This Program is made Possible through the Code Officials Education & Training Fund. Revenue for the Fund comes from Assessments on Building Permits.

Please turn down cell phones and put pagers on vibrate.

Thank you

PLUMBING ROUGH IN INSPECTION

2003 International Plumbing Code

Career Development
September 2009

2

Plumbing Rough In Inspection

- ***PRESENTED BY:***
  - Department Of Public Safety
  - Office Of Education And Data Management
- ***Referenced From:***
  - 2003 International Plumbing Code
  - State Building Code/ 2005 Connecticut Supplement
  - 2009 Amendments

3

Objectives

- *Application of 2003 IPC and*
  - *State Building Code & 2005 CT Supplement*
    - *To actual field rough in inspections*
- *Applying code inspection techniques*
  - *To field situations*
- *Referencing of field situations*
  - *To code sections*

4

Inspections To Be Performed

- ***Rough In Inspection:***
  - ***Preconcealment***
  - ***Parts of the plumbing system that are installed prior to the installation of fixture***
    - ***Water service inspection***
    - ***Building sewer inspection***
    - ***Water distribution inspection***
    - ***Drainage, waste & vent inspection***

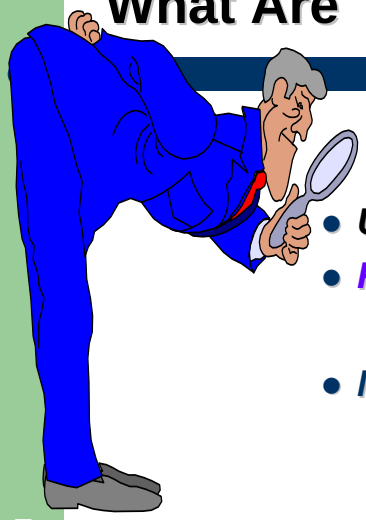
5

Inspections And Testing

- ***Required Inspections & Testing***
  - ***Section 107.1***
  - ***"…Code Official upon notification from the permit holder's agent, shall make the following inspections and such other inspections as necessary…"***

6

What Are Those Inspections?



- ***Underground Inspection***
- ***Rough-in Inspection***

- ***NOTE:***
  - ***The section also mentions Final Inspection which we will not cover within this presentation***

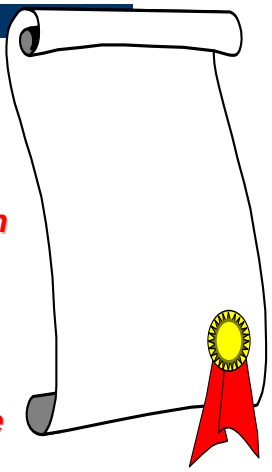
7

Underground Inspection

Rough-In Inspection

Approved Inspection Agencies
Section 107.1.1

- ***UL***
  - ***Underwriter Laboratories***
- ***CSA***
  - ***Canadian Standards Association***
- ***NSF***
  - ***National Sanitation Foundation***
- ***PDI***
  - ***Plumbing And Drainage Institute***



10

Evaluation & Follow Up
Section 107.1.2

- ***Evaluation Report Should Indicate***
  - ***System and component description***
  - ***Basis of evaluation***
  - ***Test results***
  - ***Additional data***
    - ***As deemed necessary by the Code Official***

11

Follow-up Inspection
Section 107.1.2.2

- ***"… The Code Official shall conduct the frequency of in-plant inspections necessary to ensure conformance…"***
  - ***"…or shall designate an independent, approved inspection agency to conduct such inspections …"***

12

Special Inspections
Section 107.2

- *Establishes Inspection And Record Keeping*
  - *By The Design Professional*
    - *When An Alternative Engineered Plumbing System Is Used*
- *Calling For*
  - *Periodic inspection*
  - *Written reports*

13

Testing
Section 107.3

- *Sets up procedures for testing as per sections*
  - *312 Tests and inspections*
  - *107.3.1 New, altered, extended or repaired systems*
  - *107.3.2 Equipment, material and labor for tests*
  - *107.3.3 Re-inspection and testing*

14

Approval
Section 107.4

- ***Notice Of Approval Is To Be Issued***
  - ***After***
    - ***Required Inspections Are Performed***
    - ***Required Equipment And System Tests Are Observed***
    - ***Or Written Reports Of Tests Are Received***
    - ***Determination Of Work Being In Compliance With Code***

16

Temporary Connection
Section 107.5

- *Temporary Connection*
  - *May Be Authorized Prior To The Completion Of Work*
    - *Seasonal Limitations*
    - *Time Constraints*
    - *Need For Testing*
    - *Need For Partial Equipment Operation*
- *Section 107.6 Notification of Inspecting & Testing Results*
  - *Added by the 05 CT Supplement*
    - *Passage or failure, whole or in part*

17

Required Tests
Section 312.1

- *Permit Holder Is Responsible For*
  - *1. All Tests To Be Performed*
  - *2. Notice To The Code Official*
  - *3. All Equipment, Material, Power And*
    - *Necessary Labor For The Tests*
- *All Piping Will Be Tested*

18

Tests & Inspections

- ***Section 312.1.1 Test Gauges***
  - ***Gauge increments are to be appropriate for the test being performed***
    - ***Test of 10 psi or less***
      - ***Increment of 0.10 psi or less***
    - ***Test of 10 - 100 psi***
      - ***Increment of 1 psi or less***
    - ***Test of 100 psi or over***
      - ***Increment of 2 psi or less***

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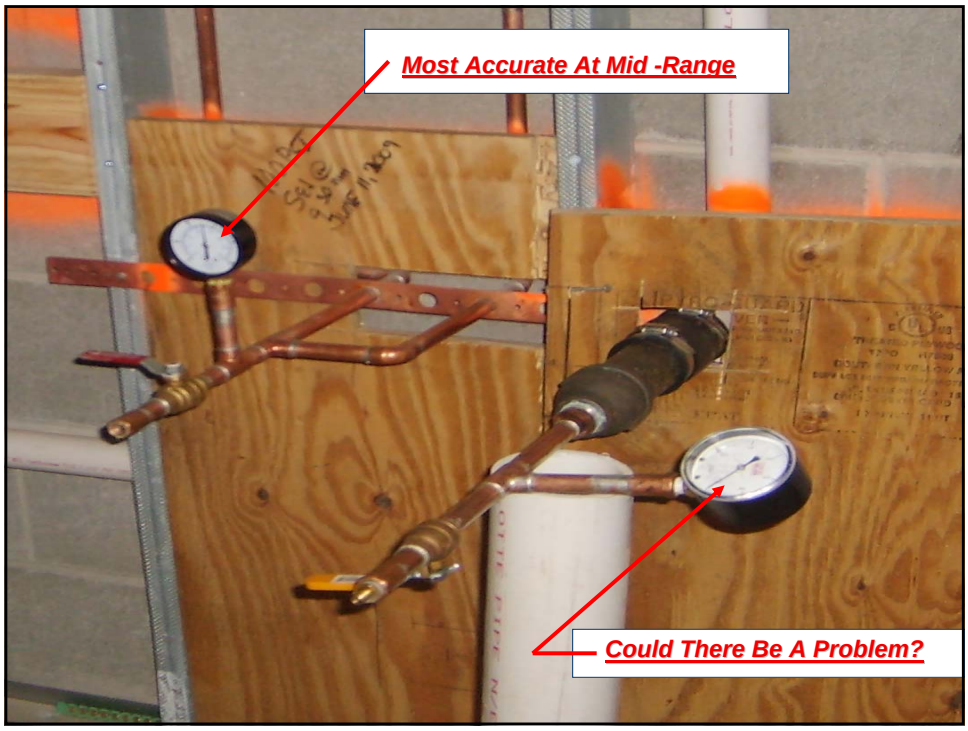
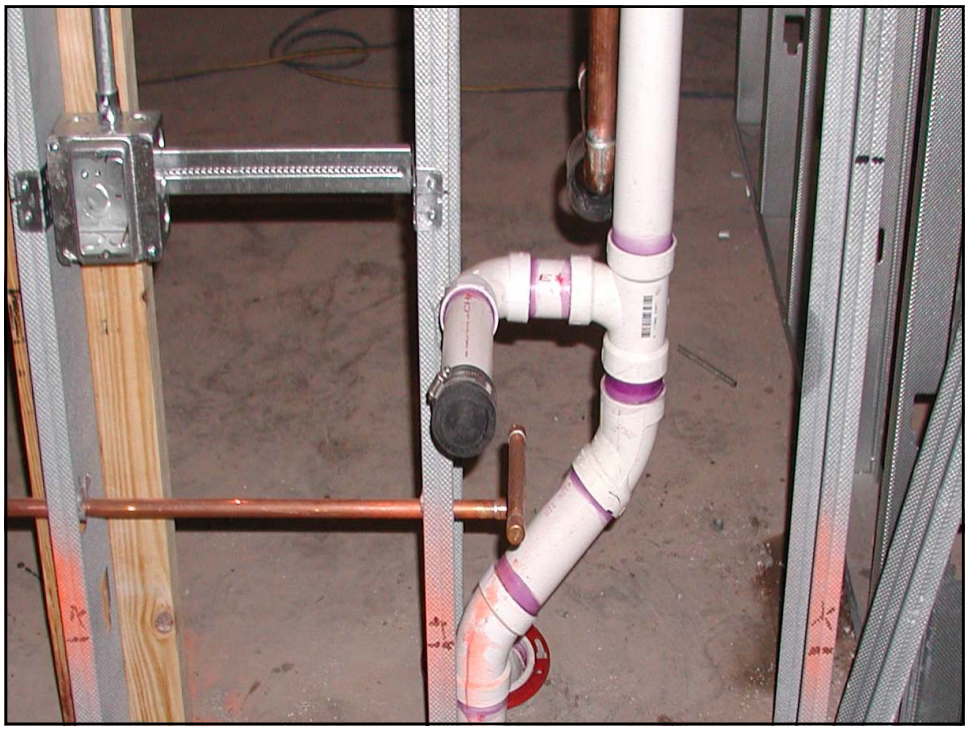


Drainage And Vent Water Test
Section 312.2

- *Water Test To Be Performed*
  - *On Entire DWV System Or In Sections.*
  - *Except For The*
    - *Upper 10 Feet Of The System*
  - *All system sections are to be tested*
    - *For a minimum of a 10 foot head*
    - *For a minimum of 15 minutes*

21



Drainage And Vent Air Test
Section 312.3

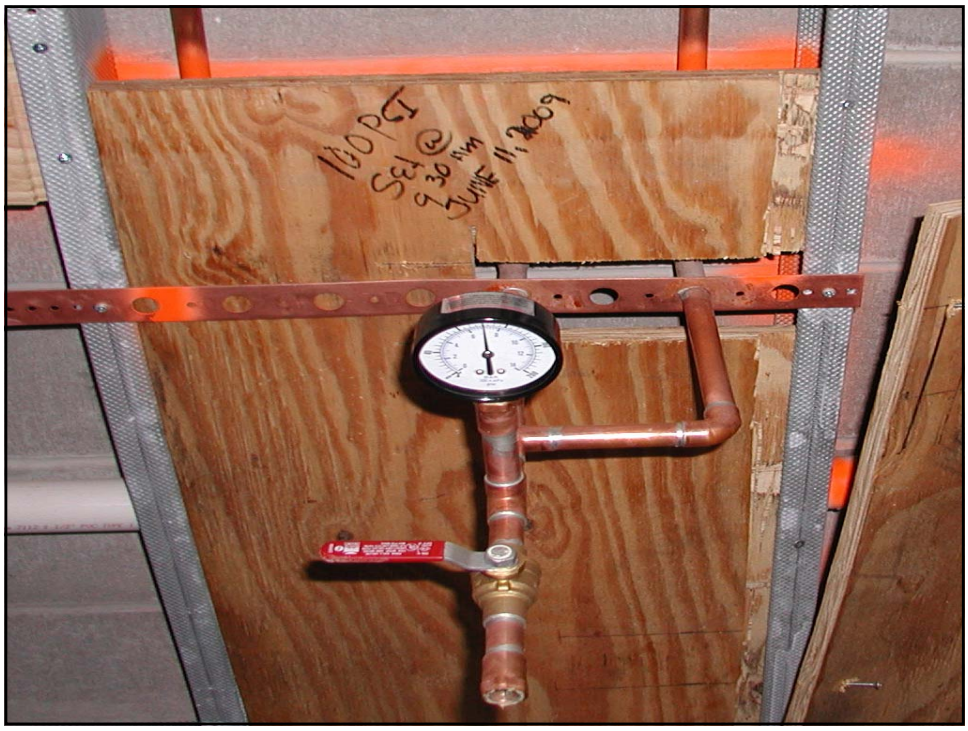
- *An Air Test May Be Performed*
  - *With A Uniform Test Pressure Of 5 psig.*
  - *Pressure Is To Be Maintained*
    - *For A Minimum Of 15 Minutes*
- *All Pressure Adjustments Are To Be Made Prior To Testing*

23

Water Supply Test
Section 312.5

- *Test May Be Done*
  - *Upon Completion Of A Section*
- *Test Pressure Must Be Equal*
  - *To working pressure of the system*
- *Water Used For Testing*
  - *Must Be Potable Water*
- *For All Systems Other Than Plastic*
  - *Air test may be used*
    - *MINIMUM TEST PRESSURE IS 50 PSI*

24



Gravity Sewer Test
Section 312.6

- ***Building Sewer System Must Be Tested To***
  - ***The Same Standards As The DWV System***
- ***System Is To Be Plugged At***
  - ***The Point Of Connection To The Public Sewer***
- **AIR TESTING *IS NOT* AN OPTION**

26

Forced Sewer Test
Section 312.7

- *A Forced Sewer Has Its Contents Placed Under Pressure For A Length Of Travel*
  - *Normally Involving the Use of a Sewage Pump or Sewage Ejector*
  - *The System Must Be Tested As A Gravity Sewer*
    - *Applied Pressure To Be 5 psi Greater Than Operating Pump Pressure*
      - *For a minimum of 15 minutes*

27

Storm Drainage System Test
Section 312.8

- *Storm Drainage Systems*
  - *Are To Be Tested To The Same Standards*
    - *As A DWV System*
      - *Drainage and Vent Water Test (312.2)*
      - *Drainage And Vent Air Test (312.3)*

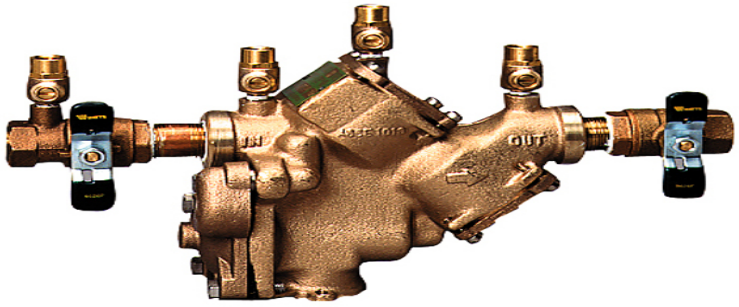
28

Inspection And Testing Of Backflow Prevention Assemblies
Section 312.9

- ***Inspection As Per***
  - ***Sections 312.9.1 & 312.9.2***
    - ***312.9.1 Inspections / IS DELETED BY***
      - ***05 CT Supplement***
  - ***Section 312.9.2 Testing / IS AMENDED BY***
    - ***05 CT Supplement***
      - ***Test at time of installation***
      - ***Owners responsibility to have tests performed***
        - ***By properly qualified individuals or agencies***

30

Reduced Pressure Zone Assemblies, Bronze



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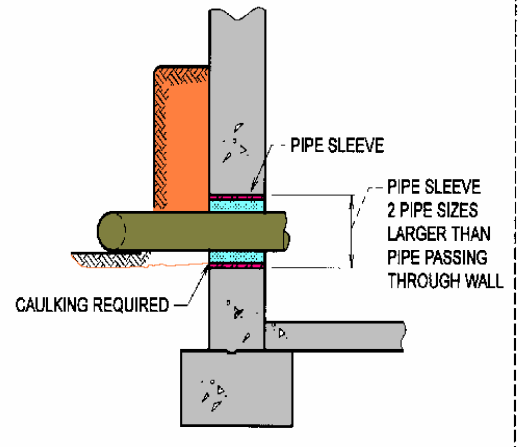
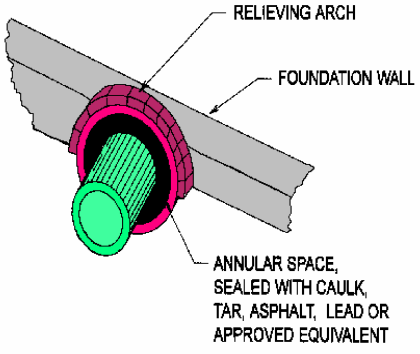
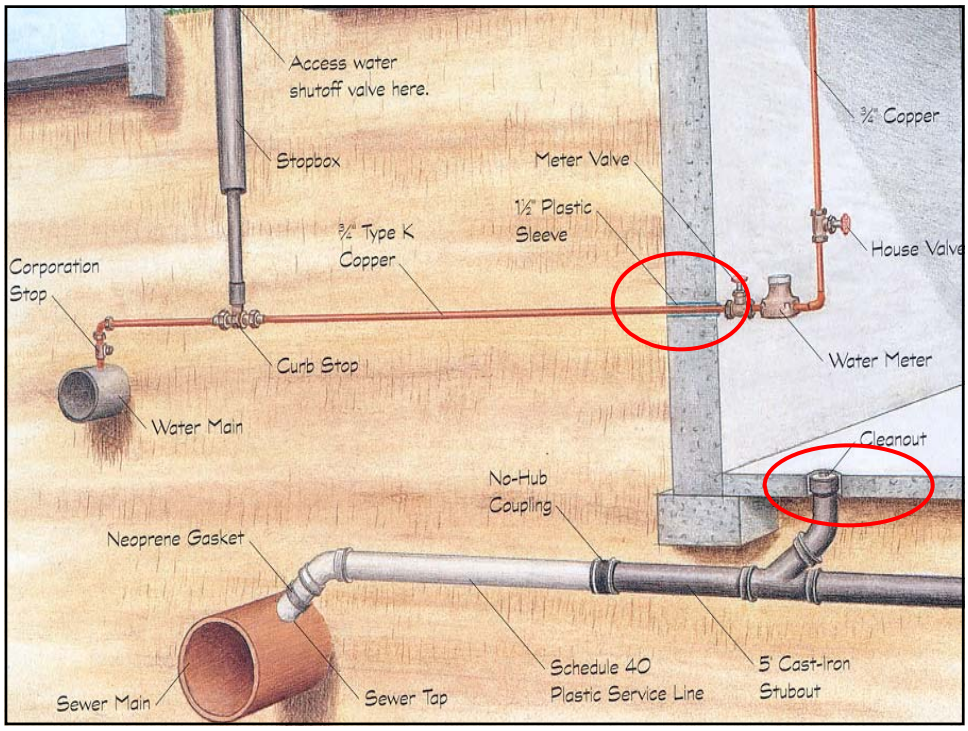
Installation Inspection



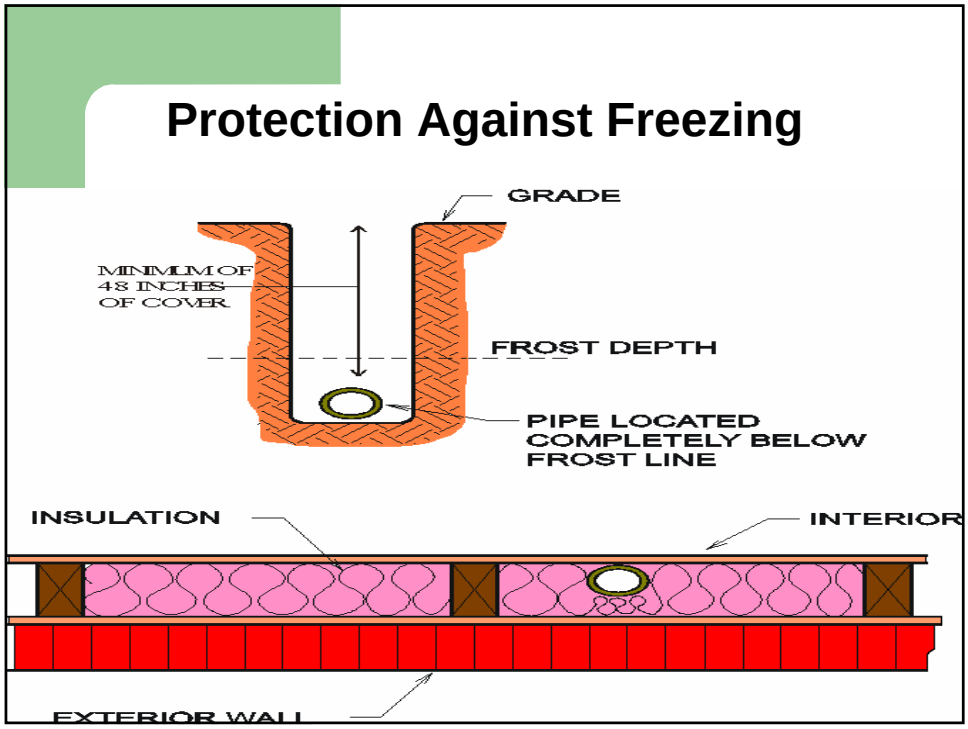
SIDE VIEW



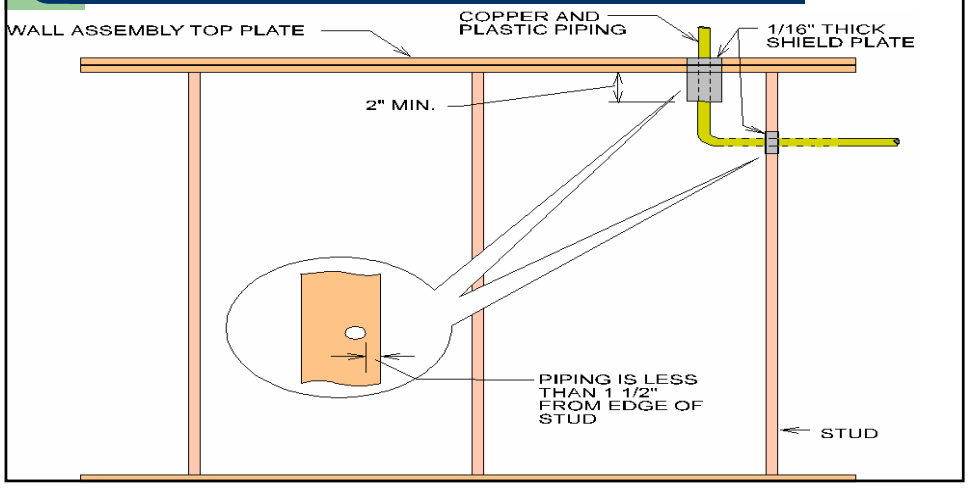
END VIEW

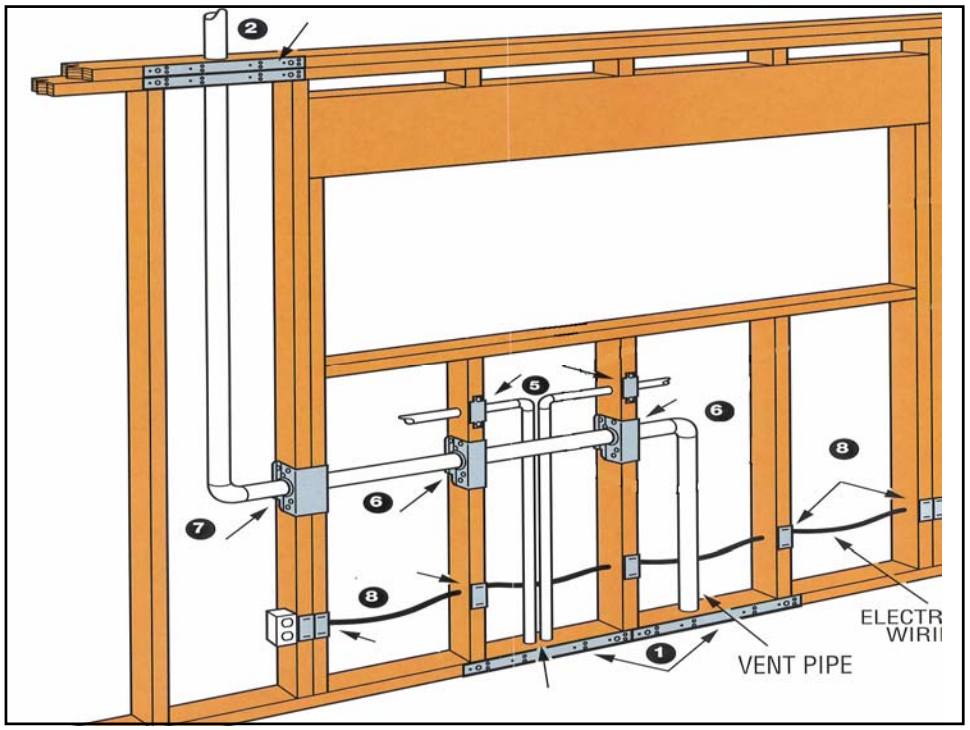


Protection Against Freezing

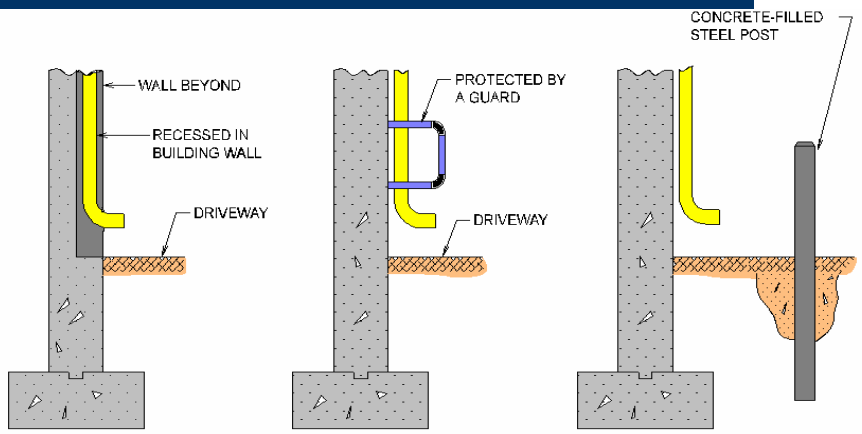


Pipe Protection





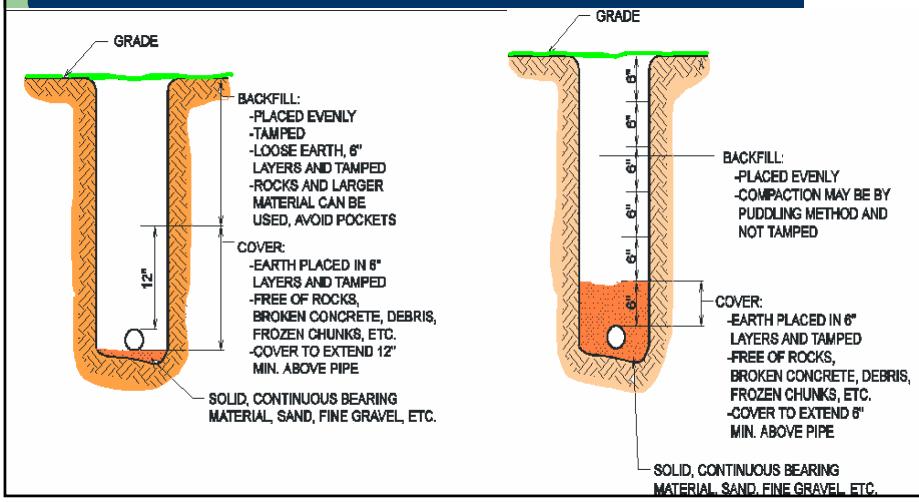
Protection of Plumbing System Components



NOTE: OTHER METHODS OF PROTECTION OF PLUMBING COMPONENTS ARE POSSIBLE, SUBJECT TO APPROVAL BY THE CODE OFFICIAL

Installation Inspection

Examine backfill and cover to be sure they are free of rocks, debris, etc. which could damage piping.



Structural Safety
Section 307

- ***Cutting notching & boring***
  - ***As per 2003 IBC***
- ***Truss alteration***
  - ***No cutting, drilling or notching***
    - ***Without verification of design or engineering professional***
- ***Trench location***
  - ***Not to extend below***
    - ***45 degrees bearing plane***

40

Problem #1

- ***On inspection of an automotive repair facility, you find that the floor drainage system within the repair stall area is tied into the city sewer.***
  - ***Does this meet code requirements?***
    - **What code section?**

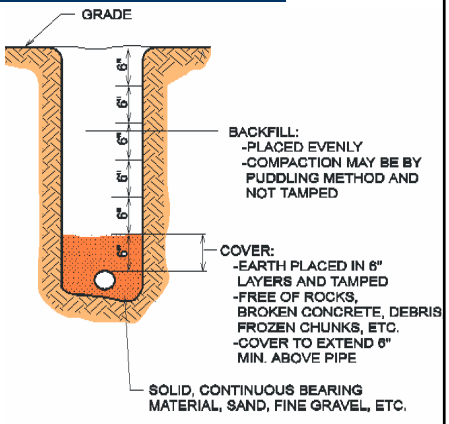
42

Answer To Problem #1

43

Problem #2

- *An inspection of a work site shows the following installation of a water supply line.*
  - *1. Is there any problem with this installation?*
  - *2. What code section covers this situation?*



44

Answers To Problem #2

An inspection of a work site shows the following
installation for a water supply line.

1. *Is there any problem with this installation?*
2. *What code section covers this situation?*
3. *Additional:*

45

Problem #3

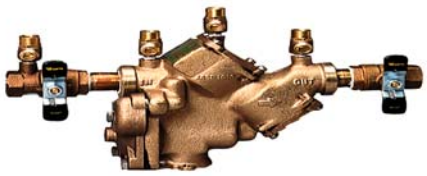
- *A three story building has a 2 inch PVC vent pipe running vertically from the second floor up through the third floor with hangar spacing of every 12 feet.*
  - *Is there any problem with this installation?*
    - *What code section covers the situation?*

46

Answers To Question #3

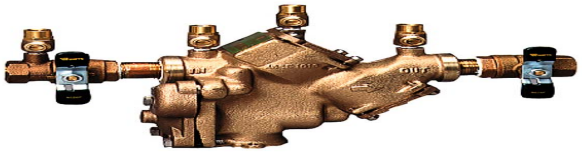
47

Problem #4



- ***A reduced pressure zone assembly has been installed. The plumber had his new apprentice test it at the time of installation. A report of the test has been given to the Building Official.***
  - ***Does the test and report meet the intent of the code?***
    - ***What code section applies?***

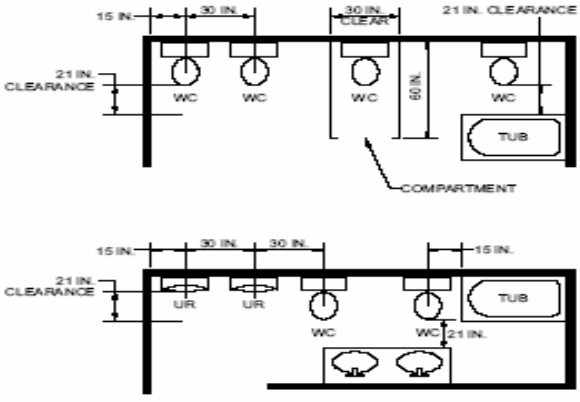
48



Answers To Question #4

49

Fixture Clearances



50

Distances between fixtures may not be so evident at the time of this inspection!

Minimum dimensions can easily be determined at this point!

Water Closet Substitution

Section 419.2

67% Substitution Of Water Closets

53

Water Closet Connection

- ***Section 420.4***
  - ***4 x 3 closet bend is acceptable***
  - ***If a 3 inch bend is utilized***
    - ***4 x 3 flange to be installed***

54

Problem #5

- *Your plan review was for a small restaurant facility that will have 2 employees and the ability to handle 10 patrons. When doing your rough in inspection, you find that the facility has only one toilet facility.*
  - *Does this facility meet code?*

    What section of the code covers this?

55

Answer To Problem #5

Does the facility meet code?

What code section?

56

Problem #6

- *Your inspection of a new mall facility shows that a central toilet area on the first floor will be 250 feet from the main entrance of the tenant space. The retail establishments going in on the third floor do not have toilet facilities.*
  - *Are employee facilities necessary for the third floor tenant spaces?*
    - *What code section?*

57

Answer To Problem #6

58

Water Heater Rough-In Inspection

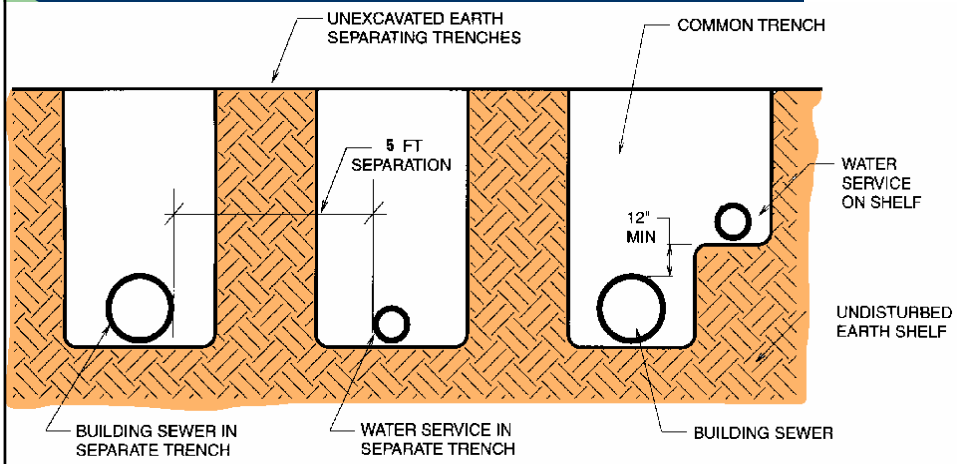
- ***Water heater inspection***
  - ***Would normally fall under Final-Inspection***
- ***Areas for Rough-In***
  - ***Section 502.2 Rooms used as a plenum***
  - ***Section 502.3 Water heaters installed in attics***
  - ***Section 504.7 Required pan***
    - ***NOTE: A check during rough-in of these areas could eliminate problems at the final-inspection***

59

<u>Question:</u> If this room is also being used for air-handling equipment, is it also being used as a plenum???

60

Water Service
Section 603



Materials

- ***Lead content of pipe & fittings***
  - ***Maximum of 8 percent***
- ***Water service pipe***
  - ***Minimum working pressure of***
    - ***160 psi @ 73.4 degrees F.***
- ***Water distribution pipe***
  - ***Hot water pipe & tubing minimum pressure rating***
    - ***100 psi @ 180 degrees F.***

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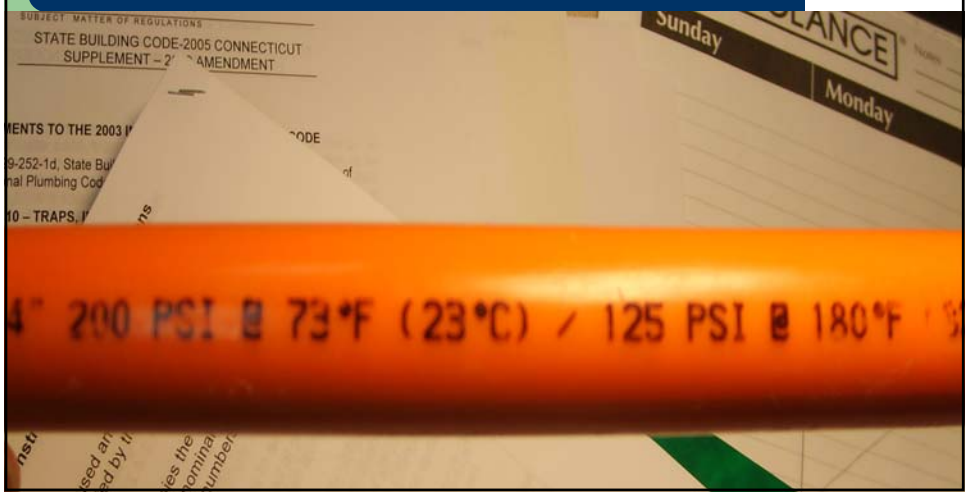
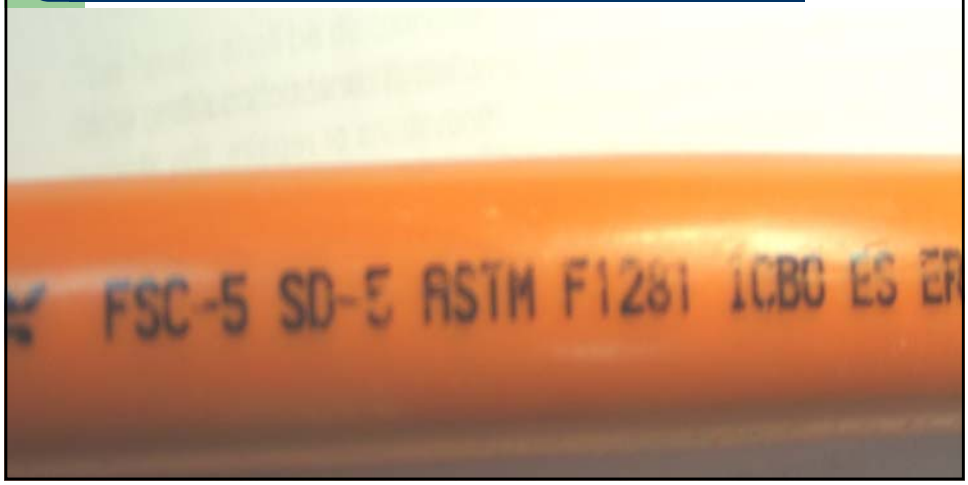
Pressure-Temperature Ratings



ASTM Listing



Backflow Application

TABLE 608.1
APPLICATION OF BACKFLOW PREVENTERS

DEVICE	DEGREE OF HAZARD[a]	APPLICATION[b]	APPLICABLE STANDARDS
Air gap	High or low hazard	Backsiphonage or backpressure	ASME A112.1.2
Air gap fittings for use with plumbing fixtures, appliances and appurtenances	High or low hazard	Backsiphonage or backpressure	ASME A112.1.3
Antisiphon-type fill valves for gravity water closet flush tanks	High hazard	Backsiphonage only	ASSE 1002, CSA-B125
Barometric loop	High or low hazard	Backsiphonage only	(See Section 608.13.4)
Reduced pressure principle backflow preventer and reduced pressure principle fire protection backflow preventer	High or low hazard	Backpressure or backsiphonage Sizes 3/8"- 16"	ASSE 1013, AWWA C511, CAN/CSA B64.4
Reduced pressure detector fire protection backflow prevention assemblies	High or low hazard	Backsiphonage or backpressure (Fire sprinkler systems)	ASSE 1047
Double check backflow prevention assembly and double check fire protection backflow prevention assembly	Low hazard	Backpressure or backsiphonage Sizes 3/8" - 16"	ASSE 1015, AWWA C510
Double check detector fire protection backflow prevention assemblies	Low hazard	Backpressure or backsiphonage (Fire sprinkler systems) Sizes 2" - 16"	ASSE 1048
Dual-check-valve-type backflow preventer	Low hazard	Backpressure or backsiphonage Sizes 1/4" - 1"	ASSE 1024
Backflow preventer with intermediate atmospheric vents	Low hazard	Backpressure or backsiphonage Sizes 1/4" - 3/4"	ASSE 1012, CAN/CSA-B64.3

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Double Check Valve Assemblies, Cast Iron

67

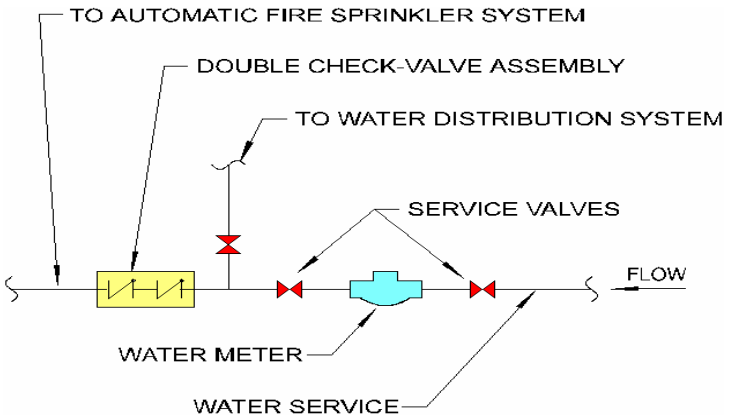
Backflow Preventers : Double Check Valves

68

Reduced Pressure Detector Assemblies, Stainless Steel

69

Common Fire Sprinkler and Domestic Water Supply



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Problem #7

- *In a small strip mall, each store front is going to have it's water heater installed in the attic space. Your inspection reveals:*
  - *Passageway of 30" high by 24" wide, 10' in length, solid flooring 24"wide, service space of 30" deep x 30" wide, access opening 20" x 28".*

Is it built to code?

What section of the code covers the installation?

71

Answer To Problem #7

- *In a small strip mall, each store front is going to have its water heater installed in the attic space. Your inspection reveals:*
  - *Passageway of 30" high by 24" wide, 10' in length, solid flooring 24"wide, service space or 30" deep x 30" wide, access opening 20" x 28".*

Is it built to code?

What section of the code covers the installation?

72

Problem #8

- ***You have a laboratory constructed so the labs have a potable water supply and a non-potable water supply.***

  Is it necessary that each system be identified?

  What code section would apply?

73

Answer To Problem #8

- ***You have a laboratory constructed so the labs have a potable water supply and a non-potable water supply.***

  Is it necessary that each system be identified?

  What code section would apply?

74

Problem #9

- ***Inspection of a facility shows a lawn irrigation system has been installed with a reduced pressure principle backflow preventer.***

  Does this meet code?

  What code section covers this installation?

75

Answer To Problem #9

- ***Inspection of a facility shows a lawn irrigation system has been installed with a reduced pressure principle backflow preventer.***

  Does this meet code?

  What code section covers this installation?

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Building Sewer & Water Service
703.1

- ***Building sewer within 5 feet of water service***
  - ***Building sewer shall conform to***
    - ***Standards for ABS plastic, Cast iron, Copper, PVC plastic***
      - ***As listed in Table 702.3***

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TABLE 702.3
BUILDING SEWER PIPE

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe	ASTM D 2661; ASTM D 2751; CSA F 628
Asbestos-cement	ASTM C 428
Cast-iron pipe	ASTM A 74; ASTM A 888; CISPI 301
Coextruded composite ABS DWV schedule 40 IPS pipe (solid)	ASTM F 1488
Coextruded composite ABS DWV schedule 40 IPS pipe (cellular core)	ASTM F 1488
Coextruded composite PVC DWV schedule 40 IPS pipe (solid)	ASTM F 1488
Coextruded composite PVC DWV schedule 40 IPS pipe (cellular core)	ASTM F 1488
Coextruded composite PVC IPS-DR, PS140, PS200, DWV	ASTM F 1488
Coextruded composite ABS sewer and drain DR-PS in PS35, PS50, PS100, PS140, PS200	ASTM F 1488
Coextruded composite PVC sewer and drain DR-PS in PS35, PS50, PS100, PS140, PS200	ASTM F 1488
Concrete pipe	ASTM C14; ASTM C76; CAN/CSA A257.1M; CAN/CSA A257.2M
Copper or copper-alloy tubing (Type K or L)	ASTM B 75; ASTM B 88; ASTM B 251
Polyethylene (PE) plastic pipe (SDR-PR)	ASTM F 714

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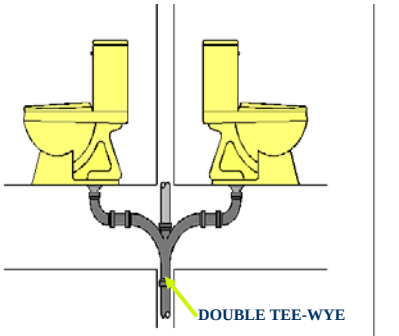
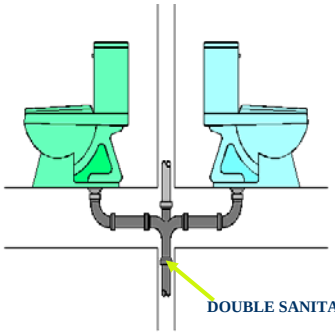
Back-to-Back Fixtures



DOUBLE TEE-WYE

(OR DOUBLE COMBINATION FITTING)

PERMITTED



DOUBLE SANITARY TEE

PROHIBITED

unless developed horizontal length is 18 inches or greater

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TABLE 706.3

FITTINGS FOR CHANGE IN DIRECTION

TYPE OF FITTING PATTERN	CHANGE IN DIRECTION		
	Horizontal to vertical	Vertical to horizontal	Horizontal to horizontal
Sixteenth bend	X	X	X
Eighth bend	X	X	X
Sixth bend	X	X	X
Quarter bend	X	X[a]	X[a]
Short sweep	X	X[a,b]	X[a]
Long sweep	X	X	X
Sanitary tee	X[c]	—	—
Wye	X	X	X
Combination wye and eighth bend	X	X	X

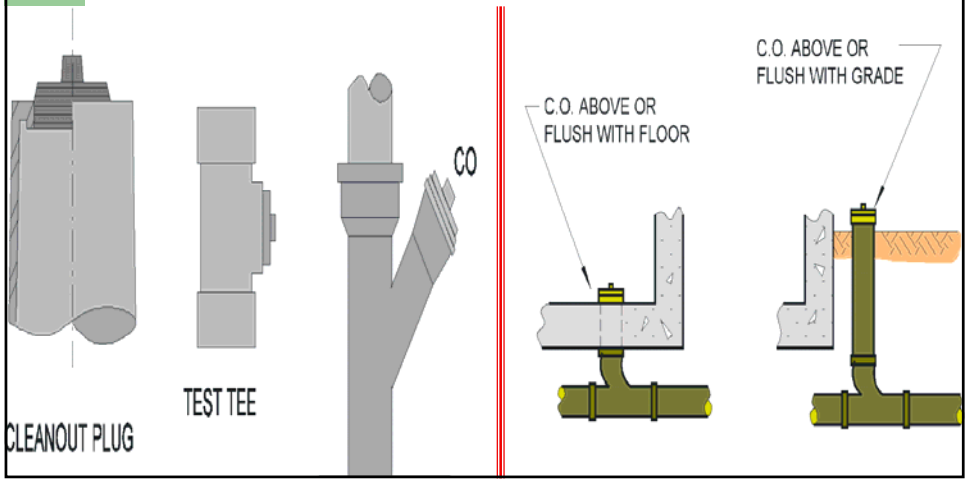
For SI: 1 inch = 25.4 mm.

a. The fittings shall only be permitted for a 2-inch or smaller fixture drain.

b. Three inches or larger.

c. For a limitation on double sanitary tees, see Section 706.3.

Cleanout Inspection



Cleanout Locations

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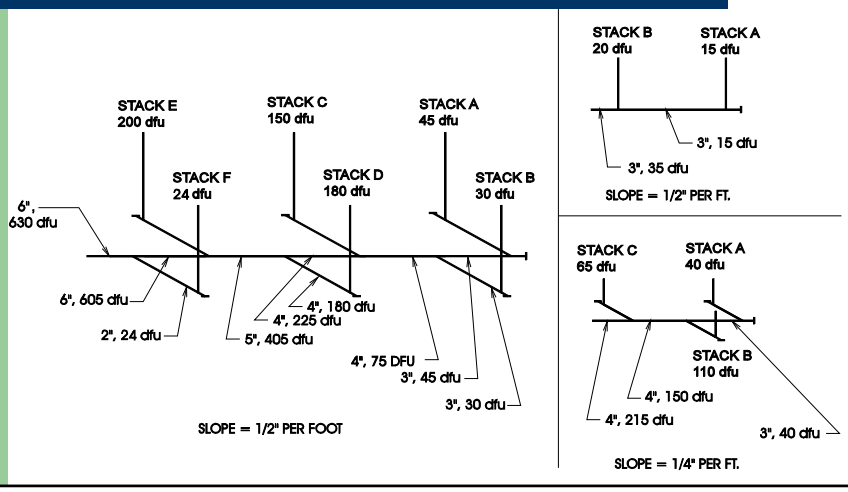
Building Drain Sizing
Section 710



83

Problem #10

- ***Your inspection finds that due to a necessary long run, the building sewer of the structure under construction is being tied into the building sewer line of the structure on the next lot.***

  Does this application meet code?

  What code section is this covered by?

84

Answer To Problem #10

- *Your inspection finds that due to a necessary long run, the building sewer of the structure under construction is being tied into the building sewer line of the structure on the next lot.*

  Does this meet code?

  What code section is this covered by?

85

Problem #11

- *Inspection shows a 6 inch drainage system has a 4 inch cleanout installed every 75 feet. Cleanouts are accessible and meet directional and clearance standards.*

  Are the cleanouts properly sized?

  What section of the code applies?

86

Answer To Problem #11

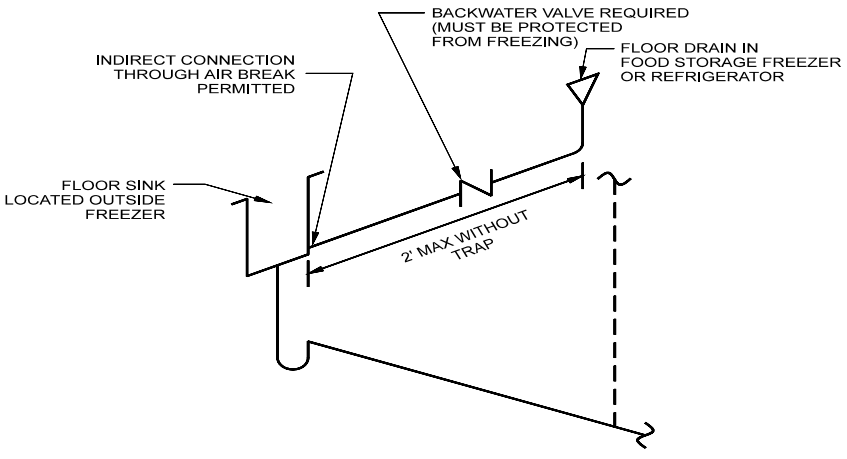
- ***Inspection shows a 6 inch drainage system has a 4 inch cleanout installed every 75 feet. Cleanouts are accessible and meet directional and clearance standards.***

  Are the cleanouts properly sized?

  What section of the code applies?

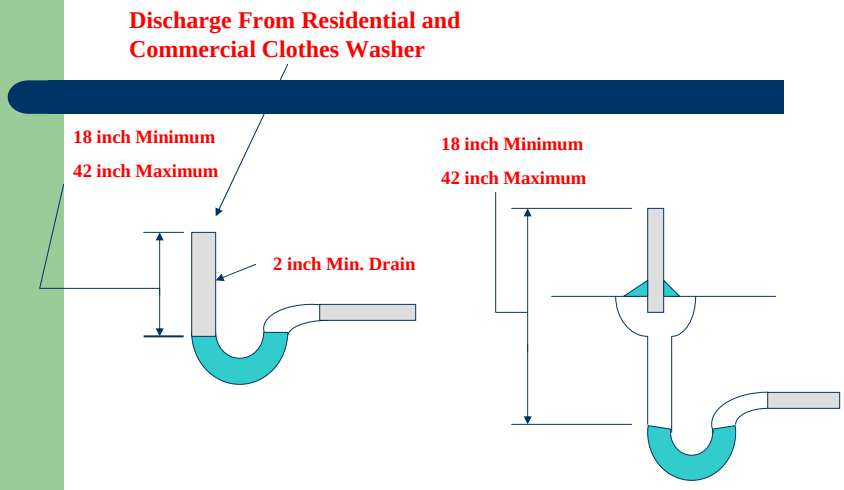
87

Floor Drain in Food Storage Freezer



88

Standpipes



Standpipe Connecting To A Floor Drain

89

Problem #12

- ***Inspection finds that you have a discharge line, for a future clinical sink directly connected to the drainage system.***

  Does this installation meet code?

  What code section is it covered by?

90

Answer To Problem #12

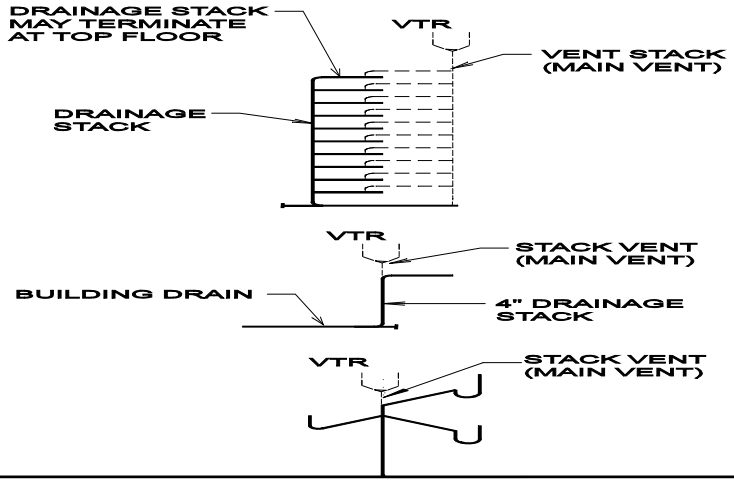
Inspection finds that you have a discharge line, for a future clinical sink directly connected to the drainage system.

Does this installation meet code?

What code section is it covered by?

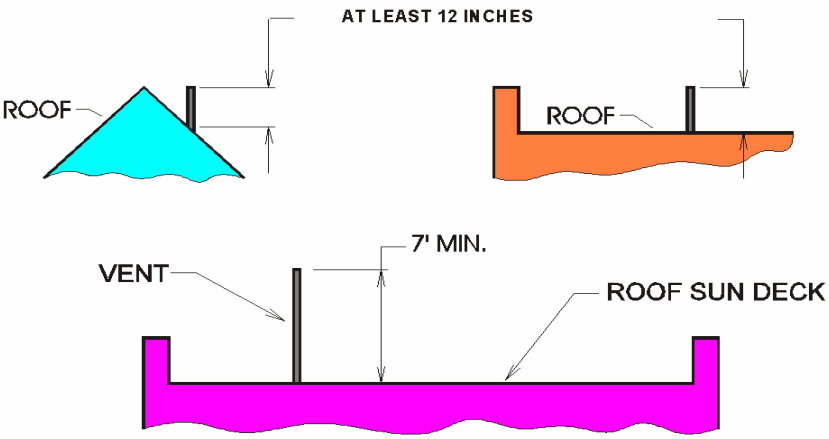
91

Vent Stacks & Stack Vents
Section 903



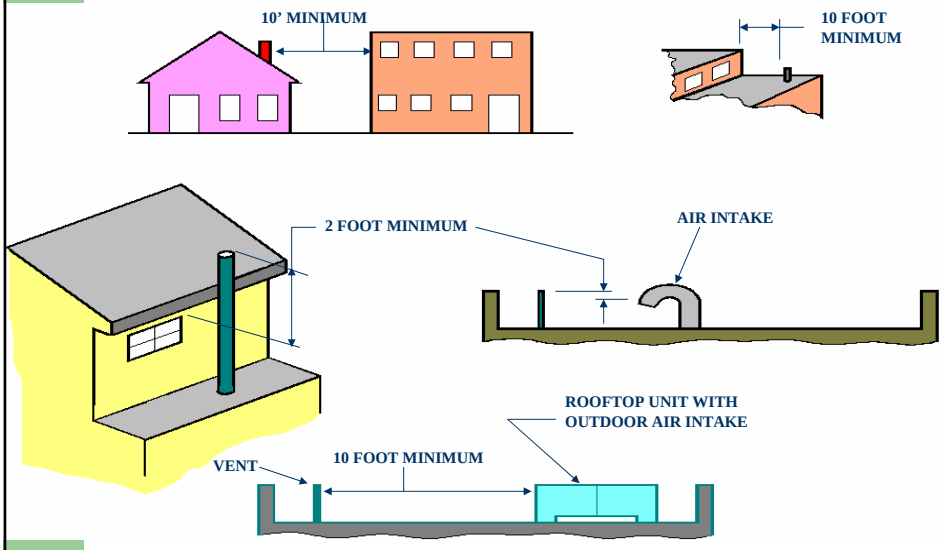
92

Vent Terminal



93

Separation of Vent Terminal

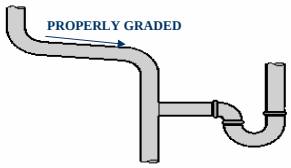


94

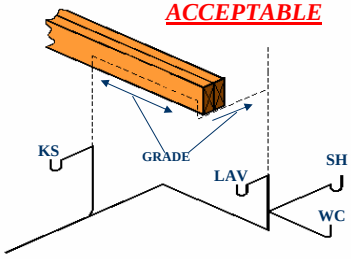
Grade of Vents

ACCEPTABLE

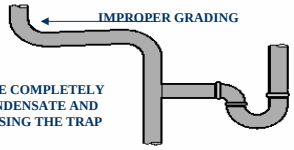
THERE IS NO MINIMUM PITCH REQUIRED. ONLY A GRADING IN THE DIRECTION OF FLOW TO THE DRAINAGE SYSTEM



ACCEPTABLE

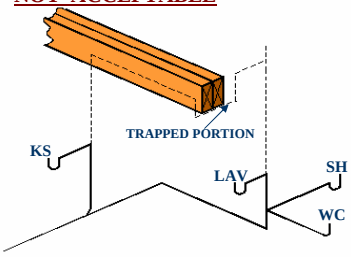


NOT ACCEPTABLE



THE VENT MAY BE COMPLETELY BLOCKED BY CONDENSATE AND RAINWATER CAUSING THE TRAP TO BE UNVENTED

NOT ACCEPTABLE



95

Problem #13

- ***Inspection of a new health club facility shows that the roof of the facility is going to be used as a sun deck. The vent terminates 5 feet above the flat roof.***

  Does the vent extension meet code?

  What code section covers the vent termination?

96

Answer To Problem #13

- ***Inspection of a new health club facility shows that the roof of the facility is going to be used as a sun deck. The vent terminates 5 feet above the flat roof.***

  Does the vent extension meet code?

  What code section covers the vent termination?

97

Problem #14

- ***An individual vent is being used to vent every two trapped fixtures as a common vent.***

  Can this method be used between floors?

  What code section is this covered in?

98

Answer To Problem #14

- ***An individual vent is being used to vent every two trapped fixtures as a common vent.***

  Can this method be used between floors?

  What code section is this covered in?

99

Problem #15

- ***You have been called to witness the DWV testing as per section 312.3. On arrival, you find that an air admittance valve has been installed.***

  Can the test be performed?

  What code section is this covered by?

100

Answer To Problem #15

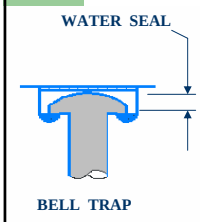
- ***You have been called to witness the DWV testing as per section 312.3. On arrival, you find that an air admittance valve has been installed.***

  Can the test be performed?

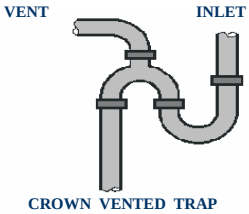
  What code section is this covered by?

101

Prohibited Traps and Cleanouts

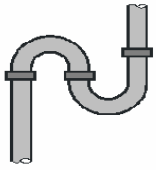


BELL TRAP



CROWN VENTED TRAP

TRAP WITH FLOAT BALL
(MOVING PARTS)

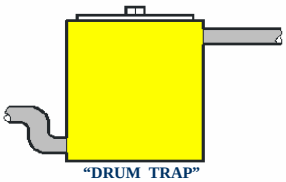


"S" TRAP

TENDS TO SELF SIPHON

"OLD STYLE"

FLOOR DRAIN WITH INTERIOR PARTITION



"DRUM TRAP"

ENLARGEMENT CHAMBER TENDS TO CREATE STOPPAGES OR CLOGGING OF THE DRAIN

2

Grease Traps

- **Grease Traps & Interceptors**
  - **To conform to PDI & ASME standards**
    - **Installed per MFG instructions**
- **Grease Trap Capacity**
  - **Retention capacity**
    - **As indicated by Table 1003.3.4.1**

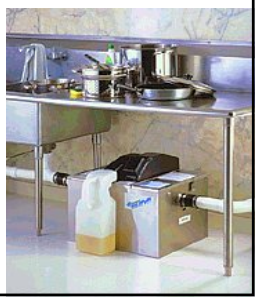


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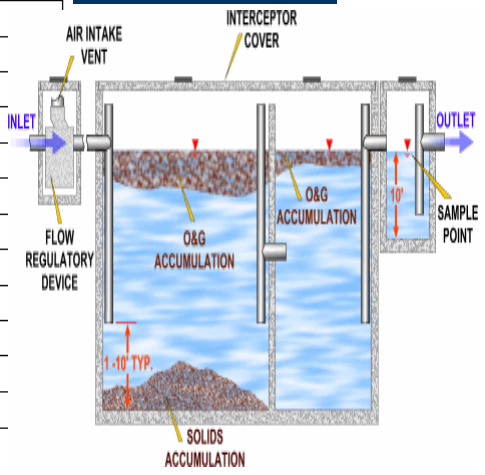
TABLE 1003.3.4.1
CAPACITY OF GREASE TRAPS

TOTAL FLOW-THROUGH RATING (gpm)	GREASE RETENTION CAPACITY (pounds)
4	8
6	12
7	14
9	18
10	20
12	24
14	28
15	30
18	36
20	40
25	50
35	70
50	100

For SI: 1 gallon per minute = 3.785 L/m, 1 pound = 0.454 kg.



Problem #16

- *An automotive repair facility is being inspected. The work area measures 2000 square feet. The separator system has a minimum capacity of 25 cubic feet.*

  Does this set up meet code?

  What code section covers this area?

105

Answer To Problem #16

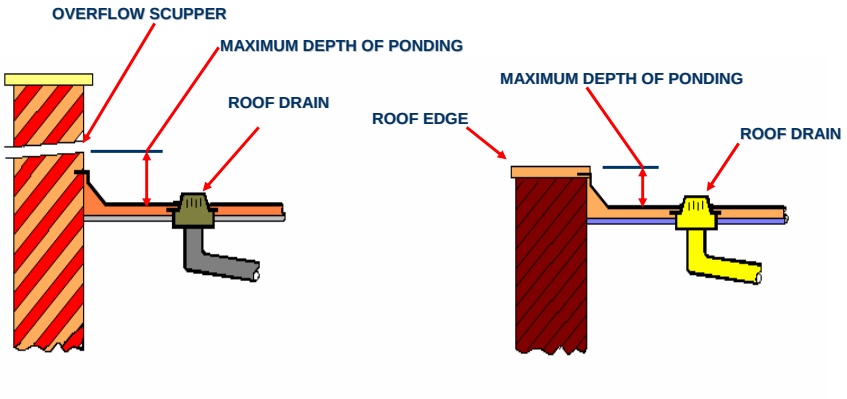
- *An automotive repair facility is being inspected. The work area measures 2000 square feet. The separator system has a minimum capacity of 25 cubic feet.*

  Does this set up meet code?

  What code section covers this area?

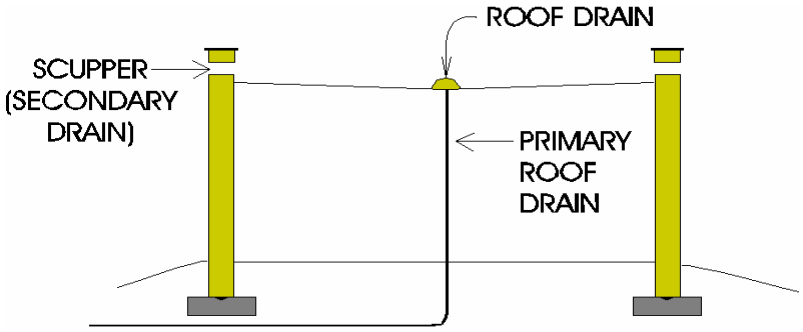
106

Roof Drain With Overflow



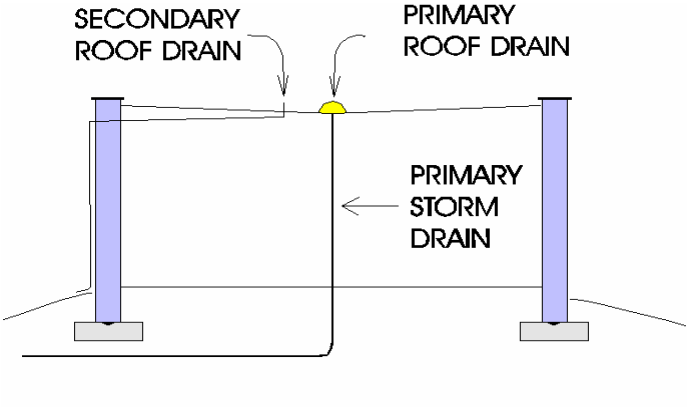
10
7

Secondary Roof Drains
Example 1: ***Permitted***



10
8

Secondary Roof Drains
Example 2: *Permitted*



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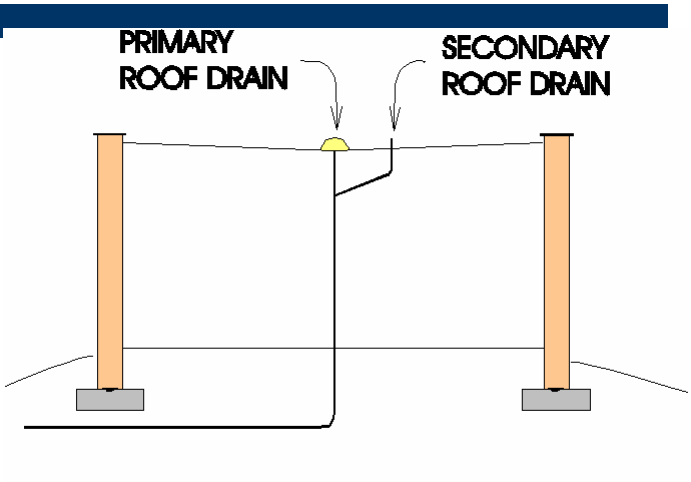
Secondary Roof Drains
Example 3: *Not Permitted*



110

Problem #17

- ***Inspection of the roof drainage system finds that the strainer is going to be even with the flat roof decking.***
  - ***Will this installation meet code?***
    - ***What code section covers this installation?***

111

Answer To Problem #17

- ***Inspection of the roof drainage system finds that the strainer is going to be even with the flat roof decking.***
  - ***Will this installation meet code?***
  - ***What code section covers this installation?***

112

Problem #18

- *As you continue your roof inspection, you note that there are 4 roof drains for a roof area of 11,000 square feet.*
  - *Does this portion of the system meet code?*
  - *What code section covers this installation?*

113

Answer To Problem #18

- *As you continue your roof inspection, you note that there are 4 roof drains for a roof area of 11,000 square feet.*
  - *Does this portion of the system meet code?*
  - *What code section covers this installation?*

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Questions