



UNIFORM PLUMBING CODE TABLES/EQUATIONS
BASED ON THE 2015 UNIFORM PLUMBING CODE
QUICK-CARDS® A UNIQUE QUICK-REFERENCE GUIDE



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GENERAL REGULATIONS

HANGERS & SUPPORTS (UMC Table 313.3)			
MATERIALS	TYPES OF JOINTS	HORIZONTAL	VERTICAL
Cast	Lead and Oakum	5 ft., except 10 ft. where 10 foot lengths are installed	Base & Each Floor = 15 ft. max.
	Compression Gasket	Every other joint; Each joint if over 4 ft.	Base & Each Floor = 15 ft. max.
Cast-Iron Hubless	Shielded Coupling	Every other joint; Each joint if over 4 ft.	Base & Each Floor = 15 ft. max.
Copper & Copper Alloys	Soldered, Brazed, Threaded or Mechanical	6 ft., if 1-1/2" and smaller; 10 ft., if 2" and larger	Each Floor = 10 ft. max.
Steel Pipe for Water or DWV	Threaded or Welded	10 ft., if 3/4" and smaller; 12 ft., if 1" and larger	Every Other Floor = 25 ft. max.
Steel Pipe for Gas	Threaded or Welded	6 ft., if 1/2"; 8 ft., if 3/4" and 1" 10 ft., if 1-1/4" & larger	6 ft., if 1/2"; 8 ft., if 3/4" and 1"; every floor level, if 1-1/4"
Schedule 40 PVC & ABS DWV	Solvent Cemented	4 ft., all sizes. Allow for expansion every 30 ft.	Base & Each Floor = mid-story guides. Provide for expansion every 30 ft.
CPVC	Solvent Cemented	3 ft., if 1" and smaller; 4 ft., if 1-1/4" & larger	Base & Each Floor = mid-story guides.
Lead	Wiped or Burned	Continuous Support	4 ft. max.
Steel	Mechanical	In accordance with standards acceptable to the Authority Having Jurisdiction.	
PEX	Cold Expansion, Insert & Compression	32 in., if 1" & smaller; 4 ft., if 1-1/4" & larger	Base & Each Floor = mid-story guides.
PEX-AL-PEX	Metal Insert and Metal Compression	All sizes 98 in., 1/2", 3/4", 1"	Base & Each Floor = mid-story guides.
PE-AL-PE	Metal Insert and Metal Compression	All sizes 98 in., 1/2", 3/4", 1"	Base & Each Floor = mid-story guides.
PE-RT	Insert and Compression	32 in., if 1" and smaller; 4 ft., if 1-1/4" & larger	Base & Each Floor = mid-story guides.
POLYPROPYLENE (PP)	Fusion weld, threaded (metal threads only), or mechanical	32 in., if 1" and smaller; 4 ft., if 1-1/4" & larger	Base & Each Floor = mid-story guides

HANGER ROD SIZES (UPC Table 313.6)	
PIPE & TUBE SIZE (MIN.)	ROD SIZE (MIN.)
1/2" to 4"	3/8"
5" to 8"	1/2"
10" to 12"	5/8"

Note: Hanger rod sizes must not be smaller than those listed in this table. Hangers and anchors must be of sufficient strength to support the weight of the pipe and its contents.

TEST GAUGES (UPC 318.0)	
PRESSURE TEST	GAUGE INCREMENTATION
10 psi or less	0.10 psi or less
Greater than 10 psi to 100 psi	1 psi or less
Greater than 100 psi	2% or less of the required test pressure

Note: Tests which are performed utilizing dial gauges, must be limited to gauges having the pressure graduations or incrementations listed on this table.

PROTECTION OF PIPING MATERIALS & STRUCTURES (UPC 312.3; 312.6)	
PIPE	RESTRICTION
Building sewer or drainage pipe	must not be installed under or within 2' of a building or structure or less than 1' below the surface of the ground.
Water, soil or waste pipe	must not be installed outside of a building, in attics or crawl spaces or in an exterior wall.

PLUMBING FIXTURES & FIXTURE FITTINGS

MAXIMUM FIXTURE & FIXTURE FITTINGS FLOW RATES (UPC Table L 402.1)	
FIXTURE TYPE	FLOW RATE
Showerheads	2.0 gpm at 80 psi
Kitchen faucets residential	1.8 gpm at 60 psi
Lavatory faucets residential	1.5 gpm at 60 psi
Lavatory faucets other than residential	0.5 gpm at 60 psi
Metering faucets	0.25 gallons/cycle
Metering faucets for wash fountains	One 0.25 gallons/cycle fixture fitting for each 20 inches rim space
Wash fountains	One 2.2 gpm at 60 psi fixture fitting for each 20 inches rim space
Water closets - other than remote locations	1.28 gallons/flush
Water closets - remote locations	1.6 gallons/flush
Urinals	0.5 gallons/flush
Commercial Pre-Rinse Spray Valves	1.3 gpm at 60 psi

Note: Remote location is where a water closet is located not less than 30 feet upstream of the nearest drain line connections or fixtures, and is located where less than 1.5 drainage fixture units are upstream of the water closet drain line connection.

LIMITATIONS OF HOT WATER TEMPERATURE (UPC 407.3, 408.3, 409.4, 410.3, 225.0)	
FIXTURE	MAXIMUM TEMPERATURE
Public Lavatories	120°F
Individual Shower and Tub-Shower Combination	120°F
Bathtubs and Whirlpool Bathtubs	120°F
Bidets	110°F
Water Heater or Hot Water Heating Boiler	210°F

MINIMUM PLUMBING FACILITIES - FIXTURES PER PERSON (UMC Table 422.1)					
Occupancy A-1: Assembly occupancy (fixed or permanent seating) - theatres, concert halls & auditoriums.					
Occupancy A-3: Assembly occupancy (typical without fixed or permanent seating) - places of worship, museums etc.					
WATER CLOSETS		URINALS	LAVATORIES		
MALE	FEMALE	MALE	MALE	FEMALE	
1: 1-100 2: 101-200 3: 201-400	1: 1-25 2: 26-50 3: 51-100 4: 101-200 5: 201-300 6: 301-400 7: 401-500	1: 1-200 2: 201-300 3: 301-400 4: 401-600	1: 1-200 2: 201-400 3: 401-600 4: 601-750	1: 1-100 2: 101-200 3: 201-300 4: 301-500 5: 501-750 6: 751-1000	1: 1-100 2: 101-200 3: 201-300 4: 301-500 5: 501-750 6: 751-1000
Over 400 add 1 fixture for each additional 500		Over 400 add 1 fixture for each additional 125	Over 600 add 1 fixture for each additional 300	Over 750, add 1 fixture for each additional 250	Over 750, add 1 fixture for each additional 200
OCCUPANCY R-1: Residential occupancy (minimal stay) - hotels, motels, bed and breakfast homes					
WATER CLOSETS		LAVATORIES	BATHTUBS/SHOWERS		
1 Per Sleeping Room		1 Per Sleeping Room	1 Per Sleeping Room		
OCCUPANCY R-2: Residential occupancy (long term or permanent)					
APARTMENTS					
WATER CLOSETS		LAVATORIES	BATHTUBS/SHOWERS		
1 Per Apartment		1 Apartment	1 Per Apartment		
DORMITORIES					
WATER CLOSETS		URINALS	LAVATORIES		BATHTUBS/SHOWERS
MALE	FEMALE	MALE	MALE	FEMALE	UNISEX
1 Per 10	1 Per 8	1 Per 25	1 Per 12	1 Per 12	1 Per 8
Add 1 fixture for each additional 25 males and 1 fixture for each additional 20 females.		Over 150 add 1 fixture for each additional 50 males.	Add 1 fixture for each additional 20 males and 1 fixture for each additional 15 females.		
OCCUPANCY R-3: Residential occupancy (one and two family dwellings)					
WATER CLOSETS		LAVATORIES	BATHTUBS/SHOWERS		
1 per one & two family dwelling		1 per one & two family dwelling	1 per one & two family dwelling		

Note: This is an abridged table. For complete table (and other occupancies) see 2015 UPC Table 422.1.

SANITARY DRAINAGE (CONTINUED)

MAX. UNIT LOADING AND MAX. LENGTH OF DRAINAGE & VENT PIPING (UPC Table 703.2)

SIZE OF PIPE (Inches)	1-1/4	1-1/2	2	3	4	5	6	8	10	12	NOTES: 1 Excluding trap arm. 2 Except sinks, urinals and dish washers - exceeding 1 fixture unit. 3 Except 6-unit traps or water closets. 4 Only four water closets or 6-unit traps allowed on a vertical pipe or stack, and not to exceed three water closets or six-unit traps on a horizontal branch or drain. 5 Based on 1/4" per ft. slope. For 1/8" per ft. slope, multiply horizontal fixture units by a factor of 0.8. 6 The diameter of an individual vent must be not less than 1-1/4" nor less than one-half the diameter of the drain to which it is connected.
DRAINAGE PIPING¹ - MAXIMUM UNITS											
Vertical	1	2 ²	16 ³	48 ⁴	256	600	1380	3600	5600	8400	
Horizontal	1	1	8 ³	35 ⁴	216 ⁵	428 ⁵	720 ⁵	2640 ⁵	4680 ⁵	8200 ⁵	
DRAINAGE PIPING¹ - MAXIMUM LENGTH (feet)											
Vertical	45	65	85	212	300	390	510	750	—	—	
Horizontal	-UNLIMITED-										
VENT PIPING⁶ - HORIZONTAL & VERTICAL											
Max. Units	1	8 ⁵	24	84	256	600	1380	3600	—	—	
Max. Length (feet)	45	60	120	212	300	390	510	750	—	—	

MAX. DRAINAGE FIXTURE UNITS FOR A TRAP & TRAP ARM (UPC Table 702.2.1)

SIZE OF TRAP & TRAP ARM	DRAINAGE FIXTURE UNIT VALUES (DFU)
1-1/4"	1 unit
1-1/2"	3 units
2"	4 units
3"	6 units
4"	8 units

DISCHARGE CAPACITY FOR INTERMITTENT FLOW ONLY* (UPC Table 702.2.2)

GPM	FIXTURE UNITS
Up to 7-1/2	Equals 1 Fixture Unit
Greater than 7-1/2 to 15	Equals 2 Fixture Units
Greater than 15 to 30	Equals 4 Fixture Units
Greater than 30 to 50	Equals 6 Fixture Units

INDIRECT WASTES; TRAPS & INTERCEPTORS

PIPE CONNECTIONS IN BLOWOFF CONDENSERS & SUMPS (UPC Table 810.1)

BOILERS BLOWOFF	WATER OUTLET	VENT
3/4"	3/4"	2"
1"	1"	2-1/2"
1-1/4"	1-1/4"	3"
1-1/2"	1-1/2"	4"
2"	2"	5"
2-1/2"	2-1/2"	6"

HORIZONTAL LENGTHS OF TRAP ARMS (EXCEPT FOR WATER CLOSETS & SIMILAR FIXTURES) ^{1,2} (UPC Table 1002.2)

TRAP ARM PIPE DIAMETER (Inches)	DISTANCE TRAP TO VENT MINIMUM (Inches)	LENGTH MAXIMUM (Inches)
1-1/4"	2-1/2"	30"
1-1/2"	3"	42"
2"	4"	60"
3"	6"	72"
4"	8"	120"
Exceeding 4"	2 x Diameter	120"

GRAVITY GREASE INTERCEPTOR SIZING (UPC Table 1014.3.6)

DRAINAGE FIXTURE UNITS (DFUs)	INTERCEPTOR VOLUME (gallons)	DRAINAGE FIXTURE UNITS (DFUs)	INTERCEPTOR VOLUME (gallons)
8	500	342	3,000
21	750	428	4,000
35	1,000	576	5,000
90	1,250	720	7,500
172	1,500	2,112	10,000
216	2,000	2,640	15,000
307	2,500	Note: Where the flow rate of directly connected fixture(s) or appliance(s) have no assigned DFU values, the additional grease interceptor volume must be: the known flow rate (gpm) x 30 minutes.	

¹Maintain 1/4 inch per foot slope.

²The developed length between the trap of a water closet or similar fixture (measured from the top of the closet flange to the inner edge of the vent) and its vent must not exceed 6 feet.

STORM DRAINAGE & FUEL GAS PIPING

CONTROLLED-FLOW MAX. ROOF WATER DEPTH (UPC Table 1105.1(1))

ROOF RISE* (Inches)	MAX. WATER DEPTH AT DRAIN (Inches)
Flat	3"
2"	4"
4"	5"
6"	6"

* Vertical measurement from the roof surface at the drain to the highest point of the roof surface served by the drain, ignoring a local depression immediately adjacent to the drain.

DISTANCE OF SCUPPER BOTTOMS ABOVE ROOF (UPC Table 1105.1(2))

ROOF RISE* (Inches)	ABOVE ROOF LEVEL AT DRAIN (Inches)
Flat	3"
2"	4"
4"	5"
6"	6"

* Vertical measurement from the roof surface at the drain to the highest point of the roof surface served by the drain, ignoring a local depression immediately adjacent to the drain.

SUPPORT OF PIPING (UMC Table 1210.2.4.1)

STEEL PIPE, NOMINAL SIZE OF PIPE (Inches)	SPACING OF SUPPORTS (feet)	NOMINAL SIZE OF TUBING SMOOTH-WALL (Inches O.D.)	SPACING OF SUPPORTS (feet)
1/2	6	1/2	4
3/4 or 1	8	5/8 or 3/4	6
1-1/4 or larger (horizontal)	10	7/8 or 1 (horizontal)	8
1-1/4 or larger (vertical)	Every floor level	1 or larger (vertical)	Every floor level

SIZING ROOF DRAINS, LEADERS AND VERTICAL RAINWATER PIPING (UPC Table 1101.2)

SIZE OF DRAIN, LEADER OR PIPE (Inches)	FLOW (gpm)	MAX. ALLOWABLE HORIZONTALLY PROJECTED ROOF AREAS AT VARIOUS RAINFALL RATES (square feet)											
		1 (in/h)	2 (in/h)	3 (in/h)	4 (in/h)	5 (in/h)	6 (in/h)	7 (in/h)	8 (in/h)	9 (in/h)	10 (in/h)	11 (in/h)	12 (in/h)
2	30	2,880	1,440	960	720	575	480	410	360	320	290	260	240
3	92	8,800	4,400	2,930	2,200	1,760	1,470	1,260	1,100	980	880	800	730
4	192	18,400	9,200	6,130	4,600	3,680	3,070	2,630	2,300	2,045	1,840	1,675	1,530
5	360	34,600	17,300	11,530	8,650	6,920	5,765	4,945	4,325	3,845	3,460	3,145	2,880
6	563	54,000	27,000	17,995	13,500	10,800	9,000	7,715	6,750	6,000	5,400	4,910	4,500
8	1,208	116,000	58,000	38,660	29,000	23,200	19,315	16,570	14,500	12,890	11,600	10,545	9,600

SIZE & LENGTH OF PIPING (UMC Table 1213.6.1)

NOMINAL PIPING SIZE (Inches)	LENGTH OF PIPING (feet)
≥ 2 1/2 < 3	> 50
≥ 3 < 4	> 30
≥ 4 < 6	> 15
≥ 6 < 8	> 10
≥ 8	Any length



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WATER SUPPLY & DISTRIBUTION

WATER SUPPLY FIXTURE UNITS (WSFU) & MIN. FIXTURE BRANCH PIPE SIZES (UPC TABLE 610.3)

APPLIANCES, APPURTENANCES OR FIXTURES	MIN. FIXTURE BRANCH PIPE SIZE	PRIVATE	PUBLIC
Bathtub or Combination Bath/Shower (fill)	1/2"	4.0	4.0
Bathtub or Combination Bath/Shower (fill) 3/4 inch Bathtub Fill Valve	3/4"	10.0	10.0
Bidet	1/2"	1.0	—
Clothes Washer	1/2"	4.0	4.0
Dental Unit, cuspidor	1/2"	—	1.0
Dishwasher, domestic	1/2"	1.5	1.5
Drinking Fountain or Water Cooler	1/2"	0.5	0.5
Hose Bibb	1/2"	2.5	2.5
Lavatory	1/2"	1.0	1.0
Lawn Sprinkler, each head	—	1.0	1.0
Mobile Home, each (min.)	—	12.0	—
Bar Sink	1/2"	1.0	2.0
Clinical Faucet Sink	1/2"	—	3.0
Clinical Flushometer Valve with or without faucet sink	1	—	8.0
Kitchen sink, domestic with or without dishwasher sink	1/2"	1.5	1.5
Laundry sink	1/2"	1.5	1.5
Service sink or Mop Basin sink	1/2"	1.5	3.0
Washup, each set of faucets sink	1/2"	—	2.0
Shower, per head	1/2"	2.0	2.0
Urinal, flush tank	1/2"	2.0	2.0
Wash Fountain, circular spray	3/4"	—	4.0
Water Closet, 1.6 GPF Gravity Tank	1/2"	2.5	2.5
Water Closet, 1.6 GPF Flushometer Tank	1/2"	2.5	2.5
Water Closet, greater than 1.6 GPF Gravity Tank	1/2"	3.0	5.5

Note: This is an abridged table. For complete table see 2015 UPC Table 610.3.

MINIMUM AIR GAPS FOR WATER DISTRIBUTION

FIXTURES WITH EFFECTIVE OPENINGS (In diameter)	WHERE NOT AFFECTED BY SIDEWALLS	WHERE AFFECTED BY SIDEWALLS
1/2" max.	1"	1-1/2"
3/4" max.	1-1/2"	2-1/4"
1" max.	2"	3"
Greater than 1"	2 times the diameter of effective opening	3 times the diameter of effective opening

MIN. LENGTH OF COLOR FIELD & SIZE OF LETTERS (UPC Table 601.3.2)

OUTSIDE DIA. OF PIPE OR COVERING	LENGTH OF COLOR FIELD	SIZES OF LETTERS
1/2" to 1-1/4"	8"	1/2"
1-1/2" to 2"	8"	3/4"
2-1/2" to 6"	12"	1-1/4"
8" to 10"	24"	2-1/2"
Over 10"	32"	3-1/2"

FLUSHOMETER FIXTURE UNITS FOR WATER SIZING (UPC Table 610.10)

WATER CLOSET WITH FLUSHOMETER VALVES		
NUMBER OF FLUSHOMETER VALVES	INDIVIDUAL FIXTURE UNITS	FIXTURE UNITS ASSIGNED FOR WATER CLOSETS ¹
1	40	40
2	30	70
3	20	90
4	15	105
5 or more	10 each	15 Plus 10 for each additional fixture in excess of 5

URINALS WITH FLUSHOMETER VALVES

NUMBER OF FLUSHOMETER VALVES	INDIVIDUAL FIXTURE UNITS	FIXTURE UNITS ASSIGNED FOR URINALS ²
1	20	20
2	15	35
3	10	45
4	8	53
5 or more	5 each	58 plus 5 for each additional fixture in excess of 5

¹And Similar 10-Unit Fixtures ²And Similar 5-Unit Fixtures
Note: Use this table with 2015 UPC Table 610.3.

IDENTIFICATION OF POTABLE & NONPOTABLE WATER SYSTEMS (UPC 601.3 - 601.3.3)

CLASSIFICATION	BACKGROUND COLOR	COLOR OF LETTERS	WORDING
Potable Water	Green	White	"POTABLE WATER"
Nonpotable Water Systems	Yellow	Black	"CAUTION: NONPOTABLE WATER, DO NOT DRINK"
Gray Water Systems	Purple	Black	"CAUTION: NONPOTABLE GRAY WATER, DO NOT DRINK"
Reclaimed (recycled) Water Systems	Purple	Black	"CAUTION: NONPOTABLE RECLAIMED (RECYCLED) WATER, DO NOT DRINK"
On-site Treated Water Systems	Purple	Black	"CAUTION: ON-SITE TREATED NONPOTABLE WATER, DO NOT DRINK"
Rainwater Catchment Systems	Purple	Black	"CAUTION: NONPOTABLE RAINWATER WATER, DO NOT DRINK"

Note: The background color and required information must be indicated every 20 ft. but not less than once per room and must be visible from the floor level.

SANITARY DRAINAGE

DRAINAGE FIXTURE UNIT VALUES (DFU)^a (UPC 702.1)

PLUMBING APPLIANCES, APPURTENANCES OR FIXTURES	MIN. SIZE TRAP & TRAP ARM	PRIVATE	PUBLIC
Bathtub or Combination Bath/Shower	1-1/2"	2.0	2.0
Bidet	1-1/4"	1.0	—
Clothes Washer, domestic, standpipe	2"	3.0	3.0
Dental Unit, cuspidor	1-1/4"	—	1.0
Dishwasher, domestic, w/ independent drain	1-1/2"	2.0	2.0
Drinking Fountain or Water Cooler	1-1/4"	0.5	0.5
Food Waste Disposer, commercial	2"	—	3.0
Floor Drain	2"	2.0	2.0
Shower, single-head trap	2"	2.0	2.0
Shower, Multi-head, each additional	2"	1.0	1.0
Lavatory	1-1/4"	1.0	1.0
Urinal, integral trap 1.0 GPF	2"	2.0	2.0
Urinal, integral trap greater than 1.0 GPF	2"	2.0	2.0
Water Closet, 1.6 GPF Gravity Tank	3"	3.0	4.0
Water Closet, 1.6 GPF Flushometer Tank	3"	3.0	4.0
Water Closet, 1.6 GPF Flushometer Valve	3"	3.0	4.0
Water Closet, greater than 1.6 GPF Gravity Tank	3"	4.0	6.0
Water Closet, greater than 1.6 GPF Flushometer Valve	3"	4.0	6.0

^aThis is an abridged table. For complete table see 2015 Uniform Plumbing Code (UPC) Table 702.1

DRAINAGE FIXTURE UNIT VALUES (DFU) - SINKS (UPC 702.1)

PLUMBING APPLIANCES, APPURTENANCES OR FIXTURES	MIN. SIZE TRAP & TRAP ARM	PRIVATE	PUBLIC
Bar	1-1/2"	1.0	—
Clinical	3"	—	6.0
Commercial with food waste	1-1/2"	—	3.0
Kitchen, domestic ^a (with or without food waste disposer, dishwasher or both)	1-1/2"	2.0	2.0
Laundry ^a (with or without discharge from a clothes washer)	1-1/2"	2.0	2.0
Service or Mop Basin	2"	—	3.0
Service, flushing rim	3"	—	6.0
Wash, each set of faucets	—	—	2.0

^aProvide a 2 inch (50 mm) minimum drain.
Note: This is an abridged table. For complete table see 2015 Uniform Plumbing Code (UPC) Table 702.1

CLEANOUTS (UPC Table 707.1)

SIZE OF PIPE (inches)	SIZE OF CLEANOUT (inches)	THREADS (per inches)
1-1/2"	1-1/2"	11-1/2
2"	1-1/2"	11-1/2
2-1/2"	2-1/2"	8
3"	2-1/2"	8
4" & larger	3-1/2"	8

MAX. / MIN. FIXTURE UNIT LOADING ON BUILDING SEWER PIPING (UPC Table 717.1)

SIZE OF PIPE (inches)	SLOPE (inches per foot)		
	1/16	1/8	1/4
6" and smaller	As specified in Table 703.2 / No minimum loading		
8"	1950/1500	2800/625	3900/275
10"	3400/1600	4900/675	6800/300
12"	5600/1700	8000/725	11200/325

MIN. HORIZONTAL DISTANCE REQUIRED FROM BUILDING SEWER (feet) (UPC Table 721.1)

Buildings or structures	2'
Property line adjoining private property	Clear
Water supply wells	50'
Streams	50'
On-site domestic water service line	1'
Public water main	10'

WATER HEATERS

INDOOR COMBUSTION AIR (UPC 506.2)

- The required volume of indoor air must be determined using the Standard Method or the Known Air Infiltration Rate Method.
- Note:** Where the air infiltration rate is less than 0.40 ACH (air change per hour), the Known Air Infiltration Rate Method must be used.
- The total required volume must be the sum of the required volume calculated for appliances located within the space.
- Rooms communicating directly with the space in which the appliances are installed through openings not furnished with doors, and through combustion air openings sized and located in accordance with Section 506.3 (Indoor Opening Size and Location) are considered a part of the required volume.

STANDARD METHOD (UPC 506.2.1)

The required volume must be a min. of 50 cubic feet per 1000 British thermal units per hour (Btu/h).

KNOWN INFILTRATION RATE METHOD (UPC 506.2.2)

Where the air infiltration rate of a structure is known, the required volume must not be less than the following: For appliances other than fan-assisted, calculate using the following equation:

$$\text{Required Volume}_{\text{other}} \geq (21 \text{ ft}^3/\text{ACH}) \times (I_{\text{other}}/1000 \text{ Btu/h})$$

For fan-assisted appliances, calculate using the following equation:

$$\text{Required Volume}_{\text{fan}} \geq (15 \text{ ft}^3/\text{ACH}) \times (I_{\text{fan}}/1000 \text{ Btu/h})$$

Where:

I_{other} = Appliances other than fan-assisted input in Btu per hour

I_{fan} = Fan-assisted appliance input in Btu/h

ACH = Air change per hour (percent of volume of space exchanged per hour, expressed as a decimal)

Note: An infiltration rate greater than 0.60 ACH must not be used with these equations.

CLEARANCE FOR CONNECTORS (UPC Table 509.7.3(1))

MINIMUM DISTANCE FROM COMBUSTIBLE MATERIAL (inches)

APPLIANCE	LISTED TYPE B GAS VENT MATERIAL	LISTED TYPE L VENT MATERIAL	SINGLE WALL METAL PIPE	FACTORY BUILT CHIMNEY SECTIONS
Listed appliance with draft hoods and appliance listed for use with Type B gas vents	As Listed	As Listed	6"	As Listed
Residential boilers and furnaces with listed gas conversion burner and with draft hood	6"	6"	9"	As Listed
Residential appliances listed for use with Type L vents	Not Permitted	As Listed	9"	As Listed
Unlisted residential appliances with draft hood	Not Permitted	6"	9"	As Listed
Residential and low-heat appliance other than those above	Not Permitted	9"	18"	As Listed
Medium-heat appliances	Not Permitted	Not Permitted	36"	As Listed

ROOF PITCH HEIGHT (UPC Table 509.6.2)

ROOF PITCH	HEIGHT (MIN.)
Flat to 6/12	1.0'
Over 6/12 to 7/12	1.25'
Over 7/12 to 8/12	1.5'
Over 8/12 to 9/12	2.0'
Over 9/12 to 10/12	2.5'
Over 10/12 to 11/12	3.25'
Over 11/12 to 12/12	4.0'
Over 12/12 to 14/12	5.0'
Over 14/12 to 16/12	6.0'
Over 16/12 to 18/12	7.0'
Over 18/12 to 20/12	7.5'
Over 20/12 to 21/12	8.0'

VENT CONNECTOR LENGTH (UPC Table 510.2.1)

CONNECTOR DIAMETER (inches)	MAX. CONNECTOR HORIZONTAL LENGTH (feet)
3"	4.5'
4"	6'
5"	7.5'
6"	9'
7"	10.5'
8"	12'
9"	13.5'
10"	15'
12"	18'
14"	21'
16"	24'
18"	27'
20"	30'
22"	33'
24"	36'

TYPE OF VENTING SYSTEM TO BE USED (UPC Table 509.4)

APPLIANCES	TYPE OF VENTING SYSTEM
Category I appliance	Type B gas vent
Category II appliance Category III appliance Category IV appliance	As specified or furnished by manufacturers of listed appliances
Incinerators, indoors	Chimney
Incinerators, outdoors	Single-wall metal pipe
Listed vented wall furnaces	Type B-W gas vent
Listed appliance equipped with draft hood	Chimney
Listed combination gas- and oil-burning appliances	Type L vent or chimney
Decorative appliance in vented fireplace	Chimney
Appliance listed for Type B gas vent	<ul style="list-style-type: none"> Single-wall metal pipe Listed chimney lining system for gas venting Special gas vent
Appliances that are capable of being converted to use solid fuel	Chimney
Unlisted combination gas- and oil-burning appliances	Chimney
Combination gas- and solid-fuel-burning appliances	Chimney
Unlisted appliances	Chimney

FIRST HOUR RATING (UPC Table 5011.1)

The min. capacity for storage water heaters must be in accordance with the first hour rating listed in this table.

Number of Bathrooms	1 to 1.5			2 to 2.5				3 to 3.5			
	1	2	3	2	3	4	5	3	4	5	6
Number of Bedrooms	1	2	3	2	3	4	5	3	4	5	6
First Hour Rating, Gallons	42	54	54	54	67	67	80	67	80	80	80

MIN. THICKNESS FOR GALVANIZED STEEL VENT CONNECTORS FOR LOW-HEAT APPLIANCES (UPC Table 509.10.1.3)

DIAMETER OF CONNECTOR (inches)	MINIMUM THICKNESS (inches)
Less than 6"	0.019"
6" to less than 10"	0.023"
10" to 12" inclusive	0.029"
14" to 16" inclusive	0.034"
Over 16"	0.056"

MIN. THICKNESS FOR STEEL VENT CONNECTORS FOR MEDIUM-HEAT APPLIANCES AND COMMERCIAL & INDUSTRIAL INCINERATORS (UPC Table 509.10.1.4)

VENT CONNECTOR SIZE		
DIAMETER (inches)	AREA (square inches)	MIN. THICKNESS (inches)
Up to 14	Up to 154	0.053
Over 14 to 16	154 to 201	0.067
Over 16 to 18	201 to 254	0.093
Over 18	Exceeding 254	0.123

REDUCTION OF CLEARANCES WITH SPECIFIED FORMS OF PROTECTION (UPC Table 509.7.3(2))

TYPE OF PROTECTION APPLIED TO AND COVERING SURFACES OF COMBUSTIBLE MATERIAL WITHIN THE DISTANCE SPECIFIED AS THE REQUIRED CLEARANCE WITH NO PROTECTION	Where the required clearance with no protection from appliance, vent connector or single-wall metal pipe is:									
	36 (inches)		18 (inches)		12 (inches)		9 (inches)		6 (inches)	
	ALLOWABLE CLEARANCES WITH SPECIFIED PROTECTION (inches)									
Use COLUMN 1 for clearances above appliance or horizontal connector. Use COLUMN 2 for clearances from appliances, vertical connector and single-wall metal pipe.										
	ABOVE COLUMN 1	SIDES & REAR COLUMN 2	ABOVE COLUMN 1	SIDES & REAR COLUMN 2	ABOVE COLUMN 1	SIDES & REAR COLUMN 2	ABOVE COLUMN 1	SIDES & REAR COLUMN 2	ABOVE COLUMN 1	SIDES & REAR COLUMN 2
3 1/2" thick masonry wall without v.a.s.	—	24	—	12	—	9	—	6	—	5
1/2" insulation board over 1" glass fiber or mineral wool batts	24	18	12	9	9	6	6	5	4	3
0.024" sheet metal over 1" glass fiber or mineral wool batts reinforced with wire on rear face with v.a.s.	18	12	9	6	6	4	5	3	3	3
3 1/2" thick masonry wall with v.a.s.	—	12	—	6	—	6	—	6	—	6
0.024" sheet metal with v.a.s.	18	12	9	6	6	4	5	3	3	2
1/2" thick insulation board with v.a.s.	18	12	9	6	6	4	5	3	3	3
0.024" sheet metal with v.a.s. over 0.024" sheet metal with v.a.s.	18	12	9	6	6	4	5	3	3	3
1" glass fiber or mineral wool batts sandwiched between two sheets 0.024" sheet metal with v.a.s.	18	12	9	6	6	4	5	3	3	3

Note: v.a.s. = ventilated air space