPMENT GROUNDING CONDUCTOR SIZES

GEC [T3603.1] & {T250.66}				EGC [T3908.12] & {T250.122}	
Cu Service Wire AWG Size	Al Service Wire AWG Size	Max Service Rating	Size of Cu GEC[A]	Breaker Rating	AWG Size of Cu EGC[B]
≤ 2	≤ 1/0	125	8	15	14
1 or 1/0	2/0 or 3/0	150/175	6	20	12
2/0 or 3/0	4/0 or 250 kcmil	200/225	4	30-60	10
> 3/0 to 350 kcmil	> 250kcmil to 500 kcmil	250/300	2	70-100	8
> 350 kcmil to 600 kcmil	> 500 kcmil to 900 kcmil	400	1/0	110-200	6

A. See *Code Check Electrical* for Al GEC sizes.
B. Al EGCs 1 size larger than Cu.

Bonding	12 IRC	11 NEC
☐ Bond all available electrodes (water piping, rod, Ufer)	[3608.1]	{250.50}
☐ Bond metal raceways enclosing GEC	[3610.3]	{250.64E}
☐ Bond service raceway fittings w/ bonding jumpers if knockouts remain or reducing washers used	[3609.4][65]	{250.92B}[65]
☐ Use bonding locknuts if no remaining concentrics	[3609.4]	{250.92B}
☐ Bond metal piping, hot, cold & gas	[3609.6&7]	{250.104A&B}
☐ EGC of equipment may be used to bond gas	[3609.7]	{250.104B}

Intersystem Bonding		
☐ Provide accessible external terminal bar w/ min 3 terminals to bond phone & CATV F36	[3609.3]	{250.94}
☐ Bar not to interfere w/ opening service enclosure	[3609.3]	{250.94}

Equipment Bonding & Grounding		
☐ Wire EGCs sized per T23	[3908.12]	{250.122}
☐ EGC must provide effective ground-fault current path	[3908.4]	{250.4A5}
☐ Earth is not an effective ground-fault current path	[3908.5]	{250.4A5}
☐ RMC, IMC, EMT, AC cable armor, electrically continuous raceways & surface metal raceways OK as EGC	[3908.8]	{250.122A}
☐ Remove paint from contact surfaces of ground bars	[3908.17]	{250.12}

APPLIANCES

Required Disconnecting Means	12 IRC	11 NEC
☐ Breaker alone OK if appliance ≤ 300VA or 1/8 hp	[T4101.5]	{422.31A}
☐ Accessible cord/plug OK for appliances listed for cords	[T4101.5]	{422.33A}
☐ Unit switch that opens all hot conductors OK	[T4101.5]	{422.34}
☐ In-sight or lockable breaker or switch **F70**	[T4101.5]	{422.31B}
☐ Breaker lockout hasp must remain in place **F70**	[T4101.5]	{422.31B}

FIG. 70

Breaker Lockout Hasp

Hasp for locking breaker must remain with or without lock in place.

Kitchen	12 IRC	11 NEC
☐ Range/oven > 8.75kw min 40A branch circuit (min 8 AWG Cu or 6 AWG Al wire)	[3702.9.1]	{210.19A3}
☐ Disposer cord min 18 in. max 36 in.	[T4101.3]	{422.16B1}
☐ DW & compactor cords min 36 in. max 48 in.	[T4101.3]	{422.16B2}
☐ DW & disposer not on same circuit	[3701.2]	{210.19A1}
Central Furnace		
☐ Central furnace must be on individual circuit EXC	[3703.1]	{422.12}
• Auxiliary equipment (ex: filter) OK on furnace circuit	[3703.1]	{422.12X}
☐ Disconnect within sight of furnace	[T4101.5]	{422.31B}
☐ Cord & plug connection not OK	[4101.3]	{422.16A}
☐ Lighting outlet switched at entry to equipment space	[3903.4]	{210.70A3}
☐ 120V recap req'd within 25 ft. & on same elevation	[3901.12]	{210.63}
Water Heaters & Space heating		
☐ Circuit min 125% of nameplate rating	[3702.10]	{422.13}
☐ In-sight or lockable breaker or switch req'd **F70**	[T4101.5]	{422.31B}
☐ No electric baseboard heaters under recep outlets	[3901.1]	{424.9}
☐ Receps in baseboard heaters not on heater circuit	[3901.1]	{424.9}
Paddle Fans		
☐ Not to be supported by standard electrical boxes	[3905.9]	{422.18}
☐ Boxes & box systems listed for fan support OK to 70lbs	[3905.8]	{314.27C}
☐ If listed for > 35 lbs, max weight must be marked	[3905.8]	{314.27C}
☐ Fans over 70 lbs req independent support	[3905.8]	{314.27C}
☐ Spare separately switched conductors to ceiling boxes only OK if box listed for paddle fan support	[3905.8][69]	{314.27C}[69]
Window/Wall Air Conditioners		
☐ Cord/plug disconnect OK if controls ≤ 6 ft. of floor	[n/a]	{440.63}
☐ Max cord length 120V = 10 ft., 240V = 6 ft.	[n/a]	{440.64}
☐ Cord/plug units req AFCI or LCDI (leakage current detection interrupter) in cord or plug cap	[n/a]	{440.65}
Central Air Conditioning		
☐ Central AC wire & breaker/fuse size per nameplate	[3702.11]	{440.4B}
☐ Disconnect in sight of condenser **F71**	[T4101.5]	{440.14}
☐ Working space req'd in front of disconnect **F63,71**	[3405.2]	{110.26A}

FIG. 71

Air Conditioning Condenser

All air conditioners require an in-sight disconnect.

GFCI & AFCI PROTECTION

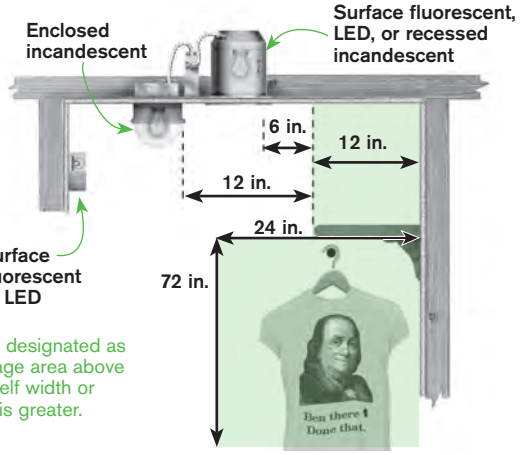
Required GFCI Protection	12 IRC	11 NEC
☐ All bathroom receps	[3902.1]	{210.8A1}
☐ All garage & accessory building receps	[3902.2]	{210.8A2}
☐ All outdoor receps EXC	[3902.3]	{210.8A3}
• Non-readily-accessible deicing circuit recep	[3902.3X]	{210.8A3X}
☐ Receps in crawl spaces at or below grade	[3902.4]	{210.8A4}
☐ All unfinished basement receps EXC	[3902.5]	{210.8A5}
• Recep supplying permanent fire or burglar alarm	[3902.5X]	{210.8A5X}
☐ All receps serving kitchen countertops	[3902.6]	{210.8A6}
☐ Receps within 6 ft. of non-kitchen sinks	[3902.7][70]	{210.8A7}[70]
AFCI Protection		
☐ Req'd for all branch circuits w/ outlets in family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms, closets, hallways, or similar rooms or areas	[3902.12]	{210.12A}
☐ Req'd for extensions or modifications of existing circuits serving above locations (can be outlet type at 1st recep)	[3902.13][71]	{210.12B}[71]
☐ "Outlet" = receptacle, lighting, or smoke alarm outlet	[3501]	{100}
☐ Must be UL listed "combination type"	[3902.12]	{210.12A}

LIGHTING OUTLETS

Required Locations		
☐ All habitable rooms & bathrooms	[3903.2]	{210.70A1}
☐ Switched recep OK in lieu of lighting outlet except in kitchens & bathrooms	[3903.2X1]	{210.70A1X}
☐ Hallways, stairways & garages	[3903.3]	{210.70A2}
☐ Outside each exterior door w/ grade-level access	[3903.3]	{210.70A2}
☐ Not req'd at garage vehicle door	[3903.3]	{210.70A2}
Switching		
☐ All switching in ungrounded (hot) conductors	[4001.8]	{404.2A&B}
☐ Req'd at each access to interior stairs if ≥ 6 risers	[3903.3]	{210.70A2}
☐ No dimmers controlling switched receps	[4001.12]	{404.14E}
☐ Neutral req'd at switch box	[4001.15][72]	{404.2C}[72]
Bath		
☐ No pendant, track, or suspended lights or paddle fans < 8 ft. above& 3 ft. to side of top of tub or shower threshold	[4003.11]	{410.10D}
☐ Luminaires < 8 ft. above footprint of tub/shower L&L for damp or wet locations if subject to shower spray	[4003.11]	{410.10D}
Recessed Lights		
☐ Type IC OK in contact w/ insulation & combustibles	[4004.8&9]	{410.116A2}
☐ Recessed light (non-IC rated) 1/2 in. from combustibles	[4004.8]	{410.116A1}
☐ Recessed light (non-IC rated) 3 in. from insulation	[4004.9]	{410.116B}
Clothes Closet F72		
☐ No open incandescent bulb fixtures	[4003.12]	{410.16B}
☐ Storage area = 12 in. or shelf width & to ceiling	[4003.12]	{410.2}
☐ Enclosed surface incandescent: 12 in. clearance	[4003.12]	{410.16C}
☐ LED, fluorescent, or recessed incandescent: 6 in.	[4003.12]	{410.16C}

FIG. 72

Closet Light Clearances



Shaded areas are designated as storage. The storage area above the shelf is the shelf width or 12 in., whichever is greater.