Code Check® Eighth Edition

Based on the 2015 IRC, 2015 UPC & UMC, 2014 NEC & including Selected California Amendments

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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 2015 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 the plumbing, mechanical, and electrical sections. Significant code changes are highlighted in the text and summarized on the inside back cover. Minor changes and those that only affected numbering, not substance, are not shown. To determine the codes in your area, contact your local building department and the ICC web site at codes.iccsafe.org.

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

CODES REFERENCED IN CODE CHECK

Organization	Code	
ICC	2015 IRC	International Residential Code
IAPMO	2015 UPC	Uniform Plumbing Code
IAPMO	2015 UMC	Uniform Mechanical Code
NFPA	2014 NEC	National Electrical Code

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

ABBREVIATIONS

A = amp(s) (ex: a 15A breaker)
ABS = black plastic DWV pipe
ACH = air changes per hour
AFF = above finished floor
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 gas 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.)
FSD = fire separation distance
FVIR = flammable-vapor ignition-resistant
galv = galvanized
GB = gypsum board
GEC = grounding electrode conductor
GPM = gallons per minute
ICF = insulating concrete forms
IMC = intermediate metal conduit
in. (after number) = inch(es) (ex: 24 in.)
kw = kilowatt
L&L = listed & labeled
lav = lavatory (bathroom sink)
lb. = pound
LFMC = liquidtight flexible metal conduit
LFNC = liquidtight flexible nonmetallic conduit
LL = line separating lots or lot from street
manu = manufacturer
max = maximum
min = minimum
n/a = not applicable
NM = nonmetallic sheathed cable
O.C. = on center
OCPD = overcurrent protection device
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
SFD = single family dwelling
SMACNA = Sheet Metal & Air Conditioning Contractors National Association
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
WRB = water-resistive barrier
WSFU = water supply fixture unit(s)

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 conventional wood-frame 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 dictate that 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.

Code numbers in the IRC begin with a letter R for building, P for plumbing, M for mechanical, G for gas, and E for electrical. We omitted these letters to save space.

KEY TO USING CODE CHECK

Each item with a checkbox refers to a **code rule**, with **code citations** at the right of the line. The building section has only one column of code citations, referencing the **2015 IRC.** Two columns of references are used in the plumbing, mechanical, and electrical sections. The citation in the left column is from the **2015 IRC**, and the one in the right column is from the **2015 UPC**, **2015 UMC**, or **2014 NEC**. Exceptions to a code are shown in the line following the letters EXC, as in this example from p. 19:

☐ Hot on left, cold on right when facing outlet EXC_____2722.2 417.5
• Single handle controls – hot/cold per control labels _____2722.2 417.5

The rule here is that fixtures must have hot water on the left, cold on right, as found in 2722.2 of the IRC and 417.5 of the UPC. There is an exception for faucets with labeled single handle controls.

Figures and tables are referenced in text lines by bolded colored fonts, as shown in the following example from p. 3:

☐ CMU reinforcement min distance from soil **T1, F3**_____404.1.2.1

The bold letters direct to Table 1 and Figure 3.

Significant changes are given a different color code citation and an endnote that keys to the list on the inside back cover. Example from page 19:

☐ 21 in. {24 in. UPC} min clear in front of lav or toilet____ 2705.1#5 402.5[45]

The rule here is that clearance is required in front of a lavatory sink or toilet (21 inches in the IRC and 24 inches in the UPC), and the superscript after the UPC citation tells us that it is change #45 on the inside back cover.

California amendments are handled the same way, with the exception of the letters CA in front of the change number, and a colorized checkbox.
Example from page 19:

■ Max 1.6 gallons per flush (check local rules)_____ 2903.2 411.2[CA7]

The rule here is that toilets have a maximum 1.6 gallons per flush, and California has modified this rule, as shown in CA change #7 on the inside back cover.

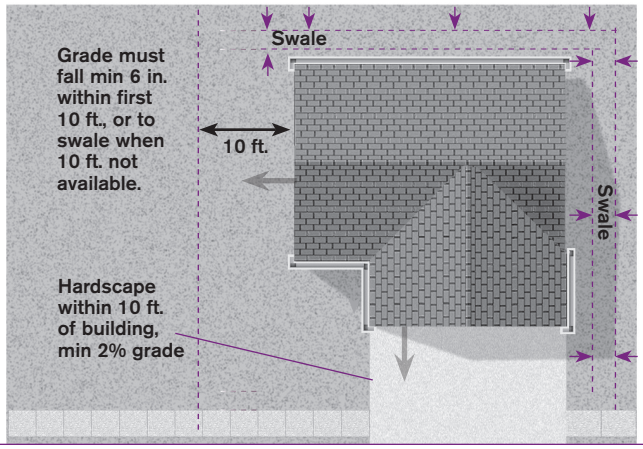
SOILS & GRADING

Soils, Grading & Drainage — 15 IRC

- ☐ Grading from foundation min 6 in. fall in 1st 10 ft. EXC **F2** _____ 401.3
  - • Use drains or swales when lot lines, walls, etc. prevent 6 in./10 ft. __ 401.3X
- ☐ Hardscape min 2% slope away from building within 10 ft. **F2** _____ 401.3X
- ☐ Graded sites top of foundation min 12 in. + 2% above street drain ____ 403.1.7.3
- ☐ Drain system req'd for foundations enclosing usable space below grade unless well-drained ground or sand/gravel mixture **F3** _____ 405.1
- ☐ Walls retaining earth & enclosing interior space req dampproofing **F3** to finished grade EXC _____ 406.1
  - • If high water table, waterproofing to finished grade _____ 406.2
- ☐ Expansive soil req design per IBC 1808.6 or waiver by BO _____ 403.1.8
- ☐ Utility or other trench may not undermine footing – stay outside line extending 45° out from outside bottom edge of footing _____ 2604.4

FIG. 2

Site Grading

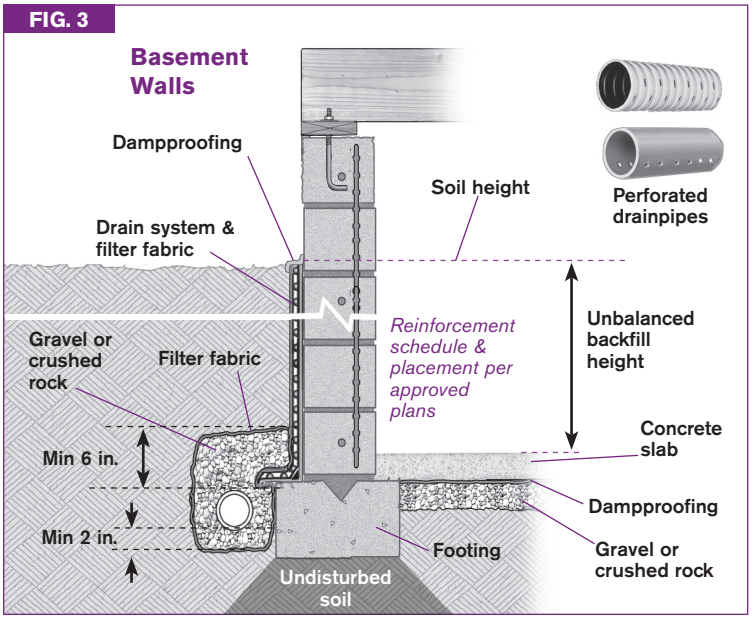


FOOTINGS & FOUNDATIONS

General — 15 IRC

- ☐ Top surface of footings req'd to be level _____ 403.1.5
- ☐ Max slope bottom of footing 1:10 – must be stepped if > 1:10 _____ 403.1.5
- ☐ Min footing thickness 6 in., min footing projection 2 in. **F3** _____ 403.1.1
- ☐ Min footing width & thickness per Tables 403.1(1-3) _____ 403.1.1[2]
- ☐ Footings min 12 in. below undisturbed ground surface **F3** _____ 403.1.4
- ☐ Footings must extend below frost line _____ 403.1.4.1
- ☐ Excavation free of organic material & wood forms removed ____ 408.5 & 506.2
- ☐ Untreated wood beam pockets req 1/2 in. air space at ends & sides _ 317.1#4

FIG. 3



Plates & Sills — 15 IRC

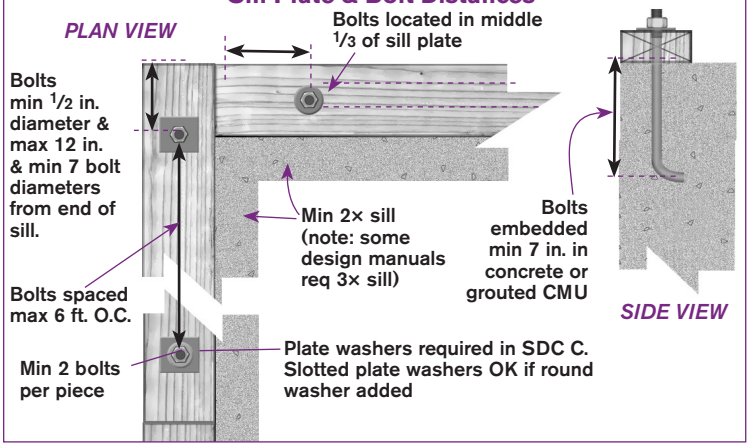
- ☐ Foundation walls min 6 in. above earth (4 in. if masonry veneer used) ___404.1.6
- ☐ Sill PT or decay resistant if < 8 in. above exposed ground _____ 317.1#2
- ☐ PT wood fasteners (including nuts & washers) hot-dipped galv, stainless steel, silicone bronze, or Cu EXC _____ 317.3.1
  - • Bolts ≥ 1/2 in. diameter _____317.3.1X1
  - • Plain carbon steel OK in Zi-Borate treated wood in dry interior____ 317.3.1X3
- ☐ Connector coatings & weights AMI or min G185_____ 317.3.1

Anchor Bolts

- ☐ Req'd for all wood sills & for exterior wall sole plates of monolithic slabs ___403.1.6
- ☐ Req'd for interior BWPs of monolithic slabs _____403.1.6
- ☐ Bolts must be in concrete or grouted cell of CMUs_____403.1.6
- ☐ Min 2 per plate section, min 7 in. embedment, max spacing 6 ft. O.C.___403.1.6
- ☐ Max 12 in. & min 7 bolt diameter from end of sill, middle 1/3 of width **F4** _ 403.1.6[3]
- ☐ SDC D & Light-frame Townhouses in SDC C: **F4**_____ 403.1.6.1
  - • Bolts req'd at all interior BWP plates & interior bearing wall sole plates
  - • Min 3 in. × 3 in. plate washers all BWLs per 602.11.1
  - • Max spacing 4 ft. O.C. for over 2 stories

FIG. 4

Sill Plate & Bolt Distances



BASEMENT & FOUNDATION WALLS

General — 15 IRC

- ☐ Parge CMU walls prior to dampproofing EXC _____ 406.1
  - • Dampproofing materials approved for direct application _____406.1X
- ☐ No unbalanced backfill > 4 ft. until walls anchored to floor _____ 404.1.7
- ☐ Walls subject to hydrostatic pressure, or supporting > 48 in. backfill w/o lateral restraint at top or bottom req engineered design_____ 404.1.1
- ☐ CMU reinforcement min distance from soil **T1, F3**_____404.1.2.1

TABLE 1 — BAR DISTANCE FROM SOIL T404.1.1(2,3,4)

Thickness of masonry foundation wall	8 in.	10 in.	12 in.
Distance face of soil to center of steel	5 in.	6 3/4 in.	8 3/4 in.

CONCRETE & REINFORCEMENT

General — 15 IRC

- ☐ Min 2,500 PSI in SDC A, B, or C _____ 404.1.3.3.1
- ☐ Min 3,000 PSI in SDC D _____ 404.1.3.3.1
- ☐ Max slump 6 in. for concrete in removable forms _____ 404.1.3.3.4

Rebar

- ☐ SDC D footings req reinforcement min 3 in. from bottom _____ 403.1.3
- ☐ SDC D #4 vertical bar 4 ft. O.C. req'd if construction joint between footing & stem wall or between footing & grouted CMU wall _____ 403.1.3.1
- ☐ SDC D #4 horizontal bars req'd within 12 in. of top of stem wall & 3 in. to 4 in. from bottom of footing_____ 403.1.3.1
- ☐ SDC D slab w/ turned-down footing reinforcement per **F5**_____ 403.1.3.3
- ☐ Clearance to forms & soil **T2**_____404.1.2 & 404.1.3.3.7.4
- ☐ Splice laps (grade 60) min 30 in. #4, 38 in. #5, 45 in. #6 _____ 404.1.3.3.7.5
- ☐ Max gap between parallel lapped bars 6 in. & 1/5 splice length _ 404.1.3.3.7.5

TABLE 2 — REINFORCING STEEL COVER 404.1.3.3.7.4

Foundation Surface	Min Cover ≤ #5 bars	Min Cover ≥ #6 bars
Cast against & permanently exposed to earth	3 in.	3 in.
Cast in removable forms & exposed to earth	1 1/2 in.	2 in.
Not exposed to weather (top of indoor slab)	3/4 in.	3/4 in.
Stay-in-place forms (ICF)	3/4 in.	3/4 in.

FLOOR FRAMING

Girders, Beams & Joists — 15 IRC

- ☐ End bearing min 1½ in. on wood or metal, 3 in. on concrete & masonry _ 502.6[6]
- ☐ Bearing on concrete direct (3 in.) or on 2 in. sill min 48 sq. in. area____ 502.6
- ☐ Joists into side of girder req hanger or min 2 in. × 2 in. ledger _____ 502.6.2
- ☐ Joist lap from opposite side of girder min 3 in. & 3 10d face nails ___ 502.6.1
- ☐ Posts that support beams & girders req positive connections _____ 502.9
- ☐ Max joist spans 40 psf floor per **T3** _____ 502.3[7]
- ☐ Notching & boring sawn lumber in accord w/ **F7 & T3** _____ 502.8.1
- ☐ Notching & boring engineered lumber AMI _____ 502.8.2
- ☐ Modification of engineered lumber AMI or per design professional __ 502.8.2
- ☐ Partition wall or girder offset under perpendicular bearing walls cannot exceed depth of joist **F8** _____ 502.4
- ☐ Double joists under parallel bearing walls **F9** _____ 502.4
- ☐ Prevent rotation of joists (blocking or hangers req'd at ends) _____ 502.7
- ☐ Blocking also req'd at intermediate supports SDC D _____ 502.7X2
- ☐ Manufactured lumber & trusses req lateral restraint AMI _____ 502.7X1
- ☐ Joists > 2×12 req blocking or bridging at max 8 ft. O.C._____ 502.7.1

Clearance to Soil

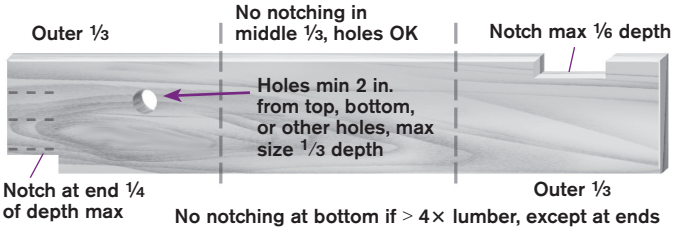
- ☐ Girders min 12 in. above exposed ground if not PT or naturally durable _317.1
- ☐ Joists & subfloor min 18 in. above ground if not PT or naturally durable _317.1
- ☐ Sills < 8 in. from exposed ground PT or naturally durable wood_____317.1

TABLE 3 JOIST SPAN, NOTCHING & BORING T502.3.1(2) & 502.8.1

Floor Joist Spans—40 lb. Live Load[A] (ft.–in.)				Notching (in.)		Boring (in.)
Size[B]	12 in. O.C.	16 in. O.C.	24 O.C.	End	Outer 1/3	2 in. to edge
DF 2×6	10–9	9–9	8–3	1 3/8	7/8	1 1/2
SP 2×6	10–3	9–4	7–7			
DF 2×8	14–2	12–9	10–5	1 7/8	1 3/16	2 7/16
SP 2×8	13–6	11–10	9–8			
DF 2×10	18–0	15–7	12–9	2 3/8	1 1/2	3 1/16
SP 2×10	16–2	14–0	11–5			
DF 2×12	20–11	18–1	14–9	2 7/8	1 7/8	3 3/4
SP 2×12	19–1	16–6	13–6			

A. See *Code Check Building* for 30 lb. floor load tables & for girder & header span tables.
B. "DF" = Douglas Fir-Larch #2, "SP" = Southern Pine #2

FIG. 7 Notching & Boring



Fire Protection of Floors — 15 IRC

- ☐ Min 1/2 in. GB or 5/8 in. wood panels underside of floor framing EXC _ 302.13
  - • Over space with sprinkler system _____ 302.13X1
  - • Over crawl space w/ no storage or fuel-fired appliances _____ 302.13X2
  - • Over unprotected space ≤ 80 sq. ft. & separated w/fireblocking __ 302.13X3
  - • Wood floor assembly w/ min 2×10 dimensional or composite lumber _____ 302.13X4
- ☐ OK to penetrate floor for ducts, wires, piping, etc._____ 302.13[8]

FIG. 8 Bearing Wall Support

Bearing walls should not offset more than 1 joist depth from the supporting girder or wall below the floor unless sized for additional load.

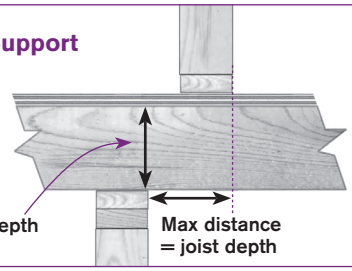
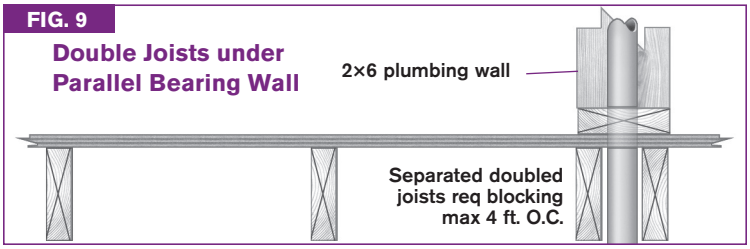


FIG. 9 Double Joists under Parallel Bearing Wall



PIPING INSTALLATION & PROTECTION

General	15 IRC	15 UPC
☐ Max support intervals **T11**	2605.1	313.3
☐ Min 16 gauge steel shield plate if < 1¼ in. from edge of framing (18 gauge and 1 in. in UPC) **F26**	2603.2.1[34]	312.9
☐ Extend 2 in. above sole plate & below top plates	2603.2.1	n/a
☐ Protection from freezing req'd for pipes outside building thermal envelope in areas subject to freezing	2603.5	312.6
☐ Pipes & fittings must bear manufacturer identification & any markings req'd by applicable standards, exc for small sizes	2609.1	301.2.1

TABLE 11 MAX SUPPORT INTERVALS IRC T2605.1 UPC T313.3

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. > 1 in. – 4 ft.[35]	
ABS & PVC[A]	4 ft.	
Cast iron w/ no-hub fittings[B]	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	IRC ≤ 1¼ in. – 6 ft., ≥ 1½ in. – 10 ft.	IRC: 10 ft. UPC: Each floor & max 10 ft.
	UPC ≤ 1½ in. – 6 ft., ≥ 2 in. – 10 ft.	

A. UPC: Provide for expansion every 30 ft.
B. UPC: Brace at max 40 ft. intervals to prevent horizontal movement.

Utility Trenches	15 IRC	15 UPC
☐ Backfill in layers & tamped in place–no backhoe or grader until 12 in. of tamped earth in place **F25**	2604.3	314.4
☐ Trench width for plastic drain pipe = pipe O.D. + 16 in. **F25**	n/a	314.4.1[36]
☐ 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	2906.4.1	609.2
☐ If other sewer material, separate trench req'd (5 ft. away IRC) or install water pipe on shelf 12 in. above sewer	2906.4.1	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	312.10

FIG. 25

Pipes in Trench

Pipe centered in trench & fully supported on smooth even bed

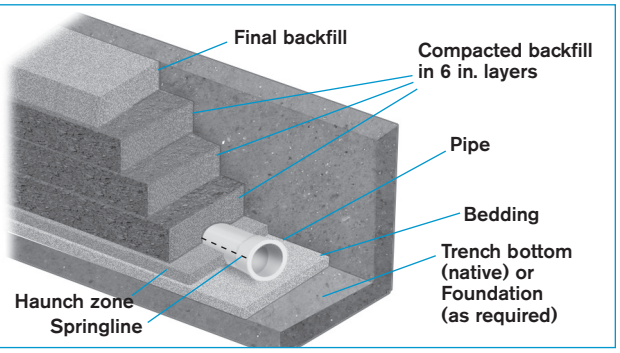
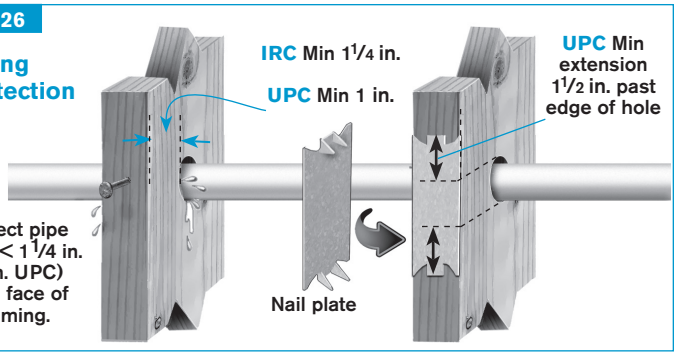


FIG. 26

Piping Protection



Piping Under or Encased in Concrete Slabs	15 IRC	15 UPC
☐ Pipes through concrete wrapped or sheathed	2603.3	312.10
☐ Gas underground beneath building req's conduit	2415.14	1210.1.6
☐ Cu water tubing underground beneath building min Type L	n/a	604.3

Underground Gas Pipes		
☐ 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 if external damage likely at 12 in.	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-applied protection EXC	2415.11.2	1210.1.3
• Field wrapping OK AMI for threads & fittings	2415.11.2X	1210.1.3

ROUGH INSPECTION: TESTING

Required Pre-Concealment Piping Tests	15 IRC	15 UPC
☐ Test all piping before cover or concealment	2503.2	105.1
☐ DWV min 5 ft. (10 ft. UPC) water head for 15 min. OR	2503.5.1	712.2
• Air test 5 psig (10 in. mercury) for 15 min.	2503.5.1	712.3
☐ Water pipe test 15 min. w/ potable water at working pressure or 50 psig air for nonplastic pipe only	2503.7	609.4
☐ Gas test min 10 min. at 1½ × working pressure & min 3 psig (15 min. at 10 psig UPC)	2417.4.1	1213.3

TABLE 12 BRANCH DRAIN & VENT SIZE IRC T3005.4.1 UPC T703.2

Pipe size		1¼ in.	1½ in.	2 in.	2½ in.	3 in.	4 in.
IRC DFUs	Vertical	1	4	10	20	48	240
	Horizontal	1[A]	3[A]	6[A]	12[A]	20	160
UPC DFUs	Vertical	1	2	16	32	48	256
	Horizontal	1	1	8	14	35	216[A]
UPC Vents[B]	Max DFUs	1	8	24	48	84	256
	Max Feet[C]	45	60	120	180	212	300

A. Based on ¼ in./ft. slope
B. IRC vents min 1¼ in. & min half the req'd drain diameter. IRC vents > 40 ft. req 1 pipe size increase.
C. UPC vents increase 1 pipe size if horizontal length > 2× the vertical length.

VENTING

General (Gravity Gas)

	15 IRC	15 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" T21	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	802.6.3.2
• Systems designed using vent sizing tables	2428.2.3	803.1.2
☐ Provide proper support AMI	2426.5&6	802.6.5
☐ Insulation shield to min 2 in. above attic insulation	2426.4	802.6.2.7
☐ 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 21 APPLIANCE VENTING CATEGORIES

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

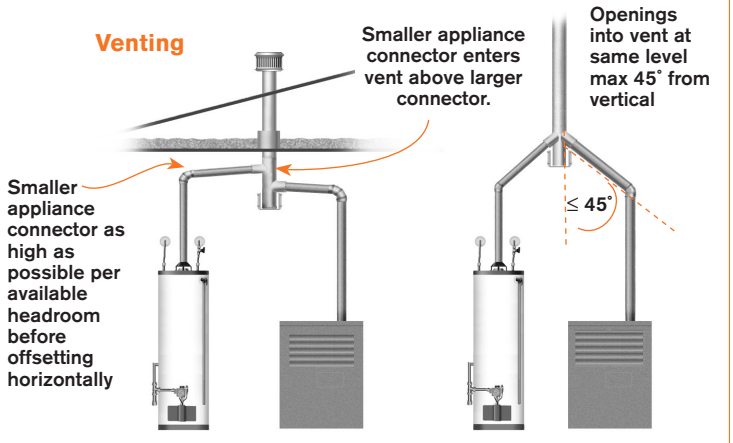
Connectors

	15 IRC	15 UMC
☐ Connectors short & straight as practical	2428.3.2	803.2.2
☐ 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 upsizes of diameter of vent collar	2428.2.11	803.1.13
☐ No single-wall in attics or excessively cold areas	2427.10.2.2	802.10.1.1
☐ No single-wall connector through interior wall	2427.10.13	802.10.12
☐ Slope min 1/4 in./ft. toward appliance F52	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

	15 IRC	15 UMC
☐ 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 F52	2427.10.4	802.10.3.1
☐ Connectors ≤ 45° of vertical OK at same level F52	2427.10.4.1	802.10.3

FIG. 52



Gas Vent Entering Masonry Chimney

	15 IRC	15 UMC
☐ Must be lined w/ clay or metal EXC	2427.5.5.1	802.5.7.1
• Not req'd when replacing appliance of similar type & rating & if chimney inspected for damage	2427.5.5.1	802.5.7.1X
☐ Cross-sectional area not > 7× size of gas vent	2427.5.4	802.5.5

Single-Wall Vent

	15 IRC	15 UMC
☐ Not allowed in dwellings & residential occupancies	n/a	802.7.3
☐ Run 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	2427.6.4	802.6.2.1
☐ If vertical surface within 8 ft. vent must terminate min 2 ft. higher than any part of building within 10 ft. horizontal F53	2427.6.3	802.6.2
☐ Min height above roofs T22	2427.6.3	802.6.2

FIG. 53

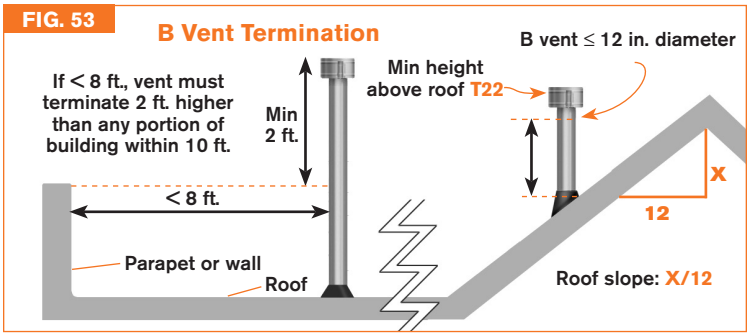


TABLE 22 B VENT TERMINATION (F53) IRC F2427.6.3 UMC T802.6.2

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

Mechanical Draft Systems (Cat. III & IV)

	15 IRC	15 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	802.3.3.2
☐ 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#4	802.3.3.3
☐ Terminate min 4 ft. to side or below or 1 ft. above building openings & min 1 ft. above ground level	2427.8#2	802.8.1
☐ Min 10 ft. horizontal separation from openings in adjacent building when vent terminates through outside wall	2427.8#5[49]	802.8.5
☐ Collect & dispose of condensate from vent	2427.9	802.9

Direct Vent Termination

(Note: Cat. IV furnaces with combustion air piped from same area as vent outlet can be considered direct vent appliances AMI)

☐ Clearances to building openings: 0–10 kBtu/hr min 6 in., 10–50 kBtu/hr min 9 in., > 50 kBtu/hr min 12 in. F54	2427.8	802.8.2
☐ 12 in. min clearance to finished ground level	2427.8	802.8.2

FIG. 54

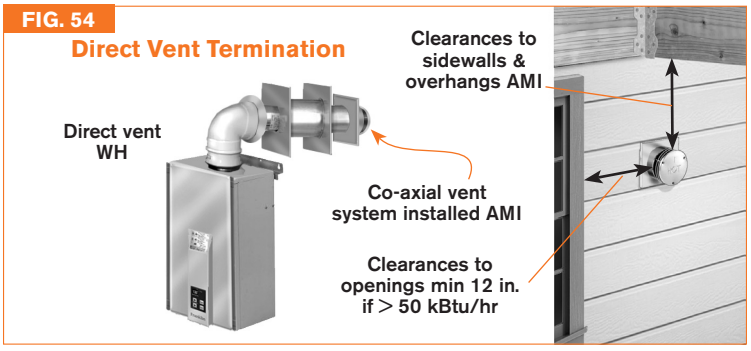
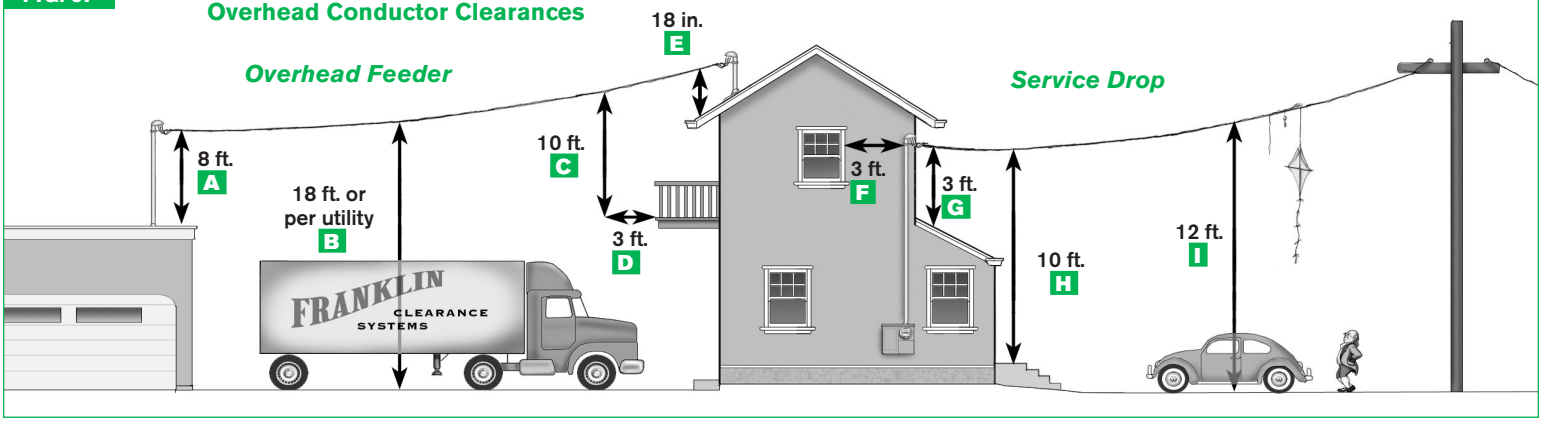


FIG. 57

Overhead Conductor Clearances



SERVICES

General	15 IRC	14 NEC
☐ All materials & equipment req approval from AHJ	3403.1	110.2
☐ L&L equipment must be installed AMI	3403.3	110.3B
☐ Single-family dwelling min 100A service	3602.1	230.79C
☐ All other services min 60A	3602.1	230.79D
☐ Only 1 service allowed per dwelling	3601.2	230.2

Service Riser/Lateral		
☐ Underground cover depth per utility & T24	3803.1	300.5A
☐ Underground raceways sealed inside panel	3601.5	230.8
☐ Warning ribbon ≥ 12 in. above buried service conductors	3803.2	300.5D3
☐ Only service conductors on mast (no CATV or phone)	3604.5	230.28
☐ No unsupported couplings above roof	3604.5.2[53]	230.28B[53]
☐ Conduit hubs identified for use w/ service equipment	3604.5.1	230.28A
☐ Plumbing pipe or fittings prohibited as conduit	3801.2	110.8
☐ Secure conduit within 3 ft. of service box	T3802.1	3XX.30A*

**The NEC uses a parallel numbering system. The section for support is ".30." The articles for various service risers are RMC=344, IMC=342, RNMC=352, EMT=358.*

Meters & Service Equipment		
☐ Verify meter height, location, fees w/ utility	utility	utility
☐ Meter base alone not considered service equipment	3606.4	230.66
☐ Service panel L&L as suitable for service F59	3606.4	230.66
☐ Service disconnect readily accessible & inside or outside nearest point of entrance of service conductors	3601.6.2	230.70A1
☐ Max 6 switches or breakers to disconnect power	3601.7	230.71A
☐ Combined rating of main breakers ≥ max load per T28	3602.3	230.80
☐ Backfed breakers mechanically secured in place	3706.5	408.36D
☐ Neutral bar bonded in service equipment F59	3607.5	250.24B

Service Conductors		
☐ Not OK to pass through interior of another building	3601.3	230.3
☐ Utility may have jurisdiction for outside service conductors	utility	90.2C
☐ Conductors min size for calculated load per T28	3602.1	230.42A
☐ Min conductor out of weatherhead per utility	utility	utility
☐ Identify (white tape) insulated neutral at each end	3407.1	200.6B
☐ Drip loop below weatherhead F57	3605.9.5	230.54F
☐ Arrange conductors to prevent water entry into riser	3605.9.6	230.54G
☐ Exposed wire listed sunlight-resistant or covered w/ tape or sleeving that is listed as sunlight-resistant	3605.6	310.10D
☐ Secure SE cable every 30 in.	T3802.1	230.51A
☐ Secure SE cable within 12 in. of box & service head	T3802.1	230.51A
☐ Wet location–type raceway & cable fittings req'd outdoors	3907.2	312.2

Vertical Clearances from Grade F57		
☐ 10 ft. min to lowest point of drip loop	3604.2.2	230.24.B
☐ 10 ft. min where accessible only to pedestrians H	3604.2.2	230.24.B
☐ 12 ft. above residential property & driveways I	3604.2.2	230.24.B
☐ 18 ft. above public streets & tractor trailer parking B	3604.2.2	230.24.B

Vertical Clearances above Roofs F57	15 IRC	14 NEC
☐ Setback, location & clearances per utility	utility	utility
☐ 8 ft. min if slope < 4:12 EXC A	3604.2.1	230.24A
• 10 ft. vertical above walkable roof deck C	3604.2.1X1	230.24AX1
☐ 3 ft. min if slope ≥ 4:12 EXC G	3604.2.1X2	230.24AX2
• 18 in. above roof OK ≤ 4 ft. overhanging eave E	3604.2.1X3	230.24AX3
☐ Maintain req'd clearance for 3 ft. past roof edge EXC	3604.2.1	230.24A
• When attached to side of building	3604.2.1X4	230.24AX4
☐ 3 ft. clearance OK for guarded/isolated roof areas	3604.2.1	230.24AX5

Clearances from Building Openings F57		
☐ 3 ft. to sides of doors or decks & 3 ft. below or to sides of openable windows F EXC	3604.1	230.9A
• Not req'd for raceway or enclosed cable	F3604.1	230.9A
☐ Distance above window per utility or local AHJ	utility	230.9AX
☐ Clearance above decks extends 3 ft. past edge C D	3604.1	230.9A

FIG. 58

Working Space around Equipment

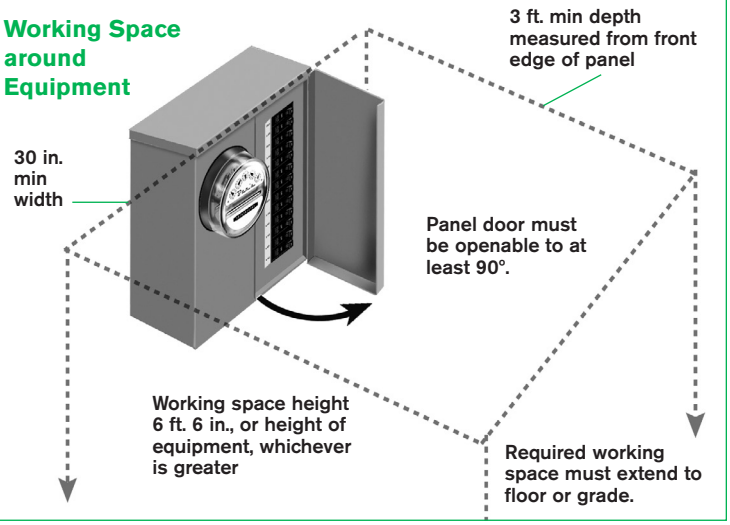


TABLE 24 MIN COVER REQUIREMENTS IRC T3803.1 NEC T300.5

Location	UF cable	Rigid metal	PVC	GFCI 15 or 20A circuit	≤ 30v
General	24 in.	6 in.	18 in.	12 in.	6 in.
Below 2 in. of concrete	18 in.	6 in.	12 in.	6 in.	6 in.
Under building	n/a	0	0	n/a	n/a
Under min 4 in. slab no vehicle	18 in.	4 in.	4 in.	6 in.	6 in.
Street	24 in.	24 in.	24 in.	24 in.	24 in.
Driveway	18 in.	18 in.	18 in.	12 in.	18 in.

GFCI & AFCI PROTECTION

Required GFCI Protection	15 IRC	14 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 any sink	3902.77[58]	210.8A7[58]
☐ Hoists & receps in boathouses	3902.11&12	210.8A8&C
☐ Receps within 6 ft. of any tub or shower stall	3902.8[58]	210.8A9[58]
☐ Receps in laundry areas (including clothes washer)	3902.9[59]	210.8A10[59]
☐ Outlets supplying dishwashers	3902.10[60]	210.8D[60]

AFCI Protection		
☐ Req'd for branch circuits w/ outlets or devices in family rooms, recreation rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, laundries, dining rooms, closets, hallways, kitchens & similar	3902.16[61]	210.12A[61]
☐ Req'd for replacement receptacles in above locations	n/a	406.4D3
☐ "Outlet" = receptacle, lighting, or smoke alarm outlet	3501	100
☐ Req'd for extensions or modifications of existing circuits serving above locations (can be outlet type at 1st recep) EXC	3902.17	210.12B
• ≤ 6 ft. of conductor extension w/ no new outlets or devices (panel replacement to nearby location)	3902.17X[62]	210.12BX[62]
☐ Must be UL listed "combination type" or type w/ similar effectiveness–see *Code Check Electrical* for complete list	3902.16[63]	210.12A[63]

APPLIANCES

Required Disconnecting Means	15 IRC	14 NEC
☐ Breaker alone OK if ≤ 300VA or 1/8 horsepower	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 **F65**	T4101.5	422.31B
☐ Lockable = equipped w/ lockout hasp that remains in place w/ lock removed **F65**	T4101.5	110.25

FIG. 65

Breaker Lockout Hasp

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

Kitchen	15 IRC	14 NEC
☐ Range/oven > 8.75kw min 40A branch circuit	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	3703.1	422.12
☐ 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	424.3B
☐ In-sight or lockable breaker or switch req'd **F65**	T4101.5	422.31B
☐ Receps in baseboard heaters not on heater circuit	3901.1	424.9

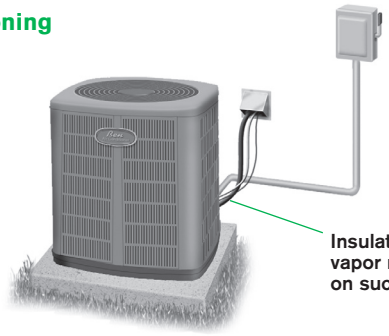
Paddle Fans		
☐ Not to be supported by standard electrical boxes	3905.9	422.18
☐ Listed fan support boxes & systems OK to 70 lb.	3905.8	314.27C
☐ If listed for > 35 lb., max weight must be marked	3905.8	314.27C
☐ Spare separately switched conductors to ceiling boxes only OK if box listed for paddle fan support	3905.8	314.27C

Window/Wall Air Conditioners	15 IRC	14 NEC
☐ Max cord length 120V = 10 ft., 240V = 6 ft.	n/a	440.64
☐ Cord/plug units req AFCI or LCDI 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 **F66**	T4101.5	440.14
☐ Working space req'd in front of disconnect **F66**	3405.2	110.26A

FIG. 66

Air-Conditioning Condenser



All air conditioners require an in-sight disconnect.

LIGHTING OUTLETS

Required Locations	15 IRC	14 NEC
☐ All habitable rooms & bathrooms	3903.2	210.70A1
☐ Switched wall 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
☐ Neutral req'd at box in habitable rooms & bathrooms	4001.15	404.2C

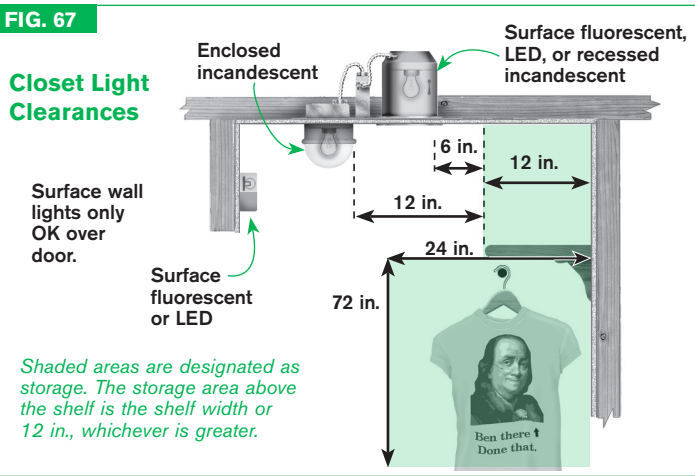
Bath		
☐ No pendant, track, or suspended lights or paddle fans < 8 ft. above & 3 ft. to side of top of tub or shower threshold	4003.11	410.10D
☐ Luminaires < 8 ft. above footprint of tub/shower L&L for damp or wet locations if subject to shower spray	4003.11	410.10D

Recessed Lights		
☐ 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
☐ Type IC OK in contact w/ insulation & combustibles	4004.8&9	410.116A2

Clothes Closet **F67**		
☐ 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. 67

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.