

Chapter 2

Definitions

Many of the answers to questions on the Plumbing Exam will come from this chapter. The following is an example of such a question.

- Question: A room containing a water closet, lavatory and bathtub is a _____. a. bath room
- b. toilet room
 - c. toilet
 - d. all of the above

Answer: After reading through the three definitions, you should recognize “a” as the correct answer.

You should read and understand all the definitions. Below are the definitions that people tend to misunderstand the most.

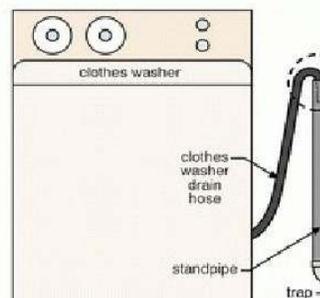
Air admittance valve

Same as a studor vent. A vent that allows air to enter the vent pipe only in the direction toward the sewer.

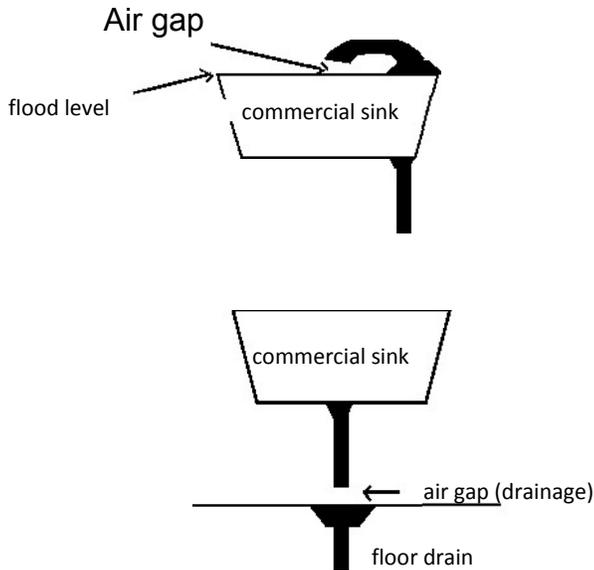
The space between the standpipe and the washer hose is an air break

Air break

Air space is below the flood level rim



Air gap (water system)

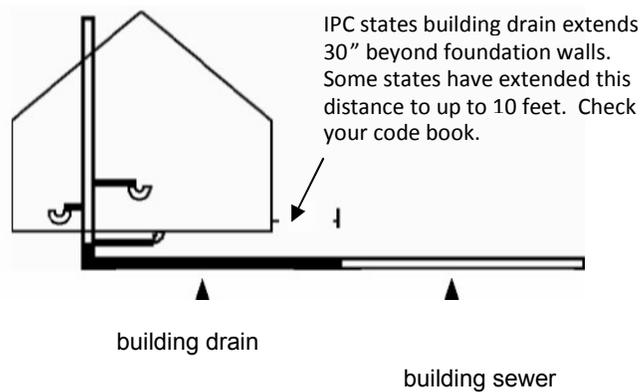


Air gap (drainage) air space is above flood level of receptacle

Base flood elevation = 100 year flood level

Building drain

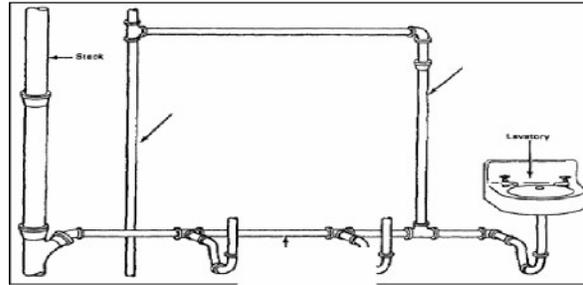
Extends 30 inches beyond building wall (Note: some states have amended this distance to as much as 10 feet, check the definition in your code book) Building sewer-pipe between building drain and street



Circuit vent

A vent connected to a **horizontal drainage branch** that serves at least two traps (max eight). Connects to the horizontal branch drain just before (downstream), the last fixture trap.

Circuit Vent



Combination fixture

A single fixture comprised of two or more fixtures, such as a three compartment sink.

Developed length of vents

There are two definitions of developed length for **vents**:

- The developed length of a stack vent or **vent stack** is measured from the vent connection at the drain to the open air.
- The developed length of **other vents** (ie. individual vent) is the measured length from its point of connection to the drainage system to its point of connection to a venting stack or outside termination. (The developed length of the circuit vent above is the distance measured from the point of connection at the horizontal drain to the point of connection to the main vent.)

Fixture branch

Drain must have at least two fixtures to be called a branch.

Chapter 3

General Regulations

Section 303

Plumbing products and materials must be **tested** or **certified** by a **third party agency** before being used.

Tested means a third party does a one-time testing (for example, UL makes a one-time test of the product and publishes the results. No follow-up test or inspection is required.)

Certified means the third party will test the product, then follow up with unannounced random tests or inspections.

When using Table 303.4, it is important to understand which category the product falls under. For example, a lavatory faucet would be a water **fixture fitting**, as defined in Chapter 2. Therefore, third party **certification** is required.

Section 307 Cutting, notching, or bored holes

A 2 x 10 floor joist has an actual depth of 9-1/2 inches. According to the IPC, the largest hole that can be cut is 1/3 times the joist depth. Decimally $1/3 = .33$ and 9-1/2 inches is 9.5 inches; therefore, $.33 \times 9.5 = 3.135$ inches. The largest hole may be 3.135 inches in diameter.

How to Convert a Fraction to a Decimal Equivalent Using Your Calculator

Divide the top number by the bottom number. To get the decimal equivalent of $1/3$ enter 1 divided by 3 = .33. Likewise, for $1/6$, enter 1 divided by 6 = .166, or for $2/3$, enter 2 divided by 3 = .66

A 2" X 8" ceiling joist may be notched 1/6th it's depth. What is the maximum size notch that can be cut if the actual joist depth is 7-1/2 inches? .166 is the decimal equivalent of $1/6$ (1 divided by 6 = .166) and 7.5 is the decimal equivalent of 7-1/2 (7+ 1 divided by 2), which is 7 +.5.

Therefore, $.166 \times 7.5 = 1.245$ inches (the largest allowable notch) is 40% of the width of 40% of the width of a single load bearing stud may be bored and 60% of

a non-bearing stud or doubled up stud may be bored. Therefore, the largest hole that may be bored in a single load bearing 2" X 4" (3-1/2" actual) stud would be 1.4 inches (.40 X 3.5 = 1.4).

To convert percent to a decimal equivalent, drop the % sign and move the decimal to the left two places. 30% = .30, 7% = .07, 150% = 1.50

According to Table 308.5, what is the maximum horizontal spacing of hangers for 10 foot lengths of cast iron pipes?

Answer: 10 feet. Refer to footnote a.

Under a floor joist, PEX must be supported every 32 inches.

Section 312.1 states that plastic water supply pipe cannot be pressure tested with air; however, all piping materials may be pressure-tested with water. Section 312.3 does not disallow plastic **drainage pipe** from being tested by 5 PSI air. Therefore, plastic drainage pipe may be tested by air.

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To convert percent to a decimal equivalent, drop the

Chapter 4

Fixtures, Faucets, and Fixture Fittings

Section 403

The minimum number of plumbing facilities required in various occupancies.

The following is an example for calculating the minimum facilities required in a 350-seat restaurant with 10 employees. The building measures 60 feet X 100 feet.

Look at Table 403.1 in the IPC. Find No. 1, A-2 *Restaurants*. Look first at sections 403.2, 403.5 and 403.6 as noted in the Classification column. **When using any table, be sure to read all applicable footnotes.**

Section 403.2

We must provide separate facilities for each sex if the minimum occupancy is greater than a certain number. Since 350 guests will be occupying this building, we must provide separate facilities for each sex.

Section 403.5

If an employee is any farther than 500 feet from a restroom then we need to build him another one. Our restaurant measures 60' x 100', so it is impossible for an employee to be farther than 500 feet from the restroom. Therefore, the employees may use the public facilities. However, we must add the number of employees to the number of guests. Also, note the restrooms may be located one story above or below the occupied story, but no higher or lower.

Section 403.6 states that public facilities shall be provided and that the public shall not have to travel more than 500 feet and more than one story up or down.

Calculating number of water closets

1) Determine the number of occupants.

350 guests + 10 employees = 360 people

2) Determine number of males and females.

403.3 states that you should assume 50% for each sex unless statistical data indicate otherwise. For the example we would have the following:

360 people X .50 = 180 males

360 people X .50 = 180 females

Water Heaters

This chapter is very self-explanatory. Note that both the Gas and Mechanical Codes state that a water heater cannot be used for space heating unless listed for such use.

The maximum temperature setting of a domestic water heater is 140 degrees, unless a master tempering valve is installed. Some states have laws stating that the maximum allowable temperature setting is 120 degrees when installed. **The occupant, however, may re-set or request to have re-set the thermostat to a higher temperature.**

Section 502.2 states that water heaters installed in garages must have the ignition source elevated 18 inches above the floor. This rule does not apply to water heaters that are resistant to flammable vapor ignition (FVIR). Today, all new gas water heaters meet this

standard. Most electric and oil water heaters must have the ignition source elevated 18 inches (the bottom thermostat on an electric water heater arcs when energized; therefore it is an ignition source.)

Chapter 6

Water Supply and Distribution

Appendix E Sizing a water distribution system

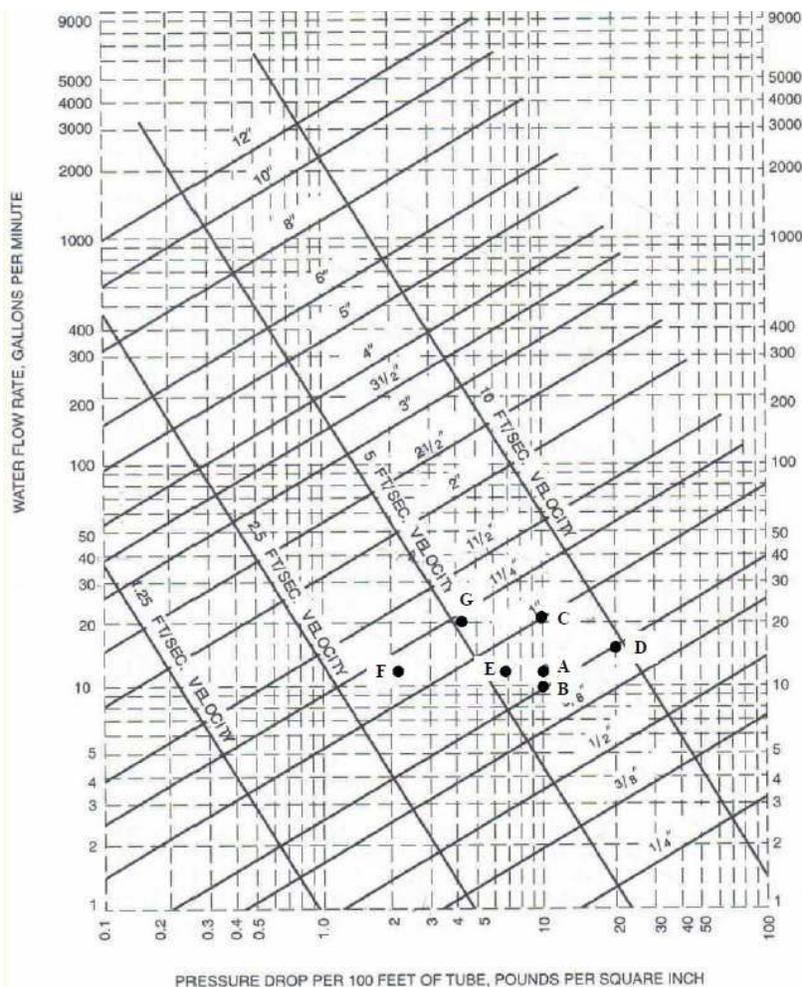
The method used to size a water distribution system in Appendix E is only one example of many approved engineering practices used to size piping. Section E 101.1.2 states that alternative engineering practices are acceptable. If you try to read and follow along the segmented loss method example presented in Appendix E, you may become frustrated and confused. The following discussion will give you the basic principles for sizing water pipes. Understanding these principles should allow you to answer any test questions regarding pipe sizing.

Understanding Friction Charts

The length of a pipe is not the length of a pipe.

A pipe has two lengths: (1) a **developed length**, which is the actual measured length and (2) an **effective length**, which is caused by the addition of fittings and valves.

Table E103 lists the **equivalent lengths** of various fittings and valves. A 3/4-inch, 90-degree elbow has an equivalent length of 2.5 feet. If seven elbows were used in 130 feet of developed length of pipe, we would have to add 17.50 feet (7 x 2.5) to the pipe to determine its total effective length. The **total effective length (TEL)** would therefore be 147.5 feet (130 + 17.5).



If the street pressure is 45 PSI, and you were to run a pipe with a total effective length of 100 feet, to a fixture requiring 12 gallons per minute @ 10 PSI, what size

would the pipe have to be if the total pressure losses through a meter, backflow preventer, valves, tees and elbows equal 25 PSI.

First, we must determine the pressure left to push the water down the pipe. This is called the **available pressure** or **allowable pressure drop**.

Street pressure	+45 PSI
Pressure losses through meter, bfp, valves, tees, and elbows	-25 PSI
Pressure needed to operate fixture	<u>-10 PSI</u>
Pressure left to size pipe (allowable pressure drop)	
10 PSI	

Second, go to Figure E103, located in Appendix E, *Friction Loss in Smooth*

Chapter 7

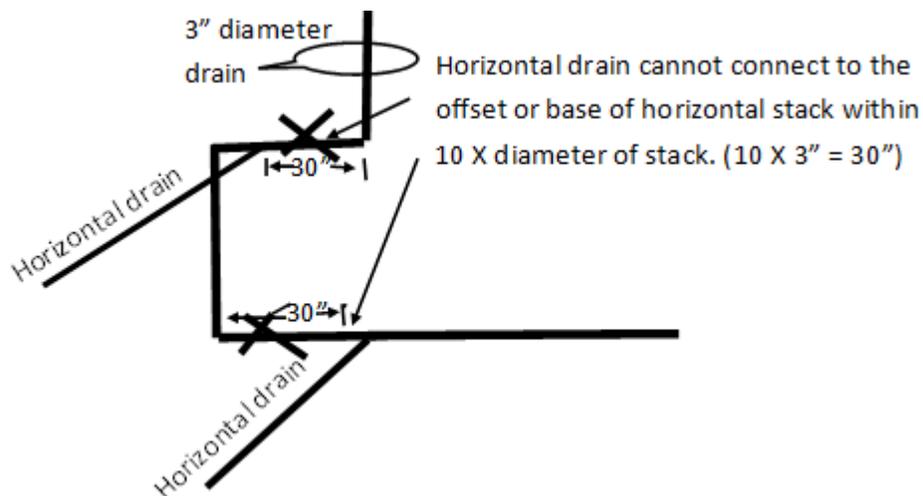
Sanitary Drainage

Section 704.1 Slope of horizontal drainage piping

Older codes required a 1/4 inch per foot slope for any pipe 3 inch diameter or less. This code has changed the rule to 2-1/2" diameter or less. A 3-inch drain now, needs only a 1/8-inch slope. (See Table 704.1)

Section 704.3 Connections to offsets and bases of stacks

Horizontal branches cannot be connected to the base of a horizontal stacks or horizontal stack offsets within 10 times the diameter of stack.



Section 711.2

If there are more than four branch intervals above the offset, the horizontal branch cannot connect in any portion of the offset. The horizontal branch must be connected at least two feet above or below the offset.

Table 706.3

This table is full of important footnotes. You are assured to have questions from it on the exam.

*Note: A **sanitary tee** cannot lie on its side or come off the top of a drainage pipe under any circumstances.*

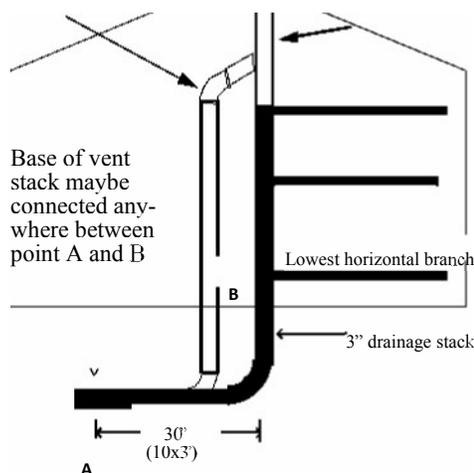
Double sanitary tees cannot be used to discharge back-to-back appliances with pumping action discharge. Most codes also prohibit the discharge of back-to-back water closets into double sanitary tees unless the water closet outlets are 18 inches or more from the stack. Double check both the footnotes in Table 706.3 and Section 706.3.

Chapter 8

Indirect and Special Waste

The illustrations in Chapter 2 (Definitions) of this guide show the difference between an air break and an air gap. Basically, any food-handling equipment (excluding those for residential use), sterilizers, potable clear water waste (such as relief valves on water heaters), and swimming pools must have an air gap when drained. **Non-potable** clear water waste from equipment such as boiler drips or process tanks is the **only** type of waste that may be drained through **either** an *air gap* or *air break*.

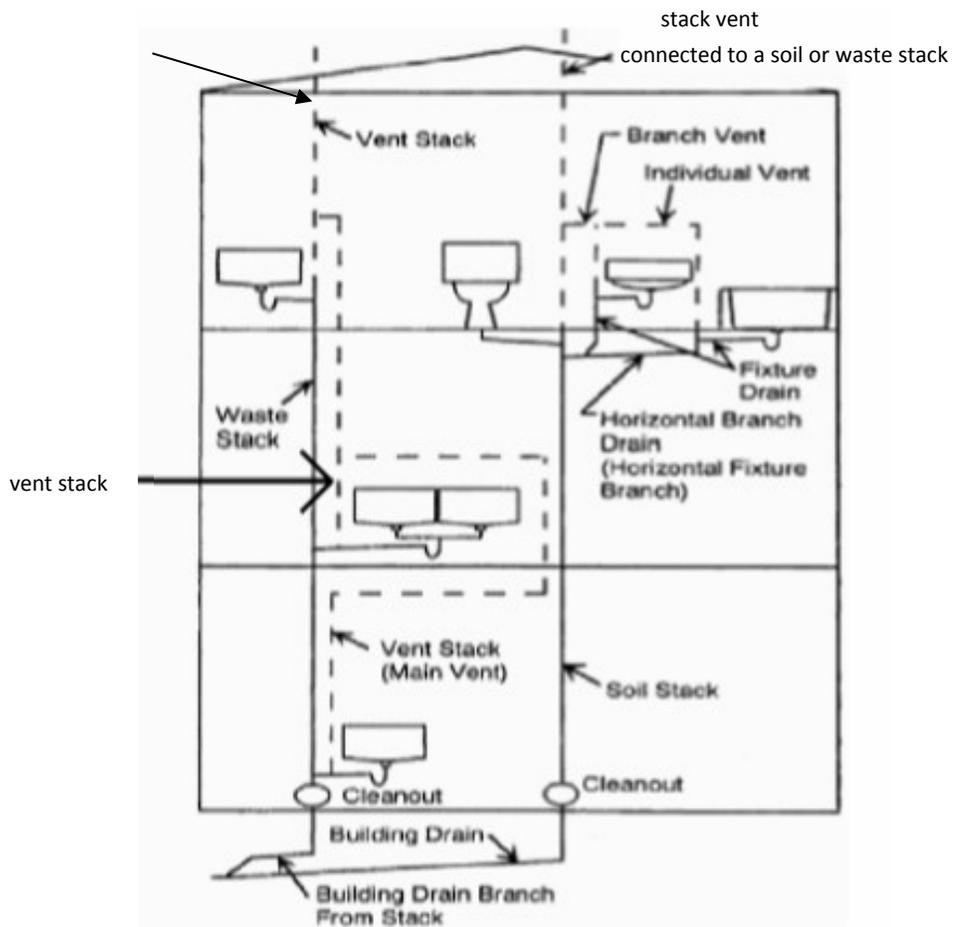
The size of all **air gaps** must be **twice the waste pipe opening**. If the waste pipe from



Chapter 9

Vents

When waste water flows down a drain pipe, it must displace air that is in front of it. If this air is not given a place to go, such as up a vent, it will bubble into the fixture. This effect is experienced when emptying a soda bottle. Another reason for venting is to give the sewer gases a means to escape to the outside air. A third reason for venting is to prevent the discharged waste water from siphoning water from the primary fixture or other fixtures and traps. And lastly, venting also prevents water from backing up into lower fixtures.



A **stack** is any vertical soil, waste or vent with or without offsets that extend through at least one story. A **vent stack** is for venting only and does not carry, nor is it designed to carry, any waste. A **stack vent** is that portion of a soil or waste stack above the highest fixture or branch drain connection

Section 903

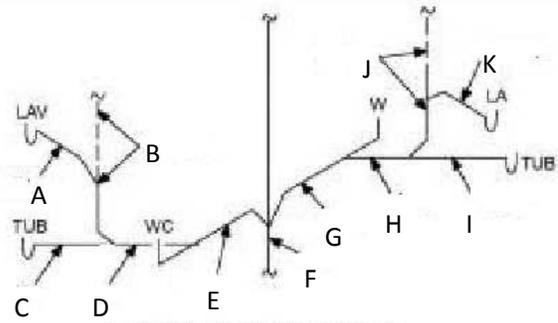
Every building must have at least one vent extended to the outside **1/2 size of building drain** (for most states, **2" minimum size**). A **vent stack is only required in buildings with five branch intervals or more**. When a vent stack is installed, its base must be connected to the drainage stack at or below the lowest horizontal branch on the stack. It may, however, be connected to the building drain as long as it is **within** a distance of 10 times the diameter of the drainage stack.

VENT STACK

Chapter 10

Sizing drains and vents using isometric drawings

The inability to read and understand isometric drawings is the number one reason for most examinees' failures. The following pages contain isometric drawings of various plumbing configurations. It is important for you to complete the blanks for each drawing. Then review the answers and cited sections. Do not leave this chapter until you feel completely comfortable with sizing the following examples.



A. TYPICAL BACK-TO-BACK BATHS

A _____

B _____

C _____

D _____

E _____

F _____

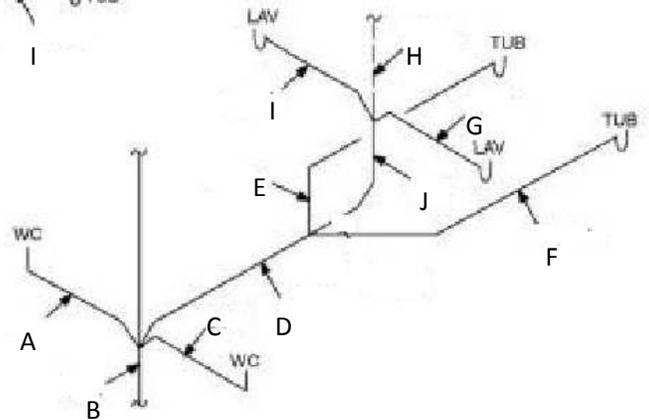
G _____

H _____

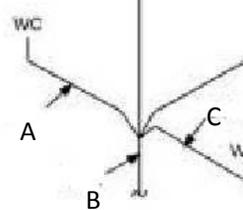
I _____

J _____

K _____



B. DOUBLE BATHS WITH WASTE FIXTURES ON COMMON HORIZONTAL BRANCH, COMMON WET VENT



C. DOUBLE BATHS WITH WASTE FIXTURES ON COMMON HORIZONTAL BRANCH, INDIVIDUAL WET VENTS

A _____

B _____

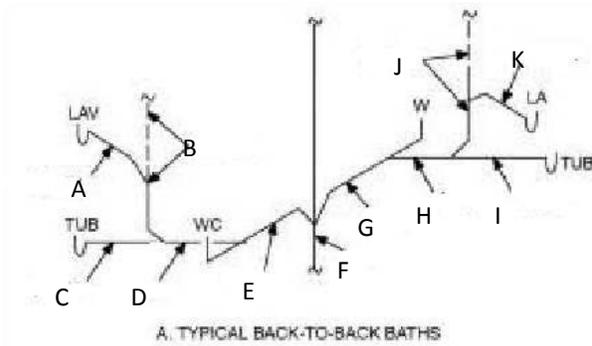
C _____

D _____

E _____

F _____

G _____



A. TYPICAL BACK-TO-BACK BATHS

A 1-1/4" 916.2

B 1-1/2" 916.2 vent B is serving drain F. drain B is wet vent (Table 909.3)

C 1-1/2" Table 709.2

D 2" Table 909.3, tub and lav (3 dfu) discharge into it

E 3" Table 710.1(1) footnote a

F 3" Serves water closets, plus cannot be smaller than E

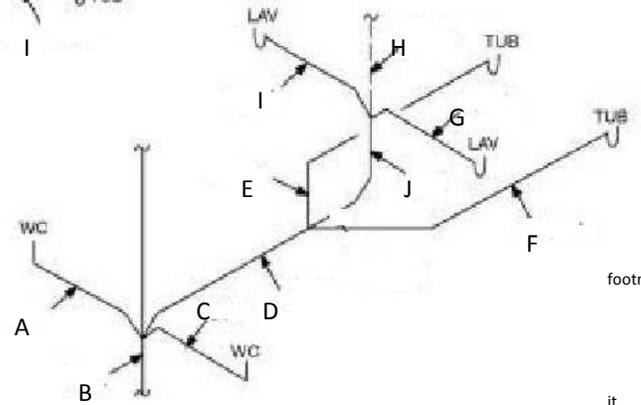
G 3" see E

H 2" see D

I 1-1/2" see C

J 1-1/2" see B

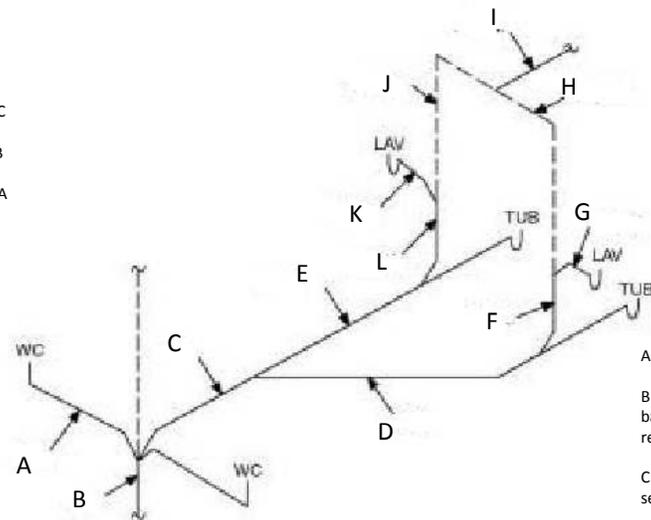
K 1-1/4" see A



B. DOUBLE BATHS WITH WASTE FIXTURES ON COMMON HORIZONTAL BRANCH, COMMON WET VENT

footnot a

it



C. DOUBLE BATHS WITH WASTE FIXTURES ON COMMON HORIZONTAL BRANCH, INDIVIDUAL WET VENTS

A 3" -Table 710.1(1), footnote a

B 3" - Drain serves only 10 dfu (2 bathroom groups), but WC requires 3" Table 710.1(1) footnote a

C 2" - Table 710.1(2) horizontal drain servin 6 dfu

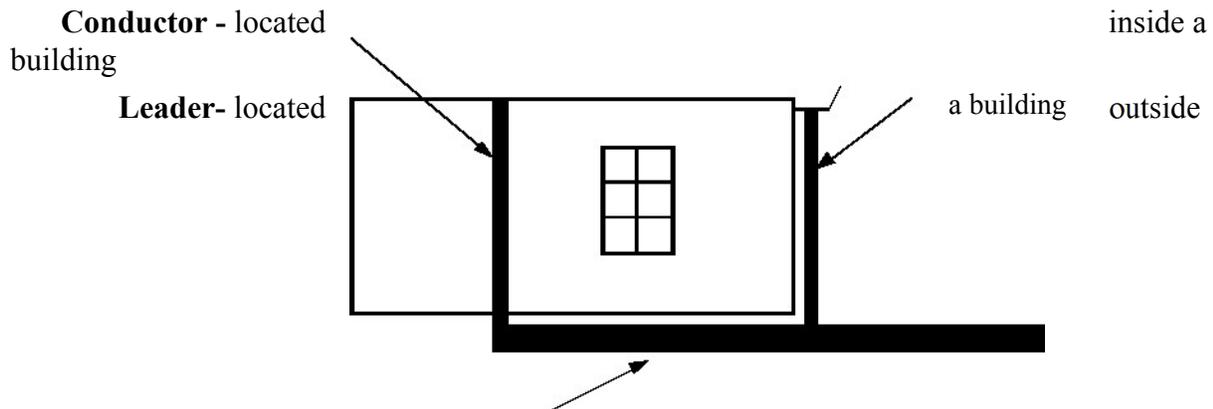
D 1-1/2" Table 710.1(2) drain serves 3 dfu

Chapter 12

Storm Drainage

Conductor

Located inside a building



Storm drain– accepts water from leaders and conductors

Leaders, conductors, and storm drain illustration

Size the storm drainage system for the above roof if it were 6300 square feet, located in Charlotte, North Carolina (choose another city if you're not in North Carolina).

1) Determine the hourly rainfall rate using figure 1106.1 (some state codes also have an Appendix B). Looks like 3.7 inches.

Using Table 1106.2 located in the rainfall rate column 4, we find 6300 square feet falls between 4600 and 8650; choose 8650. To the left, under diameter of

Soil Absorption Systems

Sizing an absorption field for other than one and two family residential

To size the trench area required for a 36-unit, 2-bedroom apartment project on percolation class 2 soil use the following formula:

$$\begin{aligned} &\text{Area} = \text{number of units [Table 604.1(2)]} \\ &\quad \times \\ &\quad \text{Conversion factor [Table 604.1(2)]} \\ &\quad \times \\ &\quad \text{Absorption area from table 604.1(1)} \end{aligned}$$

Chapter 14

Tanks

The size septic tank for our apartment building from the example in the previous chapter would be calculated according to Section 802.7.2 and Table 802.7.2 as follows:

Start with 750 gallons, then, according to Table 802.7.2, add 150 gallons for each bedroom.

$$\text{Tank size} = 750 \text{ gallons} + (150 \text{ gallons} \times 72 \text{ bedrooms})$$

INTERNATIONAL FUEL GAS CODE

Combustion air requirements Section 304.5

Question: According to section 304.5, **If the infiltration rate is unknown**, does a room measuring 10' x 10' x 8' high with two 40,000 BTUH water heaters require outdoor air for combustion?

Answer: Yes. The volume is less than 50 cu. ft. per 1000 BTUH

Solution: Divide the total BTUH by 1000

$$80,000/1000 = 80 \text{ (1000's)}$$

Then multiply the number of 1000's by 50 cubic ft.

$$80 \times 50 = 4000$$

If the room is less than 4000 cu. ft., then it needs combustion air. If it is more than 4000 cu. ft. no additional combustion air is required.

The room is 10' x 10' x 8' = 800 cu. ft.; therefore, additional combustion air is required

If the **infiltration rate is known**, the following formula may be used in lieu of the above to determine the minimum volume needed without having to add outside air. However, if the infiltration rate is known to be less than .40 air changes per hour, then the following formula must be used.

For fan-assisted appliances, calculate volume using Equation 3-2.

$$\text{Required Volume}_{fan} \geq \frac{15 \text{ ft}^3}{ACH} \left(\frac{I_{fan}}{1,000 \text{ Btu/h}} \right)$$

Question: An area measuring 20 ft. x 30 ft. x 9 ft. is being heated by a 45,000 btuh fan assisted furnace. If the infiltration rate is .35 air changes per hour, is

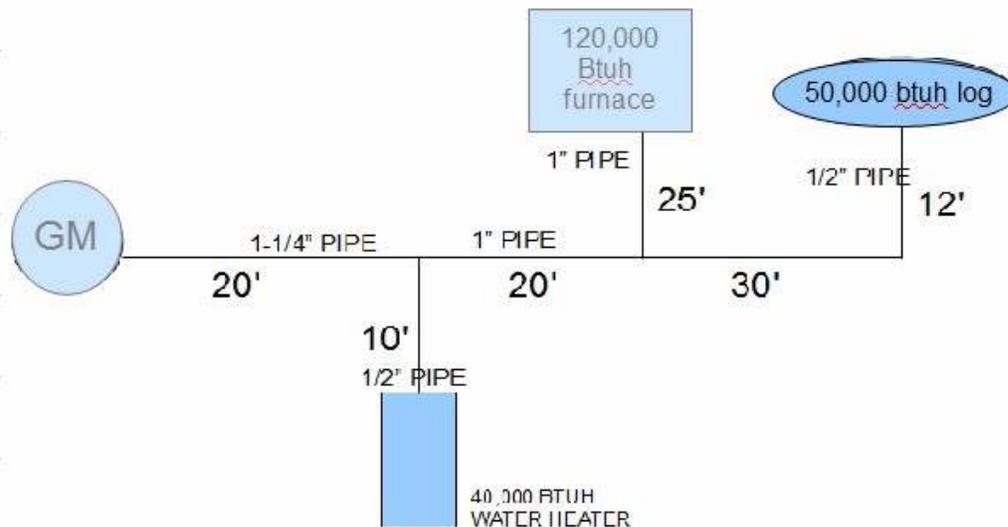
Gas Pipe Sizing

Appendix A gives an example for gas pipe sizing. Simply measure the distance between the meter and the farthest appliance; let's call this the **distance factor**, then use this distance factor to size each **run** off the **main line**. Each time part of the load is dropped off the main line resize the line using the remaining load and same distance factor.

The toughest part is making sure you use the correct sizing table. Pay attention to specifics. Is the gas pressure less than 2 psi, .5 psi, 2psi, or 5 psi.? Is the pipe copper, or stainless steel?

For the example below we will use Table 402.4(2) 2007-9 IFGC

Note: 2003 and 2006 Gas Code may have slightly different charts but the methodology is the same.



Vent Sizing

Single appliance -Table 504.2(1) Sizing vents

What size B vent is needed for a 160,000 BTUH, naturally ventilated appliance if the total vent height is 18' and the lateral 2'?

Under the height column you have to choose either 15' or 20'. **Remember this.** The taller the vent the more capacity it has, therefore, if the 20' row is used the vent may be under sized. **Always use the shorter height.** In this case use 15'. Now use the 2' lateral and select a vent size under NAT. A 5" vent will handle only 150,000 BTUH, while a 6" vent will handle 225,000 BTUH, therefore select a 6" vent.

Venting two or more appliances with a single vent –Table 504.3(1)

When connecting two or more appliances to a common vent, the smaller appliance

Contracting business

Joey's Story Profit

While Joey was walking down the street he found a yo-yo. On the following corner a friend saw it and purchased it from Joey for \$1.25. Joey was delighted, as he had just made 100% profit. His cost was \$0 and his sale was \$1.25; therefore, all the money (100%) he received was profit.

Joey thought he stumbled on a great moneymaking idea; if he could only get a hold of more yo-yos he might get rich. So, he went to yard sales and bought up all the yo-yos he could find for 60 cents each. Again, he sold them for \$1.25 each. This time he made only 65 cents per yo-yo or 52% profit.

sale price	-\$1.25
minus cost	<u>-\$.60</u>
Profit	\$.65

Joey's percent of profit is calculated below:

$$\begin{aligned} \text{Percent of profit} &= \$ \text{ Profit/Sale price} \\ &= \$.65/\$1.25 \\ &= .52 \text{ or } 52\% \end{aligned}$$

Note: Joey cannot make any more than 100% profit. In the business world there is no such thing as 150%, 1000%, or any other wild percentage above 100.

Joey was on to something big. He thought he would manufacture his own yo-yos. His material costs would be \$1.50, but since they would be new yo-yos he'd get \$4.00 each. Therefore, his profit would be \$2.50 each; increasing his percentage of profit to 63%.

$$\begin{aligned} \text{Percent of profit} &= \$\text{Profit/Sales price} \\ &= \$2.50/\$4.00 \end{aligned}$$

= .63 or 63%

Well, Joey went into the yo-yo manufacturing business. He rented a building, bought a delivery truck, got a telephone, had the lights turned on, and purchased a wood lathe. He hired a secretary to send out sales letters, keep the books, and answer the telephone. Soon he was overwhelmed with orders and had to hire parttime labor to help make yo-yos. At the end of his first year he had sold 10,000 yo-yos @ \$4.00 each and his profit and loss statement (Income Statement) looked like the following:

Joey's Yo-Yo Company Income Statement

Revenue (sales) (4.00 x 10,000)		\$40,000
Direct costs		
		15,000
Materials (1.50 x 10,000)		
Labor	4,500	
Total direct costs		19,500
Gross profit		20,500
Overhead		
Secretary salary	5,000	
Rent	3,600	
Telephone	1,200	
Depreciation (for lathe)	1,500	
Depreciation (for truck)	3,000	
Office supplies (stamps, envelopes, etc[.])	600	

Total overhead	14,900
	34,400
Total costs and overhead	
Net income (net profit)	\$ 5,600

***How to price a job.**

Suppose you purchase a gas water heater for \$350 and it costs \$150 for venting, piping plus \$140 labor, and \$35 for a permit. If your company overhead is 15%, what will the sales price of the job be if you want to make 20% net profit?

First, you need to calculate the cost of the job

Water heater	\$350
Venting and piping	\$150
Labor	\$140
Permit	<u>\$35</u>
Total job cost	\$675

Second, you must calculate a price that will include: your cost + overhead + profit. We know the cost is \$675 and we know the overhead and profit will be 35% (15%+ 20%) of the sales price.

To calculate sales price (this method must be used on the exam):

Depreciation

Most expenses are cut and dry. If you spend \$160 on utilities, the expense is \$160. Depreciation, on the other hand, must be calculated. Two common methods used to calculate depreciation are the **straight line** and the **accelerated depreciation** method. To illustrate each method we will depreciate a backhoe purchased in July for \$19,500.

Under the **straight line method**, \$5000 will be estimated to be the **salvage value** (what you think you can sell it for at the end of five years); therefore, \$14,500 is to be depreciated evenly throughout a five-year period. In each of the five years you can deduct \$2900. Since you purchased the backhoe in July and your *fiscal year* ends in December, you are only entitled to six months depreciation the first year, which is 1/2 year or \$1450. The fifth year of ownership will fall on July so you will also get 1/2 of that year's depreciation (\$1450).

IRS rules allow for methods of **accelerated depreciation**, which allows a business to claim a higher amount of depreciation for assets in the first years of operation. One such method is the *double declining balance method*. For example; the backhoe above has a life of five years, therefore each year 1/5 or 20% may be depreciated. The double declining balance method allows the business to take 40% (double the

20% allowed under the straight line method above) of the asset balance as depreciation expense each year until its useful life comes to an end.

	Depreciation	Book Value
Year 1	$.40 \times \$19500 = \7800	balance = \$11700
Year 2	$.40 \times \$11700 = \4680	balance =
	\$7020	
Year 3	$.40 \times \$7020 = \2808	balance =
	\$4212 etc. until book value is \$0	

What happens if the backhoe is sold after six years for \$3500? If, you used the straight line method you will have to show \$1500 as *a loss on sale of assets* under other income/expenses on your income statement because the books are showing it is worth \$5000. If you used the accelerated depreciation method, \$3500 would show up as *a gain in sale of assets* because the books are showing it to be worth \$0.

Net income

This is the profit made after every conceivable expense has been deducted from revenue. A

MARRIED Persons—WEEKLY Payroll Period

(For Wages Paid in 2003)

If the wages are—		And the number of withholding allowances claimed is—										
At least	But less than	0	1	2	3	4	5	6	7	8	9	10
		The amount of income tax to be withheld is—										
\$0	\$130	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
130	135	1	0	0	0	0	0	0	0	0	0	0
135	140	1	0	0	0	0	0	0	0	0	0	0
140	145	2	0	0	0	0	0	0	0	0	0	0
145	150	2	0	0	0	0	0	0	0	0	0	0
150	155	3	0	0	0	0	0	0	0	0	0	0
155	160	3	0	0	0	0	0	0	0	0	0	0
160	165	4	0	0	0	0	0	0	0	0	0	0
165	170	4	0	0	0	0	0	0	0	0	0	0
170	175	5	0	0	0	0	0	0	0	0	0	0
175	180	5	0	0	0	0	0	0	0	0	0	0
180	185	6	0	0	0	0	0	0	0	0	0	0
185	190	6	0	0	0	0	0	0	0	0	0	0
190	195	7	1	0	0	0	0	0	0	0	0	0
195	200	7	1	0	0	0	0	0	0	0	0	0
200	210	8	2	0	0	0	0	0	0	0	0	0
210	220	9	3	0	0	0	0	0	0	0	0	0
220	230	10	4	0	0	0	0	0	0	0	0	0
230	240	11	5	0	0	0	0	0	0	0	0	0
240	250	12	6	0	0	0	0	0	0	0	0	0
250	260	13	7	1	0	0	0	0	0	0	0	0
260	270	14	8	2	0	0	0	0	0	0	0	0
270	280	15	9	3	0	0	0	0	0	0	0	0
280	290	16	10	4	0	0	0	0	0	0	0	0
290	300	17	11	5	0	0	0	0	0	0	0	0
300	310	18	12	6	1	0	0	0	0	0	0	0
310	320	19	13	7	2	0	0	0	0	0	0	0
320	330	20	14	8	3	0	0	0	0	0	0	0
330	340	21	15	9	4	0	0	0	0	0	0	0
340	350	22	16	10	5	0	0	0	0	0	0	0
350	360	23	17	11	6	0	0	0	0	0	0	0
360	370	25	18	12	7	1	0	0	0	0	0	0
370	380	26	19	13	8	2	0	0	0	0	0	0
380	390	26	20	14	9	3	0	0	0	0	0	0
390	400	29	21	15	10	4	0	0	0	0	0	0
400	410	31	22	16	11	5	0	0	0	0	0	0
410	420	32	23	17	12	6	0	0	0	0	0	0
420	430	34	25	18	13	7	1	0	0	0	0	0
430	440	35	26	19	14	8	2	0	0	0	0	0
440	450	37	28	20	15	9	3	0	0	0	0	0
450	460	38	29	21	16	10	4	0	0	0	0	0
460	470	40	31	22	17	11	5	0	0	0	0	0
470	480	41	32	24	18	12	6	0	0	0	0	0
480	490	43	34	25	19	13	7	1	0	0	0	0
490	500	44	35	27	20	14	8	2	0	0	0	0
500	510	46	37	28	21	15	9	3	0	0	0	0
510	520	47	38	30	22	16	10	4	0	0	0	0
520	530	49	40	31	23	17	11	5	0	0	0	0
530	540	50	41	33	24	18	12	6	0	0	0	0
540	550	52	43	34	25	19	13	7	1	0	0	0

Appendix

Practice Plumbing Questions

Carefully read each question and then circle the letter of the best answer.

Note: Because each state has deleted or amended the International Codes to meet individual state needs, a few answers may not be found in your code book and some answers may differ from ours. If you find that your code disagrees with our answer, you should accept your code as the correct answer.

- 1) The minimum size fixture water supply pipe for a hose bibb is _____.
 - a. 1/2 inch
 - b. 3/4 inch
 - c. 1 inch
 - d. 1-1/4 inch
- 2) Notches on the end of joists shall not exceed _____ of the joist depth.
 - a. 1/8
 - b. 1/5
 - c. 1/4
 - d. 1/2
- 3) The minimum diameter of a circuit vent totaling 55 feet developed length and serving a horizontal drain branch, handling 120 dfus is ____ inches.
 - a. 1.5
 - b. 2
 - c. 2.5
 - d. 3
- 4) Cleanouts are required to be brought to the outside or be flush with the outside wall if the crawlspace is less than ____ inches high.
 - a. 18
 - b. 22
 - c. 30
 - d. 24
- 5) Solder used on copper shall conform to _____.
 - a. ASTM F80
 - b. ASTM S75
 - c. ASTM B32
 - d. ASTM M55
- 6) Backflow protection assemblies must be inspected at least _____.
 - a. every 6 months
 - b. annually
 - c. every two years
 - d. every five years
- 7) A cast iron mechanical joint coupling for hubless pipe and fittings shall comply with _____.

- a. CISP 310 or ASTM C 1277
- b. ASTM C564 or CAN/CSA B602
- c. ASTM C310
- d. ASMEA1053

8) A short sweep may be used to direct waste from vertical to horizontal only if it is ___ inches in diameter or greater.

- a. 2
- b. 3
- c. 4
- d. 6

- 9) Back pressure less than or equal to 4.33 PSI is classified as_____.
- a. Drainage
 - b. low head backpressure
 - c. high head backpressure
 - d. medium head backpressure
- 10) Copper pipe shall be horizontally supported at a maximum of _____ feet intervals.
- a. 5
 - b. 6
 - c. 12
 - d. ?
- 11) A 20 ft. length of pipe with slope per foot of $1/4$ will produce a drop of _____ inches.
- a. 3
 - b. 4
 - c. 5
 - d. 6
- 12) A building drain extends _____ beyond the exterior walls of a building.
- a. 30 inches
 - b. 5 feet
 - c. 10 feet
 - d. 48 inches
- 13) According to Table 604.3 the required flow rate for a flushometer tank type water closet is _____ GPM.
- a. 4
 - b. 1.6
 - c. 3
 - d. 1.8
- 14) A device or means to prevent backflow is a _____.
- a. Reverse valve assembly
 - b. Stopcock
 - c. Backflow preventer
 - d. Critical valve

- 15) Hot water faucets, except tub/shower mixing valves, on a fixture shall be ____.
- on the right
 - on the left
 - either left or right
 - labeled hot
- 16) A waste stack also serving as a vent+ shall ____.
- be vertical only
 - not have vertical or horizontal offsets
 - not receive discharge form water closets
 - all of the above
- 17) A 1-1/2 inch P trap with slip joints may be used as a clean out for a maximum _____ inch drain pipe.
- 1-1/4
 - 1-1/2
 - 2
 - 2-1/2
- 18) Lead free pipe contains no more than ____% lead.
- 2
 - 6
 - 8
 - 10
- 19) A forced sewer test must maintain a pressure of ____ PSI greater than the pump pressure.
- 10
 - 15
 - 20
 - 5
- 20) A three-compartment sink rated at 2 DFU per compartment has a total of _____ drainage fixture units discharging into a single indirect drain.
- 6
 - 8
 - 3
 - 4

Answer Key

1. a Table 604.5
2. c 307.2.1
3. c 40 foot rule 916.2, Table 710.1(2),
4. d 708.4
5. c 605.14.3
6. b 31 2.9.1
7. a 705.5.3
8. a or b Table 706.3 (Some codes differ, check footnote)
9. b 202 definitions
- 10.c Table 308.5
- 11.c
- 12.a Some codes differ, check 202 definition building drain
- 13.b Table 604.3
- 14.c 202 definitions
- 15.b 607.4
- 16.d 910.2
- 17.c 708.7 exception 1
- 18.c 202 definitions
- 19.d 312.7
- 20.a 709.4