

PLUMBING

QUESTIONS AND ANSWERS

By
W. H. SARGENT



Class TH6128

Book T3

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PLUMBING

Questions With Answers

ON THE

New York City Rules and Regulations

AND

USEFUL INFORMATION

FOR

PLUMBERS

ARCHITECTS

ESTIMATORS

MASTERS

INSPECTORS

DRAFTSMEN

BY

JOSEPH E. TAGGART, S.E.

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PREFACE

The following pages have been prepared in response to many requests for interpretations of the plumbing code.

Realizing the importance of strict compliance with sanitary regulations, the author has endeavored to set forth all information essential to such compliance in a form instructive and convenient.

Many years of effort and experiment have gone into building the Plumbing Code of New York City to its high level of standards, until to-day it stands as a model for sanitary rules and regulations not excelled in any city in the world.

JOS. E. TAGGART,

Member of the American Society of Sanitary Engineers, past member of the U. A. Journeymen Plumbers and Master Plumbers of New York City, teacher of plumbing and sanitary engineering in the Murray Hill Evening Trade School, New York City, formerly teacher of plan reading and estimating in the College of the City of New York, and chief estimator for the Department of Water Supply, Gas and Electricity in the City of New York. At present teacher of plumbing in Junior High School 64, Manhattan.

BOOKS NOW IN PREPARATION

BY

THE AUTHOR

PLAN READING FOR PLUMBERS

MATHEMATICS FOR PLUMBERS

PLUMBING—

INSTALLATION AND OPERATION

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Plumbing Questions with Answers

REQUIREMENTS OF EXAMINING BOARD

Q.—What are the requirements before a plumber may engage in business as a master or contractor?

A.—He must first appear before the Examining Board of Plumbers and furnish to the Board such information as may be required. Each applicant shall furnish two vouchers, who shall appear before the Board and sign under oath on form prescribed by the Board, certifying to the time the applicant has been employed by them as a journeyman plumber. Such vouchers at the time of signing applications must be lawfully engaged in the plumbing business in the city of New York. All applications must be under oath. The Board shall refuse to receive an application from any person who, at the time of making, may be unlawfully engaged in business, as a master or employing plumber. A photograph of applicant is also required to be filed with application.

Q.—What is the length of experience required to become a master plumber?

A.—No person shall be examined unless he shall have had an experience of at least three years as a journeyman plumber and is able to furnish satisfactory evidence of such fact.

Q.—Shall the applicant be a citizen of the United States?

A.—Yes—no application will be received from any person who is not a citizen of the United States.

Q.—How are applicants examined as to fitness and qualifications?

A.—The examinations are conducted in two parts, namely: a practical test to determine the applicant's skill as a journeyman. (This test consists of joint wiping of various sizes and shapes and a written examination consisting of questions and plan reading, questions on the rules and regulations, theory, and violation plans.)

Q.—Are applicants required to answer all questions in writing?

A.—Yes, all examinations shall be answered in writing by the applicant and must be in English. (The applicant's spelling or writing will not be counted against him as long as the writing is legible.)

Q.—How often are examinations conducted by the Board?

A.—The time and place of holding examinations shall be at the discretion of the Board. Ample notice shall be given to the applicants.

Q.—Do applicants receive a certificate upon passing the required tests?

A.—Yes, persons who pass the tests, as prescribed by the Board, shall be eligible to receive a certificate of competency as master or employing plumber.

Q.—Can an applicant who fails in one or both tests apply for a re-examination?

A.—Yes, an applicant who fails in the practical test shall not be eligible for another test until the expiration of three months; should he fail in the second test, he will not be eligible for a third test until the expiration of six months, and failing in the third test he will not

be eligible for a fourth test until the expiration of one year. An applicant who fails in the written examination shall not be eligible for a re-examination until the expiration of one month; should he fail in the second examination, he will not be eligible for another examination until the expiration of three months. Should he fail in the third examination he will not be eligible for another examination until the expiration of six months, and should he fail in the fourth examination, he will not be eligible for another examination until the expiration of one year.

Q.—For what length of time may an application be active?

A.—All applications will expire and be cancelled after a period of one year, if the applicant does not appear for examination within that period.

Q.—Are there any other requirements, other than passing the examinations required of an applicant before receiving a certificate?

A.—Yes, the Board shall inquire into the applicant's fitness and qualifications for conducting such business, and may require the applicant to submit, under oath, such evidence as will satisfy the Board that he is a person of good repute, character and responsibility.

Q.—What is the cost of taking examination and receiving certificate?

A.—Each applicant for examination shall pay the sum of five dollars, and the further sum of five dollars, plus the amount of revenue stamp tax, or both, upon the issuance of a certificate to engage in business.

Q.—Should the applicant fail in the examination after paying the first five dollars, what is required?

A.—He shall pay an amount to be fixed by the Board, not to exceed five dollars.

Q.—Where a master plumber loses his certificate what action is taken by the Board?

A.—The Board may issue a duplicate where the original was issued during the term of office of all members of the Board in office when duplicate certificate is requested. In other cases a certificate of record is issued.

Q.—Is any charge made for a duplicate or a certificate of record?

A.—Yes, the sum of two dollars.

Q.—Is a metal sign or plate necessary?

A.—Yes, same to be conspicuously placed at the office or shop. It is obtained from the Board upon the payment of five dollars.

Q.—What is required of a master plumber who is retiring from business?

A.—He shall surrender to the Board the metal plate or sign. Failure to do so is a misdemeanor, under the Laws of 1916—Chapter 305.

Q.—What are the requirements of every employing or master plumber, carrying on his trade or business in the City of New York?

A.—Once each year he shall register his name and address at the office of the Bureau of Buildings in the Borough in which his place of business is located, under such rules and regulations as said Bureau shall prescribe, in accordance with Section 141 (new Section 604) of the Building Code of the City of New York.

Filing of Drawings, Descriptions, Etc.

Q.—What are the rules governing the filing of drawings, descriptions, etc.?

A.—Drawings and triplicate descriptions, on forms furnished by the Bureau of Buildings for all Plumbing and Drainage, shall be properly filled in, and filed by the owner or architect in the said Bureau. The plans must

BUREAU OF BUILDINGS

BOROUGH OF MANHATTAN, CITY OF NEW YORK

NOTICE—This Application must be TYPEWRITTEN and filed in triplicate

P. & D. APPLICATION NO. _____ 191 N.B. } Plan No. _____ 191
 ALT. }

LOCATION _____ BLOCK _____ LOT _____

When properly signed by the Superintendent of Buildings of the Borough of Manhattan, this application becomes a PERMIT as required by the Building Code of the City of New York, to perform such work as is described in the foregoing statement and the attached plans and specifications which are a part hereof.

EXAMINED AND RECOMMENDED FOR APPROVAL ON _____ 191

Examiner

APPROVED _____ 191
 Superintendent of Buildings, Borough of Manhattan.

New York City, 191

TO THE SUPERINTENDENT OF BUILDINGS:

Application is hereby made for approval of the plans and specifications herewith submitted, and made a part hereof, for the PLUMBING AND DRAINAGE of the building herein described,—with the understanding that if no work is performed hereunder within one year from the time of issuance, this approval shall expire by limitation as provided by law; and the applicant agrees to comply with all the rules and regulations of the Bureau of Buildings for the Borough of Manhattan and with every other provision of law, relating to this subject in effect at this date.

STATE, COUNTY AND }
 CITY OF NEW YORK, } SS.: _____
 Typewrite Name of Applicant

being duly sworn, deposes and says: That he resides at Number _____
 in the Borough of _____
 in the City of _____ in the County of _____
 in the State of _____, that he is
 owner in fee of all that certain lot, piece or parcel of land, shown on the diagram annexed hereto and made a part hereof, situate, lying and being in the Borough of Manhattan, City of New York aforesaid, and known and designated as Number _____
 and hereinafter more particularly described; that the work proposed to be done upon the said premises, in accordance with the accompanying detailed statement in writing of the specifications and plans of such proposed work—including all amendments to the same which may be filed hereafter—is duly authorized to be performed by

Name of Owner or Lessee

and that

duly authorized by the aforesaid _____ to make application for the approval of such detailed statement of specifications and plans (and amendments thereto) in behalf of _____

(OVER)

Deponent further says that the full names and residences, street and number, of the owner or owners of the said land, and also of every person interested in said building or proposed building, structure or proposed structure, premises, wall, platform, staging or flooring, either as owner, lessee, or in any representative capacity, are as follows:

_____ No. _____
as _____
_____ No. _____
as _____
_____ No. _____
as _____
_____ No. _____
as _____
_____ No. _____
as _____

The said land and premises above referred to are situate at, bounded and described as follows, viz.:

BEGINNING at a point on the _____ side of _____
distant _____ feet _____ from the corner formed by the intersection of _____
and _____
running thence _____ feet; thence _____ feet;
thence _____ feet; thence _____ feet
to the point or place of beginning.

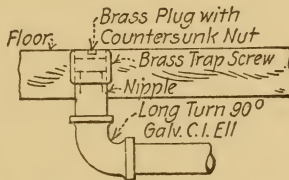
(SIGN HERE) _____ APPLICANT

Sworn to before me, this _____ }
day of _____ 191 _____ }

NOTE: Connection of well or river water supply pipes to the City water supply pipes is prohibited.

Plumbing Questions and Answers

be drawn to scale in ink, on cloth, or they must be cloth prints of such scale drawings, and shall consist of such floor plans and sections as may be necessary to show clearly all plumbing work to be done, and must show partitions and methods of ventilating water-closet apartments.



DECK PLATES FOR FLOOR CLEANOUTS

Q.—What governs the commencement of work after plans are filed?

*A.—*The said plumbing and drainage shall not be commenced or proceeded with until said drawings and descriptions shall have been so filed and approved by the superintendent of buildings.

Q.—Is it necessary to install the work as shown on plans or called for in descriptions?

*A.—*No modification of the approved drawings and descriptions will be permitted unless either amended drawings and triplicate descriptions, or an amendment to the original drawings and descriptions, covering the proposed change or changes, are so filed and approved by the superintendent of buildings.

Q.—Under what ruling is the installation of plumbing installed in buildings?

*A.—*The drainage and plumbing of all buildings, both public and private, shall be executed in accordance with the rules and regulations of the Bureau of Buildings.

Q.—Is it necessary to file plans for repairs and alterations to plumbing work?

A.—Repairs or alterations of plumbing or drainage may be made without filing drawings and descriptions in the bureau of buildings, but such repairs or alterations shall not be construed to include cases where new vertical lines or horizontal branches of soil, waste, vent or leader pipes are proposed to be used.

Q.—What is required by the plumber making repairs or alterations?

A.—Notice of such repairs or alterations shall be given to the said Bureau before the same are commenced in such cases as shall be prescribed by the rules and regulations of the said Bureau, and the work shall be done in accordance with the said rules and regulations.

Q. Give complete details of new section 604 of the New York Building Code.

A. Registration of plumbers—(a) Once in each year every employing or master plumber carrying on his trade, business or calling in the city shall register his name and address at the office of the Bureau of Buildings in the borough of the said city in which he performs work, under such rules as the said bureau may prescribe. Such registration may be cancelled by the superintendent of buildings for a violation of the rules and regulations for plumbing and drainage of such city duly adopted, or in force pursuant to the provisions of this article, or whenever the person so registered ceases to hold a certificate from the examining board of plumbers or to be actually engaged in the business of master of employing plumber, after a hearing had before said superintendent upon prior notice of not less than 10 days.

(b) No person, corporation or co-partnership shall engage in or carry on the trade, business or calling of employing or master plumbers in the city unless the name and address of such person and the president, secretary or treasurer of the corporation, or of each

and every member of the co-partnership shall have been registered as above provided.

(c) It shall be unlawful for any person, corporation, or co-partnership in the City of New York, unless said person, corporation or co-partnership shall have complied with the requirements of this section, to hold him or themselves out to the public as a master or employing plumber by the use of the word "plumber" or "plumbing" or words of similar import or meaning, on signs, cards, stationery, or in any other manner whatsoever.

(d) It shall be unlawful for any person, corporation or co-partnership in the City of New York to engage in or carry on the trade, business, or calling of employing or master plumber, unless such person, corporation, or co-partnership has conspicuously posted in the window of the place where such business is conducted, a metal plate or sign appropriately lettered or marked "licensed plumber in accordance with rules adopted by the superintendent of buildings.

(e) No person, corporation or co-partnership registered as provided in this section, or who holds a certificate from the examining board of plumbers, shall, for the benefit of any person engaged in the plumbing business, who is not so registered, apply for, receive or make use of, any permit granted to him by reason of being so registered, or holding such certificate from the examining board of plumbers.

Q.—What action should be taken by the plumber who is about to make repairs or alterations that have been ordered by the Tenement House Department or the Board of Health?

A.—Where repairs or alterations, ordered by the Board of Health or Tenement House Department for sanitary reasons include cases where new vertical and horizontal lines of soil, waste, vent or leader pipes are

proposed to be used or old ones replaced, drawings and descriptions must be filed with and approved by the Superintendent of Buildings before same shall be commenced or proceeded with.

Q.—Where repairs or alterations are to be made to an old building, is it necessary to perform such work according to the present plumbing rules?

*A.—*Repairs and alterations may comply in all respects with the weight, quality, arrangement and venting of the rest of the work in the building. Except when an existing soil, waste or vent line has been damaged by fire or other causes to the extent of fifty per cent or more of its entire length, same must be replaced by new lines installed in accordance with the rules and regulations governing new lines.

Q.—What is required by the Building Department before any part of the plumbing work is commenced?

*A.—*No plumbing and drainage or any part thereof shall be commenced until the plumber who is to do the work shall sign the specifications and make affidavit that he is duly authorized to proceed with the work. Affidavit must give the name and address of owner and plumber, etc. No registered plumber shall sign the specifications and act as the agent for a plumber who has not obtained a certificate of competency from the Examining Board of Plumbers as an Employing or Master Plumber. A violation of this rule will be deemed a sufficient reason by the Superintendent of Buildings for the cancellation of a Certificate of Registration, in accordance with Chapter 803, Laws of 1896.

Q.—What is required when the work is begun?

*A.—*Written notices must be given to the Superintendent of Buildings by the plumber when any work is begun, and at such times as the work is ready for inspection.

BUREAU OF BUILDINGS

BOROUGH OF MANHATTAN, CITY OF NEW YORK

NOTICE—This application must be typewritten and filed in triplicate. All proposed work under this application must be shown on plans and section. All vertical lines of soil, waste, leader and refrigerator pipes should be designated by numbers or letters. A soil or waste line and its attendant vent line may be considered as one stack, and so numbered or lettered. In alterations, new work only should be specified. When new fixtures are to be connected to present lines, the location and diameter of said lines must be shown on the plan.

P. & D. APPLICATION No. _____ **191**

LOCATION _____

Examined _____ 191 _____ Examiner _____

SPECIFICATIONS

Number of buildings? _____ New or old buildings? _____ Number of stories _____

Dimensions of each building: _____ Ft. front, _____ Ft. rear, _____ Ft. deep, _____ Ft. high.

How to be occupied? _____

How will the sewage and drainage of the buildings be disposed of, if by other than a public sewer? _____

House sewers—State number for each building _____ Diameter _____ inches.

Material? _____ Fall per foot _____ inches.

House traps—Number? _____ Diameter _____ inches.

Fresh-air inlets—State number for each building _____ Diameter _____ inches.

Location of inlet? _____

House drains—Number for each building? _____ Diameter _____ inches. Fall per foot _____ inches.

Area, shaft, court and yard drains—Number? _____ Diameter _____ inches.

If floor, cellar or stall drains are to be installed, state location, number and method of maintaining the water seal in traps:

Material of soil, waste and vent-pipes? _____

Soil-lines—Number in each building? _____ Diameter _____ inches.

Waste-lines—Number in each building? _____ Diameter _____ inches.

Vent-lines—Number in each building? _____ Diameter _____ inches.

Refrigerator waste-pipes—State number in each building? _____ Diameter _____ inches.

Roof drainage—State number of outside leaders? _____

Diameter _____ inches. Diameter of traps _____ inches.

State number and material of inside leaders _____

Diameter _____ Diameter of traps _____ inches.

How will the floor and base of water-closet apartment be made water-proof? _____

Describe water-closets _____

Describe urinals _____

Plumbing Questions and Answers

Q.—Is it necessary to file separate specifications for each building if the houses are exactly alike?

TABLE OF FIXTURES

TO INCLUDE FIXTURES RESET WHERE NEW ROUGHING IS INSTALLED

Indicate Number of Proposed Fixtures on all Floors	Yard	Cellar	Basement	First Story	Second Story	Third Story	Fourth Story	Fifth Story	Sixth Story	Seventh Story	Eighth Story	Ninth Story	Tenth Story	Eleventh Story	Twelfth Story	Thirteenth Story	Fourteenth Story	Fifteenth Story	Sixteenth Story	Seventeenth Story	Eighteenth Story	Nineteenth Story	Twentieth Story	
Water-closets																								
Urinals																								
Wash-basins																								
Bath-tubs																								
Wash-tubs																								
Sinks																								
Dental Cupboards																								
Stop Sinks																								
Drinking Fountains																								
Showers																								
Plunge Baths																								

REMARKS

A.—One set of specifications will be received for not more than ten houses, and then only when on adjoining lots and houses are exactly alike.

Definitions and Terms

Q.—Define the following terms:

Private sewer.

House sewer.

House drain.

Soil line.

A.—The term “private sewer” is applied to main sewers that are not constructed by and under the supervision of the Department of Public Works.

The term "house sewer" is applied to that part of the main drain or sewer extending from a point two feet outside of the outer front wall of the building, vault or area to its connection with public sewer, private sewer or cesspool.

The term "house drain" is applied to that part of the main horizontal drain and its branches inside the walls of the building, vault or area and extending to and connecting with the house sewer.

The term "soil line" is applied to any vertical line of pipe having outlets above the floor of first story for water closet connections.

Q.—Define the terms, waste line and vent pipe.

A.—The term "waste line" is applied to any vertical line of piping having outlets above the first floor for fixtures other than water closet.

The term "vent pipe" is applied to any special pipe provided to ventilate the system of piping and to prevent trap siphonage and back pressure.

Q.—What are the requirements as to material and workmanship?

A.—All materials must be of the best quality, free from defects, and all work must be executed in a thorough, workmanlike manner.

Q.—What are the requirements for the use of cast iron pipe and fittings?

A.—All cast-iron pipes and fittings must be uncoated, sound, cylindrical and smooth, free from cracks, sand holes and other defects, and of uniform thickness.

Q.—May standard C. I. pipe be used to install the plumbing system?

A.—Standard pipe may be used above ground in residence buildings not exceeding two stories and base-ment in height. In all other buildings extra heavy pipe shall be used.

Q.—How can you tell if the C. I. pipe is of proper weight?

Q.—Give the weights per linear foot for cast iron pipe, Standard and Extra Heavy.

A.—Pipe, including the hub, shall weigh not less than the following average weights per linear foot:

Diameters	Weights per Linear Foot	
	Standard	Extra Heavy
2 inches	3 3/5	5 1/2 pounds
3 inches	5 1/5	9 1/2 pounds
4 inches	7	13 pounds
5 inches	9	17 pounds
6 inches	11	20 pounds
7 inches	14	27 pounds
8 inches	17	33 1/2 pounds
10 inches	23	45 pounds
12 inches	33	54 pounds

A.—The size, weight and maker's name must be cast on each length of pipe.

Q.—How shall joints be made between C. I. pipe, and how much lead is required for each joint?

A.—All joints must be made with picked oakum and molten lead and be made gas tight. Twelve ounces of fine, soft pig lead must be used at each joint for each inch in the diameter of the pipe when extra heavy pipe is used, and nine ounces when standard pipe is installed.

Q.—When wrought iron pipe is used for the plumbing or drainage system, what grade or quality should it be?

A.—All wrought iron and steel pipes must be equal in quality to "standard," and must be properly tested by the manufacturer. All pipe must be lap-welded. No plain black or uncoated pipe will be permitted.

All wrought iron or steel water supply, vent, waste and soil pipes must be galvanized.

Q.—Where galvanized steel or wrought pipe is installed, what kind of fittings must be used?

A.—Where galvanized wrought iron or steel pipe is required, the fittings used on the same must also be galvanized. Fittings for waste or soil and refrigerator waste pipes must be cast-iron recessed and threaded

drainage fittings, with smooth interior waterway, and threads tapped, so as to give a uniform grade to branches of not less than one-fourth of an inch per foot.

Q.—Where close nipples are used on the plumbing system, what are the requirements?

*A.—*Short nipples on wrought iron or steel pipe, where the unthreaded part of the pipe is less than one and one-half inches long, must be of the thickness and weight to correspond to weight of pipe.

Q.—What average thickness and weight per linear foot of the following sizes of wrought iron pipe must be used?

*A.—*The pipe shall not be less than the following average thickness and weight per linear foot:

Diameters	Thicknesses	Weights per Linear Foot
1½ inches.....	.14 inches	2.68 pounds
2 inches.....	.15 inches	3.61 pounds
2½ inches.....	.20 inches	5.74 pounds
3 inches.....	.21	7.54 pounds
3½ inches.....	.22 inches	9.00 pounds
4 inches.....	.23 inches	10.66 pounds
4½ inches.....	.24 inches	12.34 pounds
5 inches.....	.25 inches	14.50 pounds
6 inches.....	.28 inches	18.76 pounds
7 inches.....	.30 inches	23.27 pounds
8 inches.....	.32 inches	28.18 pounds
9 inches.....	.34 inches	33.70 pounds
10 inches.....	.36 inches	40.06 pounds
11 inches.....	.37 inches	45.02 pounds
12 inches.....	.37 inches	48.98 pounds

Q.—Where brass pipe is to be used on the plumbing and drainage system, what are the requirements?

*A.—*All brass pipe for soil, waste and vent pipes and solder nipples must be thoroughly annealed, drawn, brass tubing, of standard iron-pipe gauge.

Q.—How are connections between brass pipe or brass and iron pipe to be made?

*A.—*Connections on brass pipe and between brass pipe and traps on iron pipe must not be made with slip joints or couplings. Threaded connections on brass pipe must be of the same size as iron pipe thread for same size of pipe and be tapered.

Plumbing Questions and Answers

Q.—What average weight and thickness, per linear foot, brass pipe, must be used?

A.—The following average thicknesses and weights per linear foot will be required:

Diameters	Thicknesses	Weights per Linear Foot
1½ inches.....	.14 inches	2.84 pounds
2 inches.....	.15 inches	3.82 pounds
2½ inches.....	.20 inches	6.08 pounds
3 inches.....	.21 inches	7.92 pounds
3½ inches.....	.22 inches	9.54 pounds
4 inches.....	.23 inches	11.29 pounds
4½ inches.....	.24 inches	13.08 pounds
5 inches.....	.25 inches	15.37 pounds
6 inches.....	.28 inches	19.88 pounds

Q. What quality and weights should brass ferrules be for (a) heavy pipe, (b) light pipe?

A. (a) Where heavy pipe is used brass ferrules must be of best quality cast brass, not less than four inches long and two and one-quarter, three and one-half and four and one-half inches in diameter, and not less than following weights:

Diameters	Weights
2½ in.	1 lb. 0 oz.
3½ in.	1 lb. 12 oz.
4½ in.	2 lb. 8 oz.

(b) Where light pipe is used brass ferrules must be of best quality cast brass, not less than 2 in., and 3 in., and 4 in. in diameter, and not less than the following weights.

Diameters	Weights
2 in.	1 lb. 0 oz.
3 in.	1 lb. 12 oz.
4 in.	2 lb. 8 oz.

Q.—Are one and one-half inch ferrules permitted to be used?

A.—One and one-half inch ferrules are not permitted.

Q.—What quality and weights for solder nipples must be used?

A.—Soldering nipples must be heavy cast brass or of brass pipe, iron pipe-size. When cast they must not be less than the following weights:

Diameters	Weights	
1½ inches.....	0 pound	8 ounces
2 inches.....	0 pound	14 ounces
2½ inches.....	1 pound	6 ounces
3 inches.....	2 pounds	0 ounces
4 inches.....	3 pounds	8 ounces

Q.—*State the type and quality of cleanout plugs permitted to be used.*

A.—Brass screw caps for cleanouts must be extra heavy, not less than one-eighth of an inch thick. The screw cap must have a solid square or hexagonal nut, not less than one inch high, with a least diameter of one and one-half inches. The body of the cleanout ferrule must be at least equal in weight and thickness to the caulking ferrule for the same size of pipe.

Q.—*How should the size of cleanout compare with the size of pipe or trap?*

A.—Where cleanouts are required by rules and by the approved plans, the screw cap must be of brass. The engaging part must have not less than six threads of iron-pipe size and be tapered. Cleanouts must be of full size of trap up to four inches in diameter, and not less than four inches for larger traps.

Q.—*Are long lengths of lead pipe permitted to be used for soil or waste pipe?*

A.—The use of lead pipes is restricted to the short branches of the soil and waste pipes, bends and traps, roof connections of inside leaders.

“Short branches” of lead pipe shall be construed to mean not more than:

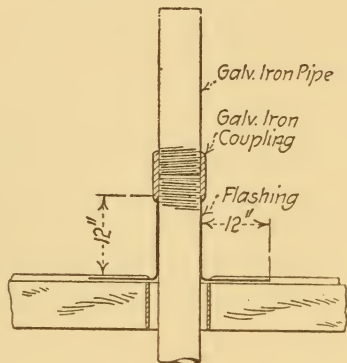
- 8 feet of 1½ inch pipe.
- 5 feet of 2 inch pipe.
- 2 feet of 3 inch pipe.
- 2 feet of 4 inch pipe.

Q.—*How must connections between lead pipe, lead and brass or copper pipe be made?*

A.—All connections between lead pipes and between lead and brass or copper pipes must be made by means of “wiped” solder joint.

Q.—*What grade of lead pipe must be used on the plumbing system and what weights per linear foot?*

A.—All lead waste, soil, vent and flush pipes must be



ROOF FLASHING FOR GALVANIZED IRON PIPE

of the best quality, known in commerce as “D” and of not less than the following weights per linear foot:

Diameters	Weights Per Linear Foot
1¼ inch (for flush pipes only).....	2½ pounds
1½ inches	3 pounds
3 inches	6 pounds
2 inches	4 pounds
4 and 4½ inches	8 pounds

Q.—*What grade and weight must the lead traps and bends be?*

A.—All lead traps and bends must be of the same weights and thicknesses as their corresponding pipe branches. Sheet lead for roof flashings must be six-pound lead, and must extend not less than six inches from the pipe, and the joint made watertight.

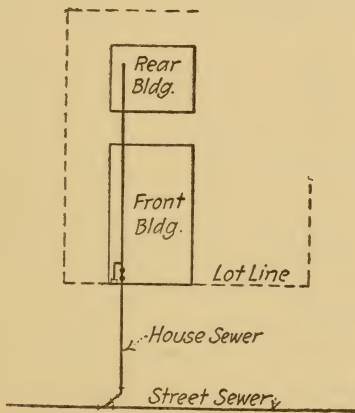
Q.—*Where copper tubing is used for roof connections*

on inside leaders, what gauge must it be? What gauge must be used in roof flashings?

A.—Copper tubing, when used for inside leader roof connections, must be seamless drawn tubing, not less than 22 gauge, and when used for roof flashings must be not less than 18 gauge.

General Regulations

Q.—Should each building be separately connected to public sewer, private sewer, or cesspool, or can two or more buildings use the same house sewer?



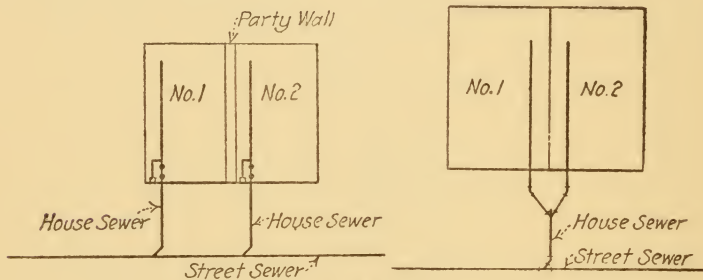
CORRECT WAY TO INSTALL A HOUSE SEWER FOR TWO BUILDINGS UPON THE SAME LOT WHEN ONE IS A REAR BUILDING

A.—Each building must be separated and independently connected with a public or private sewer, or cesspool, except where a building is located on the rear of the same lot with another building, when its plumb-

Plumbing Questions and Answers

ing and drainage system may be connected to the house-drain of the front building behind the house trap and fresh air inlet which shall be used for both buildings if sewer connected; or may be connected to an existing cesspool of front house and be provided with a separate house trap and fresh air inlet.

Q.—Where should the sewer connection be made in reference to the location of the building?



(LEFT) PROPER WAY TO CONNECT HOUSE SEWER
(RIGHT) IMPROPER WAY TO CONNECT HOUSE SEWER

*A.—*Every building must have its sewer connections directly in front of the building, unless permission is otherwise granted by the Superintendent of Buildings.

Q.—Where there is no public sewer in the street upon which a building faces, may the owner install a private sewer and how must this be constructed?

*A.—*Where there is no sewer in the street or avenue, and it is possible to construct a private sewer to connect in an adjacent street or avenue, a private sewer may be constructed, to be used in common for one or more buildings. It must be laid outside the curb under the roadway.

Q.—Are cesspools and privy vaults permitted to be installed?

A.—Cesspool and privy vaults will be permitted only after it has been shown to the satisfaction of the Superintendent of Buildings that their use is absolutely necessary.

When allowed, they must be constructed strictly in accordance with the terms of the permit issued by the Superintendent of Buildings.

Cesspools must not be used as privy vaults nor can privy vaults be used as cesspools. Cesspool and privy vaults must be located at least fifteen feet from any building and on the same lot as building for which their use is intended. Walls of cesspools and privy vaults when constructed of brick must be eight inches thick; if of stone, eighteen inches thick. Bottoms of cesspools and privy vaults must be of stone concrete six inches thick. The entire interior surface of cesspools and privy vaults must be finished with a coating of Portland cement mortar one inch thick.

As soon as it is possible to connect with a public sewer, the owner must have the cesspool and privy vault emptied, cleaned and disinfected and filled with fresh earth, and have a sewer connection made in the manner herewith prescribed.

Q.—How should pipe lines be supported to prevent settlement?

A.—All pipe lines must be supported at the base on brick piers, or by heavy iron hangers from the cellar ceiling-beams, and along the line by heavy iron hangers at intervals of not more than ten feet.

Q.—At what distance should the soil, waste or vent pipe terminate from any window?

A.—All pipes issuing from extensions or elsewhere, which would otherwise open within twenty feet of the window of any building, must be extended above the

top of any window located within such distance. When a building exceeds in height that of an adjoining building, and windows or openings are cut in the wall on the lot line within twenty feet of the roof terminal of any soil, waste or vent line now in place or subsequently installed in the lower building, the owner of the higher building shall defray the expense of extending said soil, waste or vent lines above the roof of the higher building, or shall himself make such alteration.

NOTE—VALIDITY OF PLUMBING RULE

The Validity of Rule 50 of the plumbing rules of the several bureaus of buildings is established in a decision by the Appellate Division, First Department, handed down in the case of *City of New York v. Conrad Alheidt*. The case is reported in the *New York Law Journal* of January 10, 1918, and is there summarized as follows:

Section 50 of the Plumbing Rules, which provides "that all pipes issuing from extension or elsewhere which would otherwise open within twenty feet of the window of any building must be extended above the top of any window located within such distance" is a valid provision, and should be liberally construed in the interest of the public health in order that noxious gases should not be drawn into nearby windows.

The use of the word "adjoining" in another and distinct part of the ordinance, providing, where buildings are of different height, for the extension of vent lines along the roofs of higher buildings, does not restrict the application of such provision to buildings actually contiguous to buildings containing vent lines.

The decision would seem to carry with it also a recognition of the plumbing rules in general, so that they have in effect, the same force as any city ordinances.

Q.—Are offsets permitted on the drainage system?

A.—The arrangement of all pipes must be as straight

and direct as possible. Offsets will be permitted only when unavoidable.

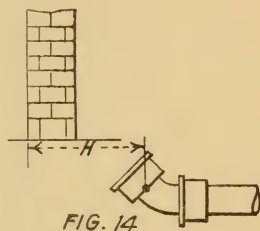
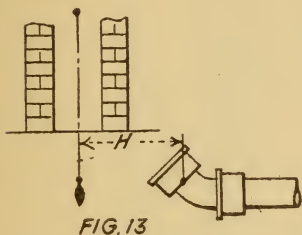


FIG. 13. OFFSET C TO C.
FIG. 14. BACK TO CENTER.

Q.—Is it good practice to expose all piping of the plumbing system to view?

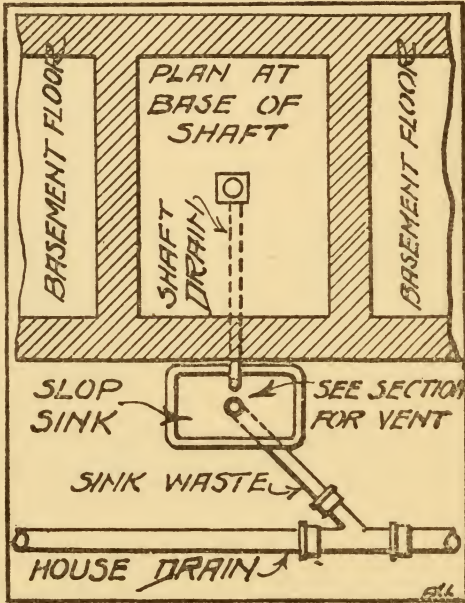
A.—All pipes and traps should, where possible, be exposed to view. They should always be readily accessible for inspection and repairing.

Q.—Is it necessary to carry at least one four-inch line above the roof for every building?

A.—In every building where there is a leader connected to the drain, if there are any plumbing fixtures, there must be at least one four (4) inch pipe extending above the roof for ventilation.

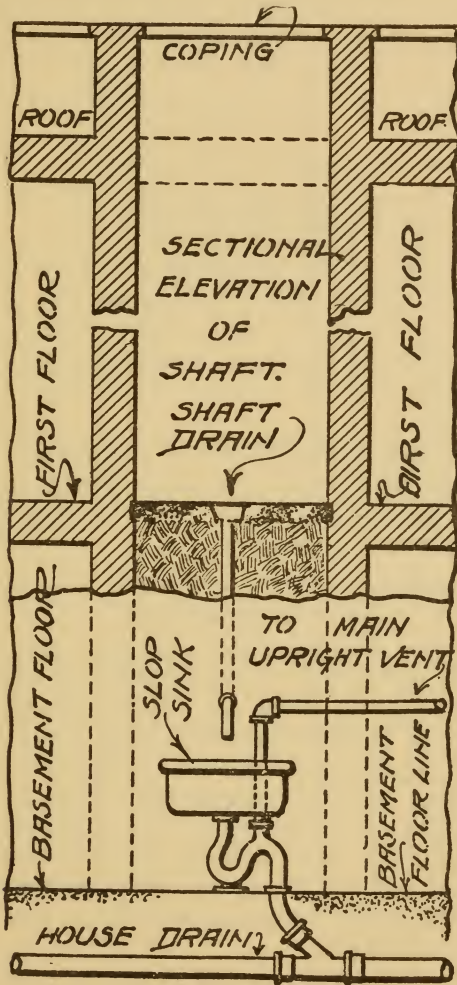
Yard, Area and Other Drains

Q.—How should yard, area and court drains be connected?



DRAINAGE CONNECTIONS IN BASEMENT

A.—All yards, areas and courts exceeding 15 square feet in area must be drained into the sewer. A shaft open at the top not exceeding twenty-five square feet in area, and which cannot be connected in back of a leader, yard, court or area drain trap, may be drained into a publicly-placed, water-supplied, properly-trapped and vented slop sink.



ELEVATION

Q.—What size should the above drains be when they are directly connected with the plumbing system?

A.—These drains, when sewer-connected, must have connections not less than three inches in diameter. They should be controlled by one trap—the leader trap, if possible.

Q.—What is an indirect connection?

A.—All connections that discharge into an open sink are known as indirect connections.

Q.—Are floor drains permitted to be installed?

A.—Floor drains will only be permitted when it can be shown to the satisfaction of the Superintendent of Buildings that their use is absolutely necessary and arrangements made to maintain a permanent water seal in the traps.

Q.—How may cellar drains be connected?

A.—Cellar drains may be connected in back of and controlled by a leader, yard, court or area drain trap which need not be vented.

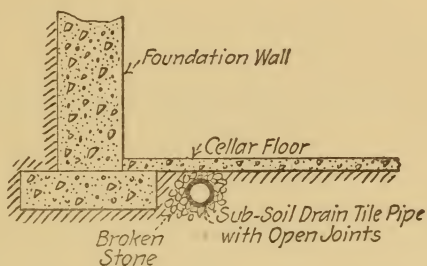
Q.—Describe the subsoil drain and how should same be connected to the drainage system?

A.—Subsoil drains should discharge into a sump or receiving tank, the contents of which are discharged by gravity and may be discharged into a rain leader, yard, court or area drain behind the trap controlling same or may be discharged through a properly trapped and vented, water supplied receptacle. Where mechanical force is required to discharge the contents into the plumbing and drainage system, a proper automatic cut-off or check valve must be provided on the connection between house-drain and apparatus used for raising the contents of sump-pit.

Note.—A subsoil drain is a drain constructed of tile pipe having open joints. Its purpose is to remove ground water to protect the foundation of buildings.

Plumbing Questions and Answers

Q.—How may the contents of settling chambers or dust receptacles for vacuum cleaners be connected?



CROSS SECTION OF A SUBSOIL DRAIN

A.—The contents of settling chamber or dust receptacle for vacuum cleaners may be discharged into a Plumbing and Drainage system, the same as sub-soil drain sump-pits.

Leaders

Q.—Must all buildings be provided with rain leaders and how should same be connected?

A.—Every building shall be kept provided with proper metallic gutters and rain leaders for conducting water from all roofs in such manner as shall protect the walls and foundations from injury. In no case shall the water from any rain leader be allowed to flow upon the sidewalk or adjoining property, but the same shall be conducted by proper pipes to the sewer. If there be no sewer in the street upon which the building fronts, then the water from said leaders may be conducted by proper pipes laid below the surface of sidewalk to the street gutter, or may be conducted by extra heavy cast-iron pipe to a leeching cesspool located at least twenty feet from any building. No plumbing fixtures shall discharge into a leeching cesspool.

Q.—Of what material must inside leaders be installed and roof connections for inside leaders be made?

A.—Inside leaders must be made of cast-iron, wrought iron or steel, with roof connections made gas and water tight by means of a heavy lead or copper-drawn tubing wiped to a brass ferrule or nipple caulked or screwed into the pipe.

Q.—What material may be used to install outside leaders and how must they connect to the drainage system?

A.—Outside leaders may be made of sheet metal, but they must connect with the house drain by means of a cast-iron pipe extending vertically five feet above the grade level.

Q.—Must leaders or rain conductors be trapped?

A.—Leaders must be trapped with cast-iron running traps so placed as to prevent freezing.

Q.—May a leader line be used as a soil or waste pipe?

A.—Rain-water leaders must not be used as soil waste or vent pipes, nor shall any such pipe be used as a leader.

House Sewer, House Drain, House Trap and Fresh Air Inlet

Q.—May an old house sewer be used as a part of the drainage system for a new building?

A.—Old house sewers can be used in connection with the new buildings or new plumbing only when they are found, on examination by the plumbing inspector, to conform in all respects to the requirements governing new sewers.

Q.—May earthenware pipe be used to install a house sewer?

A.—When a proper foundation consisting of a natural bed of earth, rock, etc., can be obtained, the house sewer can be of earthenware pipe.

Q.—Under what conditions are earthenware pipes forbidden to be used?

A.—Where the ground is made or filled in, or where the pipes are less than three feet deep, or in any case where there is danger of settlement by frost or from any cause, and when cesspools are used, the house sewer must be of extra heavy cast-iron pipe, with lead-caulked joints.

Q.—May old earthenware house drains be repaired or replaced with earthenware pipe?

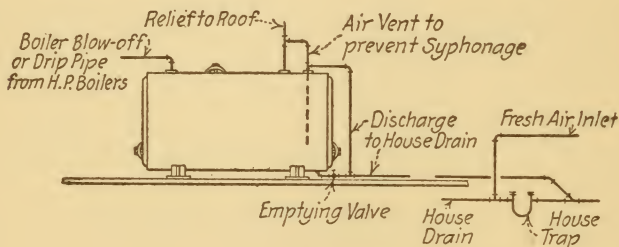
A.—No earthenware house-drain, when found in a leaky or defective condition, shall be repaired or replaced except with heavy cast-iron pipe.

Q.—Of what material must the house drain be installed? When above ground and when under ground?

A.—The house drain and its branches must be of extra heavy cast iron when under ground, and of extra heavy cast iron or galvanized wrought iron or steel when above ground.

Q.—Where should the house drain connect to the house sewer. And how must the drain be protected when passing through building wall?

A.—The house drain must properly connect with the house sewer at a point two feet outside of the outer



CONDENSING TANK WITH CONNECTIONS

front vault or area wall of the building. An arched or other opening must be provided for the drain in the wall to prevent damage by settlement.

Q.—How should the house drain be supported so as to maintain the proper fall?

A.—The house drain if above the cellar floor must be supported at intervals of ten feet by eight-inch brick piers or suspended from the floor beams, or be otherwise properly supported by proper hangers placed not more than ten feet apart.

Q.—May the steam-exhaust, boiler blow-off or drip pipes from boilers connect to the house drain?

A.—No steam-exhaust, boiler blow-off or drip-pipe shall be connected with the house-drain. Such pipes must first discharge into a proper condensing tank, and from this a proper outlet to the house sewer outside of the building must be provided. In low pressure steam systems the condensing tank may be omitted, but the waste connections must be otherwise as above required.

Q.—How must the house drain and house sewer be run. And how should branches be made to same to give the best results?

A.—The house-drain and house-sewer must be run as direct as possible, with a fall of at least one-quarter inch per foot, all changes in direction made with proper fittings, and all connections made with Y branches and one-eighth and one-sixteenth bends.

Q.—How must the size of the house sewer and house drain be determined?

A.—The house sewer and house-drain must be at least four inches in diameter when receiving the discharge of a water-closet. Where rain leaders are connected to the plumbing system, the sizes of house sewer, house drain and leader connections shall be computed according to the square feet of area drained into them. No house sewer or house-drain shall be of less diameter than the largest line of pipe connected thereon. The following table is the maximum area allowed to drain into pipes of given diameter :

Diameter of Pipe	Fall	Fall
	¼ Inch Per Foot	½ Inch Per Foot
3.....	1,200 square feet	1,500 square feet
4.....	2,500 square feet	3,200 square feet
5.....	4,500 square feet	6,000 square feet
6.....	8,000 square feet	10,000 square feet
7.....	12,400 square feet	15,600 square feet
8.....	18,000 square feet	22,500 square feet
9.....	25,000 square feet	31,500 square feet
10.....	41,000 square feet	59,000 square feet
12.....	69,000 square feet	98,000 square feet

Q.—What size cleanouts are required on the house drain or its branches?

A.—Full size Y and T branch fittings for handhole cleanouts must be provided where required on house-drain and its branches. No clean-out need be larger than six inches in diameter.

Q.—Is it necessary to install a trap on the house drain. Where must it be located and how protected?

A.—An iron running trap must be placed in the house-drain near the front wall of the house, and on the sewer side of all connections, except a Y fitting used to receive the discharge from an automatic sewage lift, oil separator, or a drip-pipe where one is used. If placed outside of the house or below the cellar floor, it must be made accessible in a brick manhole, the walls of which must be eight inches thick, with an iron or flagstone cover. When outside the house it must never be less than three feet below the surface of the ground.

Q.—Is it necessary to install a house trap in an old building where no house trap exists?

A.—When the plumbing system of any building is altered by the addition of a new soil, waste or vent line, and no house trap and fresh air inlet or leader trap exists on the house-drain, same shall be provided.

Q.—How many cleanouts are required on the house trap?

A.—The house trap must have two cleanouts, with brass screw cap ferrules caulked in.

Q.—Is it necessary to connect a fresh-air inlet to the drainage system and what size must it be?

A.—A fresh-air inlet pipe must be connected with the house-drain just inside of the house trap and extended to the outer air, terminating with open end at least one foot above the grade at most available point to be approved by the Superintendent of Buildings and shown on plans. The fresh-air inlet pipe shall be one-

half the diameter of house-drain but not less than four inches in diameter.

Q.—May the fresh-air inlet pipe terminate at the curb?

A.—No curb box or similar device with grating placed in sidewalk will be permitted for fresh air inlets.

Soil and Waste Lines

Q.—Of what material must the drainage system of a building be installed?

A.—All main, soil, waste or vent pipes must be of iron, steel or brass.

Q.—Where must the soil waste or vent lines terminate and what is the smallest size vent pipe passing through the roof?

A.—When they receive the discharge of fixtures on any floor above the first, they must be extended in full calibre at least one foot above the roof coping, and well away from all shafts, windows, chimneys or other ventilating openings. When less than four inches in diameter, they must be enlarged to four inches at a point not less than one foot below the roof surface by an increaser not less than nine (9) inches long.

Q.—Are caps, cowls or bends permitted to be affixed to the top of soil, waster or vent lines?

A.—No caps, cowls or bends shall be affixed to the top of such stack.

Q.—How must the top of all lines be protected, and to what height should the line extend where the roof is to be used by the occupants of the building?

A.—In all buildings, wire baskets must be securely fastened into the opening of each pipe in an accessible position. When roofs are used for drying purposes or roof gardens, all pipes shall be extended to a height of seven feet.

Q.—At what degree must offset be made on a line above the highest fixture connection?

A.—Necessary offsets above the highest fixture branch must not be made at an angle of less than forty-five degrees to the horizontal.

Q.—What shape fittings are used for making connections to soil or waste pipes?

A.—Soil and waste pipes must have proper Y or TY branches for all fixture connections.

Q.—May the waste pipe of any other fixture connect to the lead branch of a water closet or slop sink?

A.—No connection to lead branches for water-closets or slop sinks will be permitted, except the required branch vent.

Q.—What is the fall required for branch soil or waste pipes?

A.—Branch soil and waste pipe must have a fall of at least one-quarter inch per foot.

Q.—What fittings are prohibited from use on the drainage system?

A.—Short TY branches will be permitted on vertical lines only. Long one-quarter bends and long TYs are permitted. Short one-quarter bends and double hubs, short roof increasers and common offsets, and bands and saddles are prohibited.

Q.—What are proper sizes of pipe to be used for lines, branches, and fixture connections on the plumbing system?

A.—The diameter of soil and waste pipes must not be less than those given in the following table:

Main soil stacks in buildings serving not more than two sets of fixtures in four or less stories.....	4 inches
Main soil stacks in residence buildings serving not more than two sets of fixtures in five or six stories.....	4 inches
Main soil stacks in all other cases.....	5 inches
Branch soil pipes for not more than four water closets.....	3 inches

Vent Pipes and Venting

Q.—Must all fixture traps be back vented?

A.—All traps, except approved anti-siphon traps connected to main waste or soil lines or to the house drain by branch piping not over seven (7) feet in length with a fall not exceeding two (2) inches per foot, shall be protected from siphonage and back-pressure by special lines of vent pipes; provided that where approved deep-seal siphon-jet water closet or slop sink fixtures are installed with branch piping not over five (5) feet in length from fixture to main soil or waste line, the vent pipe may be omitted for such fixtures in buildings not over eight (8) stories in height, and where the main soil or waste line is made one inch larger in diameter than required by these rules, the vent pipe may also be omitted for such fixtures in building over eight (8) stories in height.

Q.—What kind of pipe is used to install vent lines and branch vents. How may vent lines be installed for buildings less than seven stories?

A.—All vent pipe lines and main branches must be of iron, steel or brass. They must be increased in diameter and extended above the roof as required for waste-pipes. They may be connected with the adjoining soil or waste line well above the highest fixture, but this will not be permitted when there are fixtures on more than six floors.

Q.—How must offsets be made in vent lines, and how must vent lines be connected at the bottom?

A.—All offsets must be made at an angle of not less than forty-five degrees to the horizontal, and all lines must be connected at the bottom with a soil or waste pipe or the drain in such a manner as to prevent the accumulation of rust scale.

Q.—How high must branch vent pipe be run, and how close to the crown of fixture trap must they connect?

A.—Branch vent pipes shall be kept above the top of all connecting fixtures, so as to prevent the use of vent pipes as soil pipes or waste-pipes. Branch vent pipes should be connected not less than six inches nor more than two feet from crown of trap or side of lead bend.

Q.—Where must the branch vent pipe connect to water closet and slop sink connections?

A.—Except where "yoke type" ventilation is installed, vent connection for water-closets and slop sinks must be made from the branch soil or waste-pipe just below the trap of the fixture, and the branch vent pipe must be so connected as to prevent obstruction, and no waste pipe connected between it and the fixture. Earthenware traps must have no vent horns.

Q.—What is yoke type venting?

A.—"Yoke type" ventilation shall be taken to mean a cross connection, by means of a horizontal branch soil or waste-pipe, between the main soil or waste line and the vent line, and in which the connection between the branch pipe and the vent line is made at least six (6) inches above the line of fixtures discharging into such branch pipe.

Q.—May a brick or metal flue be used as a vent pipe?

A.—No sheet metal, brick or other flue shall be used as a vent pipe.

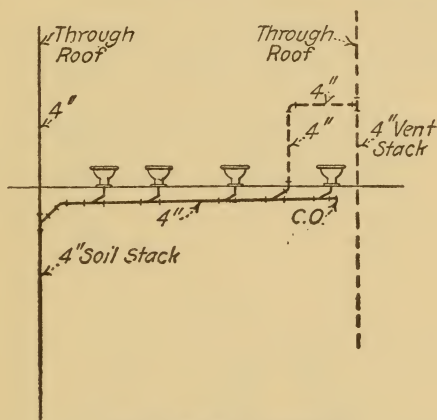
Q.—How are the size of vent pipes to be determined?

A.—The sizes of vent-pipes throughout must not be less than the following:

For main vents, two inches in diameter; for water-closets on three or more floors, three inches in diameter; for other fixtures on less than seven floors, two inches in diameter; three-inch vent pipe will be permitted for less than nine stories; for more than eight

and less than sixteen stories, four inches in diameter; for more than fifteen and less than twenty-two stories, five inches in diameter; for more than twenty-one stories, the size of the vent pipe shall be determined by the Superintendent of Buildings.

For fixtures other than water-closets and slop sinks and for more than eight stories, vent pipes may be one inch smaller in diameter than above stated.

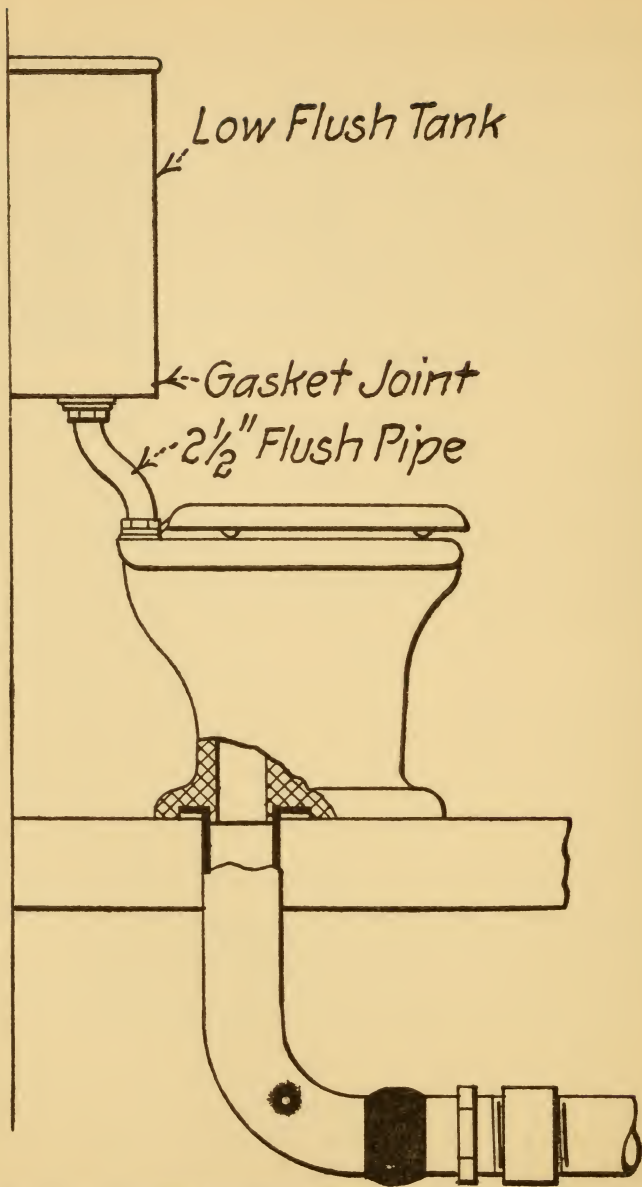


YOKE TYPE VENTING

For long branch vent pipes over ten feet in length but not exceeding twenty-five feet, two inches in diameter; when over twenty-five feet in length but not exceeding fifty feet, three inches in diameter. No branch vent pipe can exceed fifty feet in length, nor can any main vent be of less diameter than the largest branch vent connecting to same.

Q.—When fixtures are arranged in groups how must they be back vented and what size pipe must be used?

A.—When the plumbing fixtures installed in any building are arranged in groups or batteries, "yoke type" ventilation may be installed, provided that for batteries



of water closets each fixture shall be set not more than two (2) feet distant from the horizontal branch soil pipe into which it discharges, and for batteries of fixtures other than water closets each fixture shall be so located that its trap will be not more than two (2) feet distant from the horizontal branch waste line into which it discharges. When the ordinary type of venting is installed and the number of branch or back vents from the traps of fixtures connecting to any main branch vent exceeds the number and size given in the following table, a three-inch main branch vent must be provided for the additional vent connections.

2-1½	inch branches on a 1½	inch main branch.
4-2	inch braiches on a 2	inch main branch.
7-1½	inch branches on a 2	inch main branch.
2-2	} inch branches on a 2	inch main branch.
4-1½		
1-2	} inch branches on a 2	inch main branch.
5-1½		

Traps

Q.—Can any type of fixture trap be installed in this city?

A.—No form of trap will be permitted to be used unless it has been approved by the Superintendent of Buildings or the Board of Standards and Appeals.

No anti-siphon trap or deep-seal siphon-jet fixture shall be approved until it has successfully passed such test as may be prescribed by the Board of Standards and Appeals.

Q.—Name the type of traps that are prohibited. Under what conditions are tide valves permitted?

A.—No masons' cesspool, bell, pot, bottle or D-trap will be permitted, nor any form of trap that is not self-cleaning, nor that has interior chamber or mechanism, nor any trap except earthenware ones that depend upon interior partitions for a seal. Backwater or tide valves

will only be permitted when it can be shown to the satisfaction of the Superintendent of Buildings that their use is absolutely necessary and of a type as approved by him.

Q.—Must each fixture be separately trapped; where must the fixture trap be placed?

A.—Every fixture must be separately trapped by a water-sealing trap placed as close to the fixture outlet as possible, and no trap shall be placed more than two feet no inches from any fixture.

Q.—May the sink trap be used to receive the waste water pipe of wash trays?

A.—A set of not more than three wash trays may connect with a single trap, or into the trap of an adjoining sink, provided both sink and tub waste outlets are on the same side of the waste line, and the sink is nearest the line. When so connected, the waste-pipe from the wash-trays must be branched in below the seal.

Q.—When trapping fixtures what precautions must be taken?

A.—The discharge from any fixture must not pass through more than one trap before reaching the house-drain.

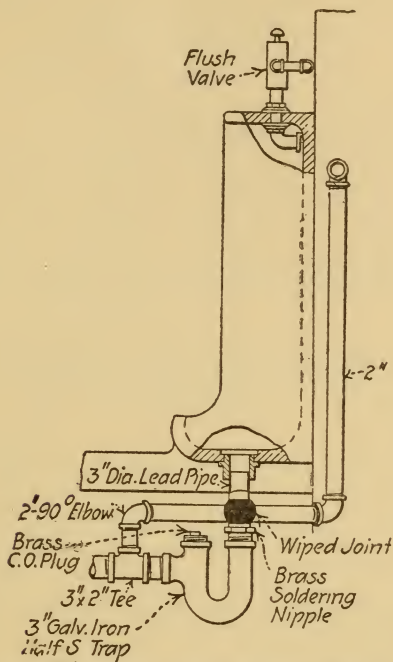
All traps must be well supported and set true with respect to their water levels.

Q.—How must the waste pipe be protected from obstruction?

A.—All fixtures, other than water-closets and urinals, must have strong metallic strainers or bars over the outlets to prevent obstruction of the waste-pipe.

Q.—Must traps be provided with cleanout screws. Where must the cleanouts be inserted?

A.—All exposed or accessible traps, except water-closet traps, must have brass trap screws for cleaning the trap placed on the inlet side, or below the water level.



PROPER CONNECTIONS FOR FLOOR TYPE URINAL

Q.—What type trap must be used for house drain, leader, yard and area drains? What size cleanouts must be used on this type trap and how would traps be protected if placed underground?

A.—All iron traps for house-drain, yard and other drains and leaders must be running traps with hand-hole cleanouts of full size of the traps, when same are less than five (5) inches. All traps under ground must be made accessible by brick manholes with proper covers.

Q.—Where must the overflow pipe from a fixture be connected to the trap?

Plumbing Questions and Answers

A.—Overflow pipes from fixtures must in all cases be connected on the inlet side of traps.

Q.—How must the connection between earthenware W. C. traps and soil pipe be made?

A.—All earthenware traps must have approved heavy brass floor plates properly secured to the branch soil pipe and bolted to the trap flange, and the joint made gas-tight. The use of rubber washers for floor connections is prohibited. All floor flanges must be set in place and inspected before any water-closet is set thereon.

Q.—What size trap and waste pipe should be provided for plunge baths? How must the waste be installed and trap vented?

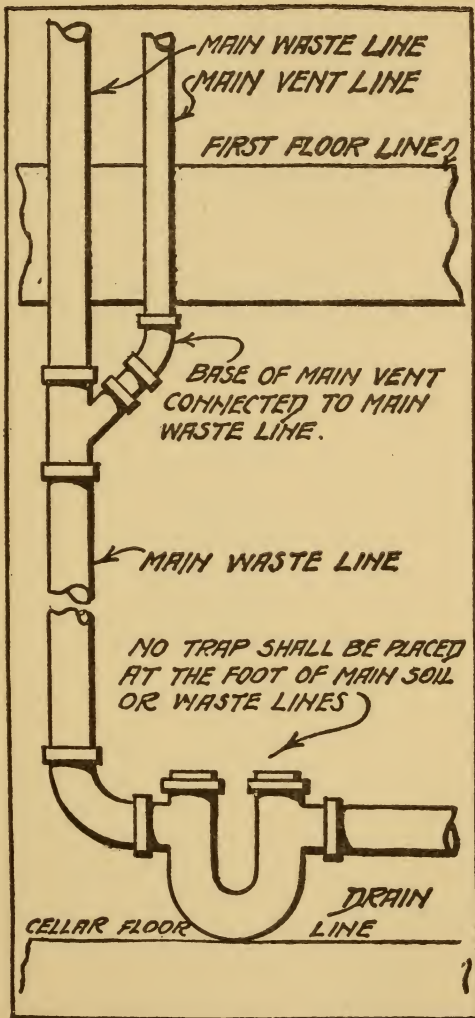
A.—Every plunge bath shall be provided with a trap at least four inches in diameter, the waste from trap to bath to be reduced to two inches in diameter and this waste to be controlled by a gate valve. Overflow pipes, if provided, must be connected on inlet side of trap. Except where an approved anti-siphon trap is installed in the manner specified in Rule 91, such trap must be ventilated by a separate vent line extended above the roof, of the same size as trap and water connection.

Q.—What are the smallest size traps permitted for water-closets, slop sinks, kitchen sinks, wash trays, urinals, shower baths, other fixtures?

A.—The sizes for traps must not be less than those given in the following table:

Traps for water-closets.....	4	inches in diameter
Traps for slop sinks.....	3	inches in diameter
Traps for kitchen sinks.....	2	inches in diameter
Traps for wash trays.....	2	inches in diameter
Traps for urinals.....	2	inches in diameter
Traps for shower-baths.....	2	inches in diameter
Traps for other fixtures.....	1½	inches in diameter

Q.—Must the main soil or waste lines be trapped?

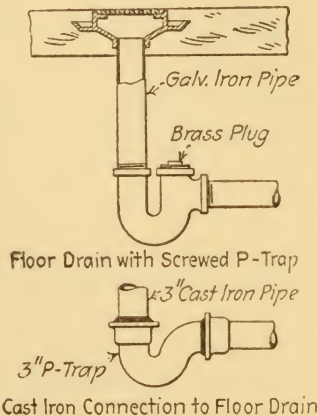


A.—No trap shall be placed at the foot of main soil and waste pipe lines.

Traps for leaders, area, floor and other drains must be at least three inches in diameter.

Q.—How must the waste pipe of dental cuspidors be connected?

A.—Every dental cuspidor must be separately trapped by a trap of at least one and one-half (1½) inches in

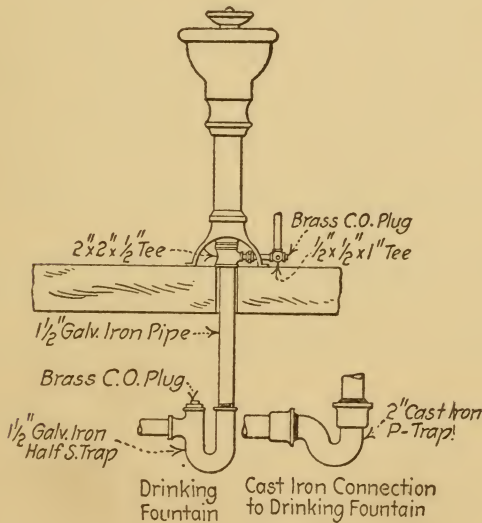


diameter, which shall be vented except where an approved anti-siphon trap is installed in the manner previously stated, and placed as close to the fixture as possible. The connection between trap and cuspidor may be three-quarters ($\frac{3}{4}$) of an inch in diameter.

Q.—What fixtures are permitted to be installed with indirect waste pipes? What size waste pipe must be used for such fixtures? Is it necessary to back vent the traps of drinking fountains?

A.—No plumbing fixtures, except bar sinks, soda

fountains or drinking fountains, shall be installed with an indirect waste connection to the plumbing and drainage system. The waste of every bar sink, soda fountain and drinking fountain, if not directly connected, must discharge over a properly water-supplied, trapped sink, with trap vented, unless an approved anti-siphon trap is installed in the manner previously stated. The main waste lines shall be two (2) inches in diameter, and the branches to fixtures at least one and one-half ($1\frac{1}{2}$) inches in diameter. Drinking fountains must be trapped and the waste line extended through the roof. No vent connections need be provided.



CAST IRON AND SCREW PIPE CONNECTIONS
FOR DRINKING FOUNTAINS

Safe and Refrigerator Waste Pipes

Q.—If installing refrigerator or safe waste-pipes, what kind of pipe must be used, and what size pipe must be used for the main waste and branches?

A.—Safe and refrigerator waste-pipes must be of galvanized iron, and be not less than one and one-quarter inch in diameter nor larger than one and one-half inch in diameter with pipe branches at least one inch in diameter with strainers over each inlet.

Q.—Must refrigerator waste pipes be trapped?

A.—Safe and refrigerator waste-pipes shall not be trapped. They must discharge over a properly water-supplied, trapped sink, with trap vented unless an approved anti-siphon trap is installed in the manner previously stated, such sink to be publicly placed, and not more than four feet above the floor. In no case shall any refrigerator or safe waste-pipe discharge over a sink located in a room used for living purposes.

Q.—How must branch waste pipes for refrigerators connect to the waste line?

A.—The branches on vertical lines must be made by Y or TY fittings and carried up to the safe with as much pitch as possible.

Q.—Where lead safes are used how must they be installed?

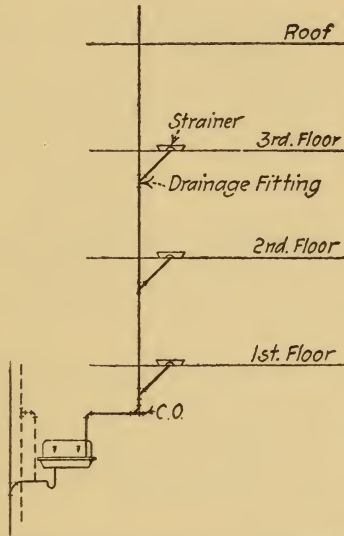
A.—Lead safes must be graded and neatly turned over bevel strips at their edges.

Q.—How must offsets or change in direction be made on the refrigerator waste-pipe?

A.—Where there is an offset on a refrigerator waste-pipe in the cellar, there must be cleanouts to control the horizontal part of the pipe.

Plumbing Questions and Answers

Q.—Must the refrigerator waste line be carried above the roof?



REFRIGERATOR WASTE FOR TENEMENTS

A.—In all lodgings and tenement houses the safe and refrigerator waste-pipes must extend above the roof.

Water Closets, Sinks and Washtubs

Q.—What are the requirements for water closet accommodations in buildings?

A.—In all buildings occupied as stores, dwellings, lodging or boarding houses, hotels, offices, lofts, workshops, factories or storage houses, there must be at least one water-closet in each building. There must be sufficient water-closets so that there will never be more than fifteen persons to each water-closet. In places of public assembly, the number of toilets and the most available location are to be determined by the Superintendent of Buildings.

Q.—Does the above answer completely cover the water-closet accommodations in all classes of buildings?

A.—No; special regulations govern tenements and factory buildings. For factory buildings see factory laws of the State Labor Department. For tenements see Tenement House Laws.

Q.—In buildings used for business purposes, public assembly or hotels must separate toilet rooms be provided for men and women?

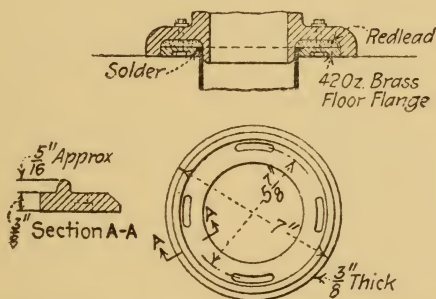
A.—Separate water-closets and toilet rooms must be provided for each sex in buildings used as workshops, lofts, office buildings, factories, hotels, and all places of public assembly.

Q.—What are the rules governing water-closet accommodations in lodging houses?

A.—In lodging houses, there must be one water-closet on each floor, and where there are more than fifteen persons on any floor there must be an additional water-closet on that floor for every fifteen additional persons or fraction thereof.

Q.—How must the floor and walls be constructed in water-closet apartments?

A.—In tenement houses, lodging houses, factories, workshops, and all public buildings, the entire water-closet apartment, and side walls to a height of six inches from the floor, except at the door, must be made water-proof with asphalt, cement, tile, metal or other water-proof material as approved by the Superintendent of Buildings.



HEAVY FLOOR FLANGE AND CONNECTION

Q.—Is it necessary to use a floor slab when setting W. C. bowl?

A.—Every earthenware water-closet with connection through the floor in all new work, and in all alterations, must be set on an approved floor slab of porcelain, slate or other material impervious to moisture, same to be not less in size than the base of the water-closet set thereon.

Q.—Of what material must W. C. bowls be made, and how set?

A.—All water-closets must have earthenware flushing rim bowls. They must be set entirely free and open from all enclosing woodwork.

Q.—Are long hopper W. C. bowls permitted?

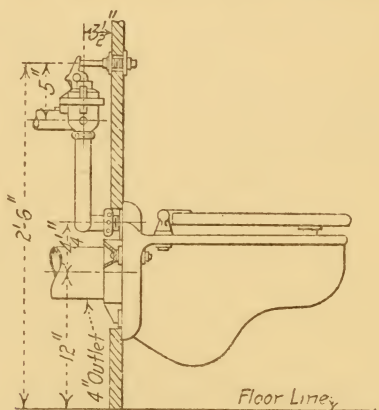
A.—Long hopper water-closets will not be permitted, except earthenware hoppers where there is an exposure to frost.

Q.—May drip trays be installed on W. C. bowls?

A.—Drip trays on water-closets will not be permitted.

Q.—May water-closets or urinals be directly connected with the domestic water supply of a building?

A.—Water-closets and urinals must never be connected directly with or flushed from the water-supply pipes, except when flushometer valves are used.



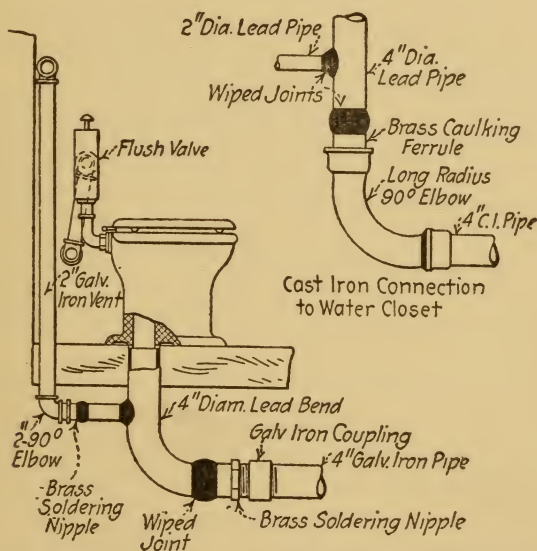
WALL TYPE WATER CLOSET DETAILS

Q.—How must W. C. apartments be ventilated?

A.—In all buildings, the water-closet and urinal apartments must be ventilated to the outer air by windows opening on the same lot upon which the building is situated or by a ventilating skylight placed over each room or apartment wherein such fixtures are located.

Q.—How must partitions forming W. C. apartments be constructed?

A.—In all buildings, the outside partition of any water-closet or urinal apartment must be air-tight and extend to the ceiling or be independently ceiled over. When necessary to properly light such apartments, the upper part of the partitions must be provided with translucent glass. The interior partitions of such apartments must be dwarfed partitions.



WROUGHT IRON AND CAST IRON CLOSET CONNECTIONS

Q.—May the general W. C. accommodations of a building be placed in the cellar or outside the building?

A.—The general water-closet accommodation of any building cannot be placed in the cellar, nor can any

water-closet be placed outside of a building except to replace an existing water-closet.

Q.—How must an interior room, used for a W. C. apartment, which has no window to the outer air or skylight, be ventilated?

A.—In alteration work where it is not practicable to ventilate a water-closet or urinal apartment by windows or a skylight directly to the outer air, there may be provided a galvanized wrought iron vent duct extended to the outer air which must be equal in area to at least one hundred and forty-four square inches for one water-closet or urinal, and an additional seventy-two square inches for each water-closet added therein.

Q.—May W. C. seat be supported on iron legs?

A.—Where water-closets will not support a rim-seat, the seat must be supported on galvanized iron legs.

Q.—How must the water supply to W. C. and urinals be connected?

A.—Each water-closet and urinal must be flushed from a separate cistern, the water from which is used for no other purpose, or may be flushed through flushometer valves.

Q.—Where flush-valves are used how must they be supplied?

A.—Where "Flushometers" are used, they must be supplied from tank pressure, unless otherwise permitted by the Superintendent of Buildings; the rising lines shall be at least one and one-half inches in diameter, and the branches shall be at least one and one-quarter inches in diameter for water-closets and three-quarters inch in diameter for urinals.

Q.—Where may the overflow of water-closet cisterns discharge?

A.—The overflow of cisterns may discharge into the bowl of the closet, but in no case connect with any part of the drainage system.

Q.—May iron cisterns or automatic flush valves be installed for water-closets or urinals?

A.—Iron water-closet and urinal cisterns and automatic water-closet and urinal cisterns are prohibited, unless approved by the Superintendent of Buildings.

Q.—How may wood cisterns for W. C. and urinals be lined?

A.—The copper lining of water-closet and urinal cisterns must not be lighter than ten (10) ounce copper.

Q.—Where flush pipes are installed what size and grade of pipe must be used?

A.—Water-closet flush pipes must not be less than one and one-fourth inches and urinal flush pipes one (1) inch in diameter, and if of lead must not weigh less than two and one-half pounds and two pounds per linear foot. Flush couplings must be of full size of the pipe.

Q.—May connection between flush pipe and W. C. bowl be made with rubber connections?

A.—Rubber connections and elbows are not permitted on flush pipes.

Q.—May Latrines or trough water-closets be installed?

A.—Latrines, trough water-closets and similar appliances may be used only on written permit from the said Superintendent of Buildings, and must be set and arranged as may be required by the terms of the permit.

Q.—What type of urinals and urinal apartments may be used?

A.—All urinals must be constructed of materials impervious to moisture, and that will not corrode under the action of urine. The floor and wall of the urinal apartments must be lined with similar non-absorbent and non-corrosive material.

Q.—May the platforms or treads of urinals be directly connected with the plumbing system?

A.—The platforms of treads of urinal stalls must

never be connected independently to the plumbing system, nor can they be connected to any safe waste-pipe.

Q.—Where trough W. C. or urinals are installed of what material must they be constructed?

A.—Iron trough water-closets and trough urinals must be enameled or galvanized.

Q.—May sinks be inclosed with woodwork?

A.—In all houses, sinks must be entirely open, on iron legs or brackets without any inclosing woodwork.

Q.—May wooden or cement wash tubs be installed?

A.—Wooden wash tubs are prohibited, except when used in hotels, restaurants or bottling establishments for washing dishes or bottles. Cement or artificial stone tubs will not be permitted unless approved by the Superintendent of Buildings.

Water Supply for Fixtures

Q.—Must all plumbing fixtures be water supplied? Where fixtures are supplied from flush tank what size tanks should be used?

A.—All water-closets and other plumbing fixtures must be provided with a sufficient supply of water for flushing to keep them in a proper and cleanly condition.

Flush tanks must have a capacity of eight gallons for water-closets and five gallons for urinals.

Q.—How must house service pipes be connected with street mains?

A.—House service pipes must be connected to the street mains by means of taps, and a stop-cock or valve placed under the sidewalk at the curb, in compliance with the rules and under the supervision of the Department of Water Supply, Gas and Electricity.

Note.—The connection and inspection of service pipes

for water supply is now under the supervision of the Bureau of Engineering, Department of Water Supply, Gas and Electricity. The size of tap or connection is computed according to the combined floor area of the building. Corporation taps are installed in sizes from five-eighth inch up to two inch. For connections larger than two inch fittings or wet connections are installed.

Q.—How must the house main for water supply be controlled at the front wall where it enters the building?

A.—A separate stop or valve must be placed upon the service pipe inside the front wall.

Q.—What is the smallest size of service pipes permitted to be installed for different classes of buildings?

A.—The diameters of street service pipes must not be less than three-quarter inch for dwellings and tenements occupied by six families or less; one inch for tenements or apartment houses occupied by more than six families and one and one-half inch for hotels, factories and other miscellaneous buildings, provided that in no case can the diameter of the service pipes be less than the diameter of the tap installed under the supervision of the Department of Water Supply, Gas and Electricity.

Riser Lines

Q.—What is the smallest size riser lines permitted? How must the riser and branches from same be controlled?

A.—The diameter of all riser lines in plumbing systems shall be not less than three-quarters ($\frac{3}{4}$) inches; except that when lead or brass is used, the minimum diameter may be one-half ($\frac{1}{2}$) inch.

Separate stop-cocks or valves, so located as to be accessible at all times, shall be placed at the foot of each riser line and, in all buildings other than residence

buildings occupied exclusively by one or two families or having not more than fifteen sleeping rooms, on each branch line from the riser for each isolated fixture or each group of fixtures, such as bathroom fixtures, kitchen fixtures, etc.; except that only one stop-cock or valve shall be required for the fixtures contained in any one apartment, suite, store or loft occupied by one tenant when all the fixtures contained in each such apartment, suite, store or loft are supplied from one branch line.

Q.—What is the smallest size pipe permitted for water supply branches to fixtures?

*A.—*Diameters of branches to any fixtures must not be less than one-half inch, except when used to supply water-closets, cisterns or lavatories. When the material used is lead or brass pipe, the minimum diameter may be three-eighths inch. Branches for flush valves for water-closets must not be less than one and one-quarter inch in diameter and for urinals not less than three-quarters of an inch in diameter.

Q.—What type of W. C. bowls are prohibited?

*A.—*Pan, plunger, offset-washout and washout, or other water-closets having an unventilated space, or the walls of which are not thoroughly washed out at each discharge, will not be permitted.

Q.—At what distance apart should the hot and cold water risers be installed?

*A.—*Where a hot water supply system is installed, the distance between the hot and cold water risers should not be less than six inches. Where it is impossible to place them six inches or more apart, the hot water riser must be covered with an approved insulating material and a method of circulation provided that will insure a prompt delivery of hot water at the faucet when required.

Q.—How should risers and branches be supported?

*A.—*All risers and branches must be properly fastened.

Q.—Where the street pressure is insufficient to properly supply all fixtures, what other equipment is required?

A.—When the water pressure is not sufficient to supply freely and continuously all fixtures, a house supply tank must be provided of sufficient size to afford an ample supply of water to all fixtures at all times. Such tanks must be supplied from the pressure or by power pumps, as may be necessary; when from the pressure, ball cocks must be provided.

Q.—Where house tanks are used for the water supply of a building how must the water be protected from contamination?

A.—House supply tanks must be metal-covered so as to exclude dust and so located as to prevent water contamination by gas and odors from plumbing fixtures.

Q.—Of what material must house tanks be constructed?

A.—House supply tanks must be of wood or iron or or wood lined with tinned and planished copper.

Q.—How must house tanks be supported?

A.—House tanks must be supported on iron beams. For tank supports see section 428 of the building code.

Q.—How should the overflow pipe from house tank be connected?

A.—The overflow pipe should discharge upon the roof, where possible, and in such cases should be brought down to within six (6) inches of the roof, or it must be trapped and discharged over an open and water-supplied sink not in the same room, nor over three and one-half feet above the floor. In no case shall the overflow be connected with any part of the plumbing system.

Q.—How must emptying pipes for house tanks be connected? What size must they be and how controlled?

A.—Emptying pipes for such tanks must be provided and be discharged in the manner required for overflow

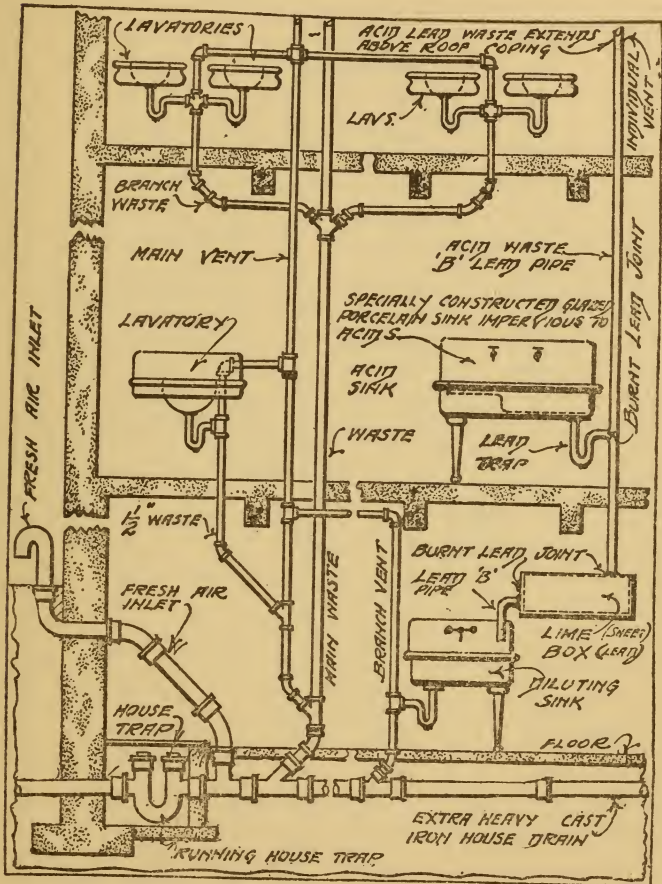
pipes, and may be branched into overflow pipes. Emptying pipes for tanks containing more than five hundred (500) gallons must be four (4) inches in diameter and provided with a valve of same size fitted with a wheel or lever handle.

Acid Waste

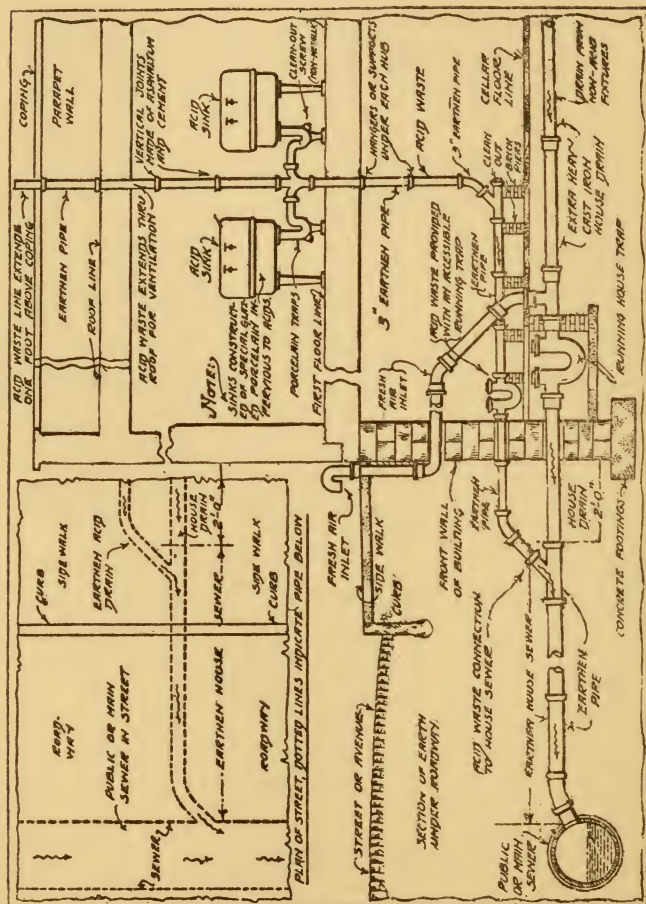
Q.—What size and kind of pipe is required for acid waste? How must this waste connect to the plumbing system and how must joints be made on acid waste pipe?

*A.—*Acid wastes must be "B" lead pipe or earthen pipe; if of lead pipe they must be at least two inches in diameter, and if of earthen pipe at least three inches in diameter. They must be extended through roof for ventilation and continued down to the lower story of building and so arranged as to discharge into a lime box and diluting sink properly trapped and vented and connected inside of house trap. If the lime box and diluting sink is not used the acid waste must be extended to an earthen house sewer or separately and independently connected to a public or private service in street and provided with an accessible running trap located just inside of front wall of building. All branches and joints on lead acid wastes must be made by means of burnt lead joints. If earthenware pipe is used, vertical joints must be made with a mixture of asphaltum and cement. Each length of pipe on vertical runs and on horizontal runs when above the cellar floor must be supported at each hub by proper supports. All floor drains and fixture connections must be trapped and run as direct as possible.

Plumbing Questions and Answers



ACID WASTE WITH INDIRECT CONNECTION AND LIME BOX



ACID WASTE WITH DIRECT CONNECTION TO EARTHEN HOUSE SEWER

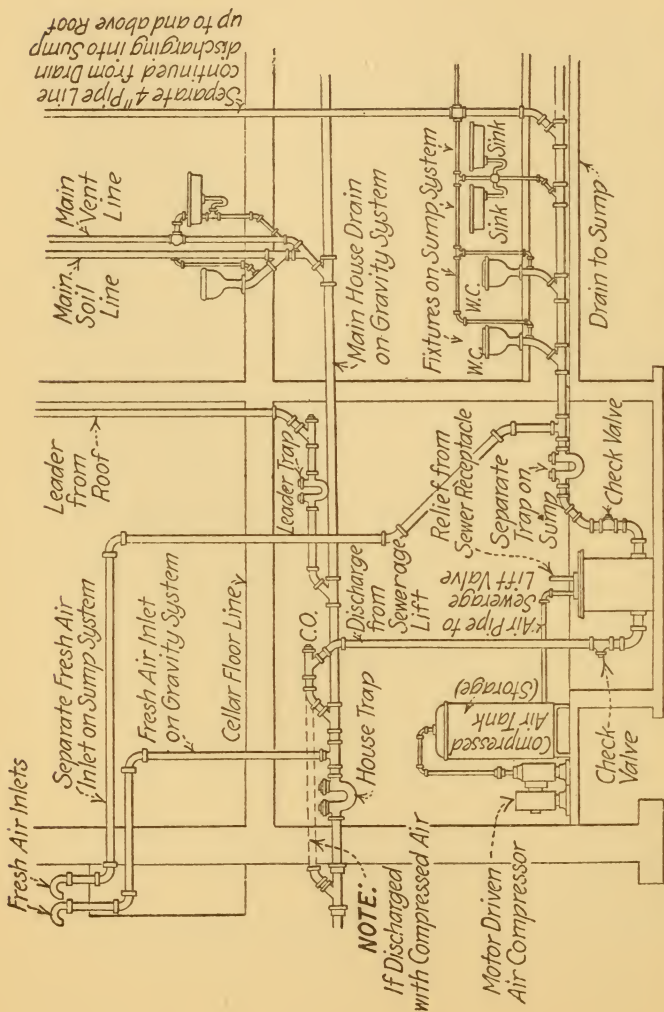
Sewage Lift

Q.—How must sewage lift of sewage ejector be connected? How must a sump system be installed in relation to the plumbing system of a building?

A.—When it is necessary to use a sump system and sewage lift to receive the discharge from the waste or soil connection of fixtures, same shall be arranged to be accessible. If discharged with compressed air it shall be connected to the house drain on the sewer side of all leader or area drain traps and fixture connections or may be connected to house drain on the sewer side of house trap. A separate trap and fresh air inlet must be provided on the inlet side of sump and a four-inch pipe line continued from drain discharging into sump up to and above roof, for purposes of ventilation. Relief pipes must be provided on sewage receptacles of sumps. Traps of fixtures connected to sump systems must not be vented to vent lines which are used to ventilate traps of fixtures on gravity system. Sump systems should be entirely separate both as to discharge and venting from rest of plumbing system in buildings.

For connections and installation of sump system see following page.

The connection shown in broken lines to Y branch in front of house is where mechanical force is used to discharge the contents of sump.



CONNECTION OF SUMP SYSTEM SHOWING ARRANGEMENT OF PIPING, BROKEN LINES, SOLID LINES, CONNECTION FOR GRAVITY DISCHARGE

Oil Separators

Q.—What is required for the installation of oil separators?

A.—Oil separators installed in any building where volatile fluids are used must be arranged to be readily accessible. They must not receive the discharge of any water-closet, rain leader, yard, court or area drain.

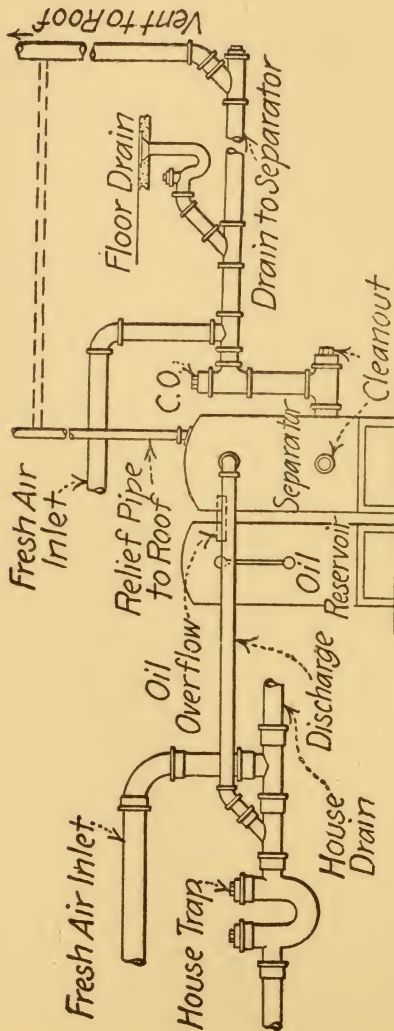
They must, if discharged by gravity, be connected by a Y branch fitting to the house drain behind the house trap in such a manner that they will not interfere with the house drain and the rest of the plumbing and drainage system. When mechanical force is used to discharge the contents, the connection must be made by a Y branch fitting on the sewer side of house trap.

No separate running trap need be provided on the drain entering oil separators, but a separate fresh air inlet and vent line must be provided to keep the system of drainage controlled by the oil separator entirely separate from the rest of plumbing and drainage system.

The size of fresh air inlet shall be determined by the size of inlet connection to oil separator, which shall be considered the same as the term house-drain for determining the size of all fresh air inlets, which shall conform to the same requirements as regards size and arrangement of terminals for fresh air inlets as called for in regulations.

Vent lines shall conform in all respects to vent lines for plumbing fixtures as regards size and arrangement.

Relief pipes must be provided at least one and one-half inches in diameter. They may be connected to a vent line when installed as a separate system or must be carried independently above the roof.



PIPING FOR A GARAGE OIL SEPARATOR

Modifications

Q.—Can a modification of any section of the plumbing rules be granted by the Superintendent of Buildings?

A.—When for any reason it may be impracticable to comply strictly with the foregoing rules, the Superintendent of Buildings shall have power to modify their provisions so that the spirit and substance thereof shall be complied with. Such modifications shall be indorsed upon the permit over the signature of the Superintendent of Buildings.

Testing the Plumbing System

Q.—Must the installation of a plumbing system be tested? By whom should this test be made?

A.—The entire plumbing and drainage system within the building must be tested by the plumber, in the presence of a plumbing inspector, under a water test. All pipes must remain uncovered in every part until they have successfully passed the test. The plumber must securely close all openings, as directed by the Inspector of Plumbing. The use of wooden plugs for this purpose is prohibited.

Q.—How must the water test be applied for the entire system or for different sections?

A.—The water test will be applied by closing the lower end of the main house-drain and filling the pipes to the highest opening above the roof with water. The water test shall include at one time the house drain and branches, all vertical and horizontal soil, waste and vent and leader lines and all branches therefrom to a point

above the surface of the finished floor and beyond the finished face of walls and partitions. If the drain or any part of the system is to be tested separately, there must be a head of water at least six (6) feet above all parts of the work so tested, and special provision must be made for including all points and connections in at least one test.

Q.—Is any other test required other than the water test, if so what kind?

A.—After the completion of the plumbing work in any new or altered building and before the building is occupied, a final smoke test must be applied in the presence of a Plumbing Inspector. Except that for a building not over six stories in height, a peppermint test may be applied.

Q.—By whom should the material be supplied for a peppermint test and how much peppermint should be used to apply this test?

A.—The material and labor for the test must be furnished by the plumber. When the peppermint test is used, two ounces of oil of peppermint must be provided for each line up to five stories and cellar in height and an additional ounce of oil of peppermint must be provided for each line when lines are more than five stories in height.

Plumbing of Tenement Houses

Q.—Have the plumbing rules of the Tenement House Department any relation to the plumbing rules of the Building Department?

A.—All sections or parts of sections of the tenement house law relating to plumbing and drainage of tenement houses are to be observed, and are hereby made a part of these rules and regulations.

Gas Piping and Fixtures

Q.—May gas outlets be placed at any part of the building?

A.—Gas outlets for burners shall not be placed under tanks, back of doors or within four feet of any meter.

Q.—How must the size of piping for gas fitting be computed?

A.—All buildings shall be piped according to the following scale:

Diameter	Length	Burners
$\frac{3}{8}$ inch.....	26 feet	8
$\frac{1}{2}$ inch.....	36 feet	6
$\frac{3}{4}$ inch.....	60 feet	20
1 inch.....	80 feet	35
$1\frac{1}{4}$ inch.....	110 feet	60
$1\frac{1}{2}$ inch.....	150 feet	100
2 inch.....	200 feet	200
$2\frac{1}{2}$ inch.....	300 feet	300
3 inch.....	450 feet	450
$3\frac{1}{2}$ inch.....	500 feet	600
4 inch.....	600 feet	750

Q.—What size outlets must be installed for gas ranges and how must this outlet be controlled?

A.—Outlets for gas ranges shall have a diameter not less than required for six burners, and all gas ranges and heaters shall have a straightway cock on service pipe.

Q.—Is brass tubing permitted to be used as gas piping outside of plaster or woodwork?

A.—When brass piping is used on the outside of plastering or woodwork, it shall be classed as fixtures.

Q.—What gauge tubing shall be used on gas fixture work, and how must connections be made between tubing and fittings?

A.—All brass tubing used for arms and stems of fixtures shall be at least No. 18 standard gauge and full size outside so as to cut a full thread.

All threads on brass pipe shall screw in at least five-sixteenths of an inch. All rope or square tubing shall

be brazed or soldered into fittings and distributors. or have a nipple brazed into the tubing.

Q.—Where brass fittings are used such as cocks, swing joints, etc., how must they be constructed?

A.—All cast fittings, such as cocks, swing joints, double centres, nozzles, etc., shall be extra heavy brass. The plugs of all cocks must be ground to a smooth and true surface for their entire length, be free from sand-holes, have not less than three-quarters of an inch bearing (except in cases of special design), have two flat sides on the end for the washer, and have two nuts instead of a tail screw. All stop pins to keys or cocks shall be screwed into place.

Q.—What test is required on all jobs of gas fitting?

A.—After all piping is fitted and fastened and all outlets capped up, there must be applied by the plumber, in the presence of an inspector of the Bureau of Buildings, a test with air to a pressure equal to a column of mercury six inches in height, and the same to stand for five minutes; only mercury gauge shall be used. No piping shall be covered up, nor shall any fixture, gas heater or range be connected thereto until a card showing the approval of this test has been issued by the Superintendent of Buildings.

Q.—Would the gas company install a meter or supply gas to a job that has not been tested?

A.—No meter will be set by any gas company until a certificate is filed with them from the Bureau of Buildings certifying that the gas pipes and fixtures comply with the foregoing rules.

Q.—How must all outlets be protected when installing new work?

A.—All outlets and risers shall be left capped until covered by fixtures.

Q.—Are unions or running threads permitted to be used on gas fitting? Where it is necessary to make re-

pairs on long runs of piping how may connections be made without removing the entire run of pipe?

A.—No unions or running threads shall be permitted. Where necessary to cut out to repair leaks or make extensions, pipe shall be again put together with right and left couplings.

Q.—May gas fitters' cement be used for installing gas piping?

A.—No gas fitters' cement shall be used, except in putting fixtures together.

Q.—What is the minimum distance below the ceiling that gas outlets must be located? What governs this distance? Are swing brackets permitted? What is the minimum length for gas brackets? How must gas outlets be protected when placed near combustible material?

A.—All gas brackets and fixtures shall be placed so that the burners of same are not less than three feet below any ceiling or woodwork, unless the same is properly protected by a shield, in which case the distance shall not be less than eighteen inches.

No swinging or folding gas brackets shall be placed against any stud partition or woodwork.

No gas brackets on any lath and plaster partition or woodwork shall be less than five inches in length, measured from the burner to the plaster surface or woodwork.

Gas lights placed near window curtains or any other combustible material shall be protected by a proper shield.

Q.—What kind of fittings must be used for installing gas piping.

A.—All fittings (except stop-cocks or valves) shall be of malleable iron.

Q.—How must the gas service be controlled where it enters the building.

A.—There shall be a heavy brass straightway cock

or valve on the service pipe immediately inside the front foundation wall. Iron cocks or valves are not permitted.

Q.—What is the best location to install gas risers?

A.—Where it is not impracticable so to do, all risers shall be left not more than five feet from front wall.

Q.—How should all gas piping be layed to insure a good job? How should it be protected from dampness?

A.—No pipe shall be laid so as to support any weight (except fixtures) or be subjected to any strain whatsoever. All pipe shall be properly laid and fastened to prevent becoming trapped, and shall be laid, when practicable, above timbers or beams instead of beneath them. Where running lines or branches cross beams, they must do so within thirty-six inches of the end of the beams, and in no case shall the said pipes be let into the beams more than two inches in depth. Any pipe laid in a cold or damp place shall be properly dripped, protected and painted with two coats of red lead and boiled oil or tarred.

Q.—How must gas piping be layed in concrete or cement floors to protect it from corrosion?

A.—No gas pipe shall be laid in cement or concrete unless the pipe or channel in which it is placed is well covered with tar.

Q.—How must ceiling drops be fastened and how far below the finished plaster must the drop terminate?

A.—All drops must be set plumb and securely fastened, each one having at least one solid strap. Drops and outlets less than three-quarters of an inch in diameter shall not be left more than one inch below plastering, centrepieces or woodwork.

Q.—Is it the duty of the plumbing inspector to inspect the installation of gas piping in new and old buildings?

A.—Hereafter the gas piping and fixtures in all new buildings and all alterations and extensions made to the

gas piping or fixtures in old buildings must be done in accordance with the following rules, which are made in accordance with the provision of section 89 of the Building Code.

For additional requirements of public buildings, theatres, and places of assemblage, see Part XXI of the Building Code.

Q.—Is it necessary to be a registered master plumber to install new gas piping or make alterations to same?

A.—Before the construction or alteration of any gas piping in any building or part of any building, a permit must be obtained from the Superintendent of Buildings. This permit will be issued only to a registered plumber. Small alterations may be made by notifying the Bureau of Buildings, using the same blank forms provided for alterations and repairs to plumbing.

Q.—What grade and quality of pipe must be used for installing gas piping?

A.—All gas pipe shall be of best quality wrought iron or steel and of the kind classed as standard pipe, and shall weigh according to the following scale:

Diameters	Weights per Linear Foot
$\frac{3}{8}$ inch.....	0.56 pound
$\frac{1}{2}$ inch.....	0.85 pound
$\frac{3}{4}$ inch.....	1.12 pound
1 inch.....	1.67 pound
$1\frac{1}{4}$ inch.....	2.24 pounds
$1\frac{1}{2}$ inch.....	2.68 pounds
2 inch.....	3.61 pounds
$2\frac{1}{2}$ inch.....	5.75 pounds
3 inch.....	7.54 pounds
$3\frac{1}{2}$ inch.....	9.00 pounds
4 inch.....	10.66 pounds
No pipe allowed of less than $\frac{3}{8}$ inch in diameter.	

Anti-Siphon Traps

A hearing was held by the Board of Standards and Appeals of New York City on Dec. 27, 1918, in reference to changing the rules and regulations governing plumbing in the city of New York.

The changes voted upon at this meeting affected eight sections of the plumbing laws covering trap and back venting.

Q.—What tests are required for anti-siphon traps or fixtures before such traps or fixtures shall be approved?

INSTRUCTIONS

1. The entire cost and responsibility for the installation of the necessary equipment for such test shall be borne by the person or firm submitting the appliance.

2. Such person or firm shall also furnish the board, together with the application for test, the following material and information.

(a) A stock trap of the size and design to be tested, which shall be of the P and S type and shall be of lead or brass, cast in one piece, and without interior partitions or mechanism.

(b) A similar trap cut in half.

(c) A similar trap, to be used in the test, provided with glass observation ports of sufficient size to permit clear observation of the action occurring within the trap during test, and such observation ports shall be so located that the amount of water seal remaining after each test can be readily observed.

(d) An affidavit that the three traps submitted are regular stock traps.

(e) A list of all cities, towns or municipalities where such trap has been officially approved for use without back venting.

The testing apparatus shall be located within the City of New York, and in a place, building or structure to meet the approval of the testing authorities. Such apparatus shall be so located that every part is easily accessible for inspection.

APPARATUS

The apparatus shall consist of the following:

A tank of not less than fifty nor more than one hundred and fifty gallons capacity, with adequate water supply for refilling same during the test.

A vertical wrought iron or steel pipe line fifty feet long, connected to the underside of the tank, and of the same internal diameter as the trap to be tested.

A quick-opening valve, located ten feet below the underside of the tank.

A TY fitting located two feet below the quick-opening valve, with horizontal branch pipe connected thereto, of the same diameter as the vertical line, this branch line not to exceed two feet in length, with a pitch towards the vertical line of two inches to the foot, and the trap to be tested shall be connected to this horizontal branch pipe.

A wash basin, or fixture answering the same purpose, which can be conveniently connected or disconnected from the inlet side of the trap.

The test shall be conducted as follows:

FOR ANTI-SIPHON QUALITIES

For the purpose of determining the efficiency of the trap, the tank shall be completely filled, a water seal established in the trap; and:—

The quick-opening valve shall be opened for five seconds, then closed for five seconds, and this alternating process repeated five times.

The quick-opening valve shall be opened and the entire contents of the tank discharged at one time.

The wash basin shall be connected to the trap, filled with water, and both wash basin and tank discharged simultaneously. The quick-opening valve shall be kept open until the entire contents of the tank has been discharged.

The trap shall be disconnected and a bridge of solid soap formed across the lower half of the discharge end of the trap, so as to effectually block one-half of the clear water way, and the foregoing tests repeated.

Each operation shall be repeated several times, if desired by the testing authorities.

FOR SELF-CLEANSING QUALITIES

For the purpose of determining its self-cleansing qualities, the trap shall be filled with sand and the wash basin filled with water and allowed to discharge. A similar operation shall be repeated with tea leaves, coffee grounds, sawdust and grated soap.

FOR SERVICE QUALITIES

The service qualities of the trap may be tested as follows:

A trap which has been in actual constant use for a period of not less than one year shall be removed under the supervision of a representative of the testing authorities, split into two halves, and submitted for inspection, for the purpose of determining whether sediment or coating of grease or other foreign matters has accumulated in the trap during service conditions.

APPROVAL

An approval shall not be issued for any anti-siphon trap which has been subjected to the foregoing tests unless the trap has:

1. Maintained its water seal throughout the test.
2. Been successfully scoured of any foreign sub-

tances placed in the trap, when water has been discharged through same.

3. Upon inspection, after service, shown no excessive accumulation of grease or other foreign substance.

Deep Seal Siphon-Jet Fixtures, or Anti-Siphon Fixtures.

Instructions Applicants for approval of deep seal siphon-jet or anti-siphon fixtures shall submit the following with their application:—

(a) A stock fixture of the size and design to be tested.

(b) A similar fixture, cut in half.

(c) A similar fixture, to be used in the test, provided with glass observation ports of sufficient size to permit clear observation of the action occurring within the fixture during test, and such observation ports shall be so located that the amount of water seal remaining after each test can be readily observed.

(d) An affidavit that the three fixtures submitted are regular stock fixtures.

APPARATUS

The apparatus shall be similar to that required for anti-siphon traps, except that vertical and horizontal pipes shall have an internal diameter of three inches for testing slop sinks and four inches for testing water closets; tank shall have a capacity of not less than one hundred gallons and the fixture shall be provided with its usual water supply so that same may be flushed when required.

TEST

For the purpose of determining the efficiency of the fixture to maintain a water seal, it shall be tested in a manner similar to that prescribed for anti-siphon traps, except that no soap bridge need be provided at the outlet.

RULES AND REGULATIONS FOR THE INSTALLATION OF
WATER SUPPLY

DEFINITION OF TERMS

The term *city main* is applied to all water mains that are constructed by, or under the supervision of, the Department of Water Supply, Gas and Electricity.

The term *private main* is applied to water mains that are constructed by private water companies or consumers in the public highway.

The term *tap or wet connection* is applied to connections made by and under the supervision of the Department of Water Supply, Gas and Electricity to the city mains.

The term *house service* is applied to that part of the main supply extending from the point of connection to the city main to the stop-cock or valve inside the front wall of building.

The term *curb stop* is applied to the stop-cock or valve placed upon the service with an extending rod to the level of the walk.

The term *curb box* is applied to the casing placed over the curb stop to protect the extending rod.

The term *main stop-cock or valve* is applied to the controlling stop placed inside the front building wall.

The term *house main* is applied to the main supply pipe extending from the main-stop or valve through the house cellar to its connections with the risers, pumps or suction tank.

The term *riser* is applied to the vertical lines extending through the building from its connection with the house main or pump.

The term *tank line* is applied to the vertical line through the building supplying tank water.

The term *hose-bib* is applied to the faucet, valve or connection placed outside of a building or within the building for the use of a hose supply.

GENERAL REGULATIONS

Taps and Connections

All taps or connections of any kind made to the city water mains are to be made by, and under the supervision of, the Department of Water Supply, Gas and Electricity. No one but employees of the Department of Water Supply, Gas and Electricity shall make connections of any kind to the city mains.

All applications for a new tap or connection to the city mains must be accompanied with a copy of the approved plans showing the area of floors and the intended use of the building.

Applications for tap or connection must be made by a licensed plumber to the Bureau of Water Register, which will determine the size of tap, charge, kind of service pipe, and whether same is to be metered or not.

All work in connection with taps or services, new or repair work, shall be under the supervision of the Department of Water Supply, Gas and Electricity, and passed by inspectors connected with this department.

The size and number of taps for any shall be computed upon the floors area of said building, according to the following table:

7,500 to 15,000	7,500 square feet.....	1-5/8" tap
15,000 to 20,000	" "	1-3/4" "
20,000 to 30,000	" "	2-5/8" "
30,000 to 40,000	" "	3-5/8" or equivalent
40,000 to 50,000	" "	4-5/8" " "
50,000 to 60,000	" "	5-5/8" " "
		6-5/8" " "

For buildings over 60,000 square feet, size of connections shall be decided by the Commissioner of the Department of Water Supply, Gas and Electricity.

One inch is the largest screw tap allowed on eight inch mains.

Two inch screw taps shall be placed only in mains ten inches or larger.

No screw tap larger than two inches shall be permitted.

Where connections larger than two inches are required, they shall be made by wet connections.

All two inch-connections to mains less than ten inches shall be made by wet connections.

Connections to screw taps up to two inch shall be made by standard brass couplings furnished with the taps by the Department of Water Supply, Gas and Electricity, and leather washers.

Connection between couplings and lead services must be made by wiped joints, and all work must be done in a thorough and workmanlike manner.

Connections made between lead services and wet connections shall be made with a brass nipple not less than six inches in length, with a short thread on one hand, to which a follower is to be screwed to form a spiket end for caulking. Caulked joints must be made with picked oakum and molten lead and be made water-tight. Twelve ounces of fine, soft pig lead must be used at each joint for each inch diameter of pipe.

Connections between galvanized iron services and wet connections shall be made by lead caulked joint as above stated including the follower placed on the end of the iron pipe:

Services

All work of repairing or installing of services shall be done by a registered licensed plumber.

Notice must be left at the Bureau of Water Register, of the Department of Water Supply, Gas and Electricity, by the plumber, fixing the day on which he wishes a tap or plug inserted. This notice must be given at or before three o'clock, at least one day previous to the excavation for the insertion of the said tap or plug. No tap will be driven until the service shall have been laid.

Plumbing Questions and Answers

The opening must be made two feet each side of the main, three feet long and six inches clear under main, and be free from water so that the tapper can do his work properly.

All new service pipes of two inches in diameter or less shall be of "AA" lead of the following weight:

5/8 inches	.....	2 3/4	pounds	per	ft.
3/4 "	.....	3 1/2	"	"	"
1 "	.....	4 3/4	"	"	"
1 1/4 "	.....	5 3/4	"	"	"
1 1/2 "	.....	7 1/2	"	"	"
2 "	.....	9	"	"	"

Services larger than two inch must be of "AA" lead or double strength galvanized iron. This material must be used from the tap all the way into the building to the main stop-cock or valve. (A roundway stop-cock or gate valve must be placed on the service at the street curb with an extending rod encased in a cast iron curb box with cover at the level of the sidewalk pavement.)

Each new service must be laid in a straight line from main to curb-box, and this line must be at right angles with the main to which it is connected. From this point the direction of the service should be as direct as possible as all change of direction retards the pressure.

Whenever the supply is discontinued and service cut off, all abandoned taps or connections shall be drawn from water mains and plugs inserted in their stead at the expense of the owner of abutting property towards which the tap faces.

All pipe fittings, valves or curb-cocks required to be installed under these rules must be of a pattern and material approved by the Department of Water Supply, Gas and Electricity.

The use of the Grove Electric Indicator for the location of taps shall be furnished by the Department of Water Supply, Gas and Electricity. Upon application of a licensed plumber, a charge will be made for each

tap—if the indicator is successful—to be paid within fifteen days after the bill for services is rendered.

No street shall be opened for work on service pipes or connections, or water mains tapped, or service pipes laid without written permission from the Department of Water Supply, Gas and Electricity. Only persons licensed to perform this class of work will receive such permission. The particular person to be employed will be named in the permit in each case.

Licensed plumbers of this city, and employees of the Department of Water Supply, Gas and Electricity, are the only persons authorized to make connections with water mains, or to set or remove meters.

For services larger than two inch, where double strength galvanized iron pipe is installed not less than two feet of "AA" lead pipe should be used at the connection of the service to the main to secure flexibility and avoid effects of settling.

The use of hose inside of buildings for any purpose whatever is allowed only where the premises are fully metered.

Hose-bibbs or connections outside of buildings are prohibited, except where the premises are fully metered.

The use of hose outside of buildings is not permitted, except where the premises are fully metered and a special permit obtained from this department. Permits will be issued yearly, free of charge, upon applications, for use of hose for sprinkling or washing of sidewalks, stoops, areas, house fronts, yards, courtyards or gardens.

The use of hose in or about any premises that are not fully metered is prohibited, except where a special permit has been issued, for which a charge of five dollars a year will be made.

Permits must be shown on request of police or inspectors of the Department of Water Supply, Gas and Electricity.

DEPARTMENTAL OFFICES AND THEIR LOCATIONS

FACTORY LAW

State Department of Labor, Main Office, Albany, N. Y.
New York City Office: 124 East Twenty-eighth Street

PLUMBER'S LICENSE

Examining Board of Plumbers,
Municipal Building, New York City.

PLUMBING PERMITS

Building Departments:

Manhattan—Municipal Building, 20th Floor.

Brooklyn—Borough Hall, 4th Floor.

Queens—Queens Subway Building, 2nd Floor.

Richmond—Borough Hall.

Bronx—Tremont and Third Avenues, 1st Floor.

WATER METER AND SERVICE PERMITS

Department of Water Supply, Gas and Electricity:

Main Office—Municipal Building, 24th Floor.

Bronx—Tremont and Arthur Avenues.

Brooklyn—50 Court Street.

Queens—Municipal Building, Court Square.

Richmond—Borough Hall, St. George.

TENEMENT HOUSE LAW

Tenement House Department—Municipal, 19th Floor.

PLUMBING LAWS

Board of Standards and Appeals

Measures of Weight, Capacity and Area

LONG MEASURE

12 Inches = 1 Foot
3 Feet = 1 Yard
5½ Yards = 1 Rod
4 Rods = 1 Chain
10 Chains = 1 Furlong
8 Furlongs = 1 Mile

LIQUID MEASURE

4 Gills = 1 Pint
2 Pints = 1 Quart
4 Quarts = 1 Gallon
31½ Gallons = 1 Barrel
2 Barrels = 1 Hogshead

CUBIC MEASURE

1728 Cubic Inches = 1 Cubic Foot
27 Cubic Feet = 1 Cubic Yard
24.75 Cubic Feet = 1 Perch
128 Cubic Feet = 1 Cord

AVOIRDUPOIS MEASURE

16 Ounces = 1 Pound
100 Pounds = 1 Hundred Weight
20 Cwt. = 1 Ton

SQUARE MEASURE

144 Square Inches = 1 Square Foot
9 Square Feet = 1 Square Yard
30¼ Square Yards = 1 Square Rod
160 Square Rods = 1 Acre
640 Acres = 1 Square Mile

RULE FOR THE WEIGHT OF PIPE

D—Outside diameter of pipe in inches.

a—Inside diameter.

w—Weight of a lineal foot of pipe in lbs.

$$W = K (D^2 - a^2)$$

K = 2.45 for cast iron.

K = 2.64 for wrought iron.

K = 2.82 for brass.

K = 3.03 for copper.

K = 3.86 for lead.

Mensuration of Surfaces and Volumes

Area of triangle = base \times $\frac{1}{2}$ perpendicular height.

Circumference of circle = diameter \times 3.1416.

Area of circle = square of diameter \times .7854.

Area of surface of cylinder = circumference \times length
+ area of two ends.

To find diameter of circle having given area: Divide the area by .7854, and extract the square root.

To find the volume of a cylinder: Multiply the area of the section in square inches by the length of inches = the volume in cubic inches. Cubic inches divided by 1728 = volumes in cubic feet.

Surface of a sphere = square of diameter \times 3.1416.

Solidity of a sphere = cube of diameter \times .5236.

Area of the base of a pyramid or cone, whether round, square or triangular multiplied by one-third of its height = the solidity.

Double the diameter of a pipe increases its capacity four times.

A "miner's inch" of water approximately equals a supply of 12 U. S. gallons per minute.

Plumbing Questions and Answers

AREA OF CIRCLES

Diam-eter	Area	Diam-eter	Area	Diam-eter	Area	Diam-eter	Area
$\frac{1}{8}$	0.0123	10	78.54	30	706.86	65	3318.3
$\frac{1}{4}$	0.0491	$10\frac{1}{2}$	86.59	31	754.76	66	3421.2
$\frac{3}{8}$	0.1104	11	95.03	32	804.24	67	3525.6
$\frac{1}{2}$	0.1963	$11\frac{1}{2}$	103.86	33	855.30	68	3631.6
$\frac{5}{8}$	0.3068	12	113.09	34	907.92	69	3739.2
$\frac{3}{4}$	0.4418	$12\frac{1}{2}$	122.71	35	962.11	70	3848.4
$\frac{7}{8}$	0.6013	13	132.73	36	1017.8	71	3959.2
1	0.7854	$13\frac{1}{2}$	143.13	37	1075.2	72	4071.5
$1\frac{1}{8}$	0.9940	14	153.93	38	1134.1	73	4185.4
$1\frac{1}{4}$	1.227	$14\frac{1}{2}$	165.13	39	1194.5	74	4300.8
$1\frac{3}{8}$	1.484	15	176.71	40	1256.6	75	4417.8
$1\frac{1}{2}$	1.767	$15\frac{1}{2}$	188.69	41	1320.2	76	4536.4
$1\frac{5}{8}$	2.073	16	201.06	42	1385.4	77	4656.6
$1\frac{3}{4}$	2.405	$16\frac{1}{2}$	213.82	43	1452.2	78	4778.3
$1\frac{7}{8}$	2.761	17	226.98	44	1520.5	79	4901.6
2	3.141	$17\frac{1}{2}$	240.52	45	1590.4	80	5026.5
$2\frac{1}{4}$	3.976	18	254.46	46	1661.9	81	5153.0
$2\frac{1}{2}$	4.908	$18\frac{1}{2}$	268.80	47	1734.9	82	5281.0
$2\frac{3}{4}$	5.939	19	283.52	48	1809.5	83	5410.6
3	7.068	$19\frac{1}{2}$	298.64	49	1885.7	84	5541.7
$3\frac{1}{4}$	8.295	20	314.16	50	1963.5	85	5674.5
$3\frac{1}{2}$	9.621	$20\frac{1}{2}$	330.06	51	2042.8	86	5808.8
$3\frac{3}{4}$	11.044	21	346.36	52	2123.7	87	5944.6
4	12.566	$21\frac{1}{2}$	363.05	53	2206.1	88	6082.1
$4\frac{1}{2}$	15.904	22	380.13	54	2290.2	89	6221.1
5	19.635	$22\frac{1}{2}$	397.60	55	2375.8	90	6361.7
$5\frac{1}{2}$	23.758	23	415.47	56	2463.0	91	6503.9
6	28.274	$23\frac{1}{2}$	433.73	57	2551.7	92	6647.6
$6\frac{1}{2}$	33.183	24	452.39	58	2642.0	93	6792.9
7	38.484	$24\frac{1}{2}$	471.43	59	2733.9	94	6939.8
$7\frac{1}{2}$	44.178	25	490.87	60	2827.4	95	7088.2
8	50.265	26	530.93	61	2922.4	96	7238.2
$8\frac{1}{2}$	56.745	27	572.55	62	3019.0	97	7389.8
9	63.617	28	615.75	63	3117.2	98	7542.9
$9\frac{1}{2}$	70.882	29	660.52	64	3216.9	99	7697.7

To compute the area of a diameter greater than any in the above table:

RULE—Divide the dimension by 2, 3, 4, etc., if practicable, until it is reduced to a quotient to be found in the table, then multiply the tabular area of the quotient by the square of the factor. The product will be the area required.

EXAMPLE—What is area of diameter of 150? $150 \div 5 = 30$. Tabular area of 30 = 706.86 which $\times 25 = 17,671.5$, area required.

CIRCUMFERENCE OF CIRCLES

Diameter	Circumference	Diameter	Circumference	Diameter	Circumference	Diameter	Circumference
3/8	.3927	10	31.41	30	94.24	65	204.2
3/4	.7854	10 1/2	32.98	31	97.38	66	207.3
7/8	1.178	11	34.55	32	100.5	67	210.4
1 1/8	1.570	11 1/2	36.12	33	103.6	68	213.6
1 1/4	1.963	12	37.69	34	106.8	69	216.7
1 3/8	2.356	12 1/2	39.27	35	109.9	70	219.9
1 1/2	2.748	13	40.84	36	113.0	71	223.0
1 3/4	3.141	13 1/2	42.41	37	116.2	72	226.1
1 7/8	3.534	14	43.98	38	119.3	73	229.3
2	3.927	14 1/2	45.55	39	122.5	74	232.4
2 1/8	4.319	15	47.12	40	125.6	75	235.6
2 1/4	4.712	15 1/2	48.69	41	128.8	76	238.7
2 3/8	5.105	16	50.26	42	131.9	77	241.9
2 1/2	5.497	16 1/2	51.83	43	135.0	78	245.0
2 3/4	5.890	17	53.40	44	138.2	79	248.1
3	6.283	17 1/2	54.97	45	141.3	80	251.3
3 1/8	7.008	18	56.54	46	144.5	81	254.4
3 1/4	7.854	18 1/2	58.11	47	147.6	82	257.6
3 3/8	8.639	19	59.69	48	150.7	83	260.7
3 1/2	9.424	19 1/2	61.26	49	153.9	84	263.8
3 3/4	10.21	20	62.83	50	157.0	85	267.0
4	10.99	20 1/2	64.40	51	160.2	86	270.1
4 1/8	11.78	21	65.97	52	163.3	87	273.3
4 1/4	12.56	21 1/2	67.54	53	166.5	88	276.4
4 3/8	14.13	22	69.11	54	169.6	89	279.6
4 1/2	15.70	22 1/2	70.68	55	172.7	90	282.7
5	17.27	23	72.25	56	175.9	91	285.8
5 1/8	18.84	23 1/2	73.82	57	179.0	92	289.0
5 1/4	20.42	24	75.39	58	182.2	93	292.1
5 3/8	21.99	24 1/2	76.96	59	185.3	94	295.3
5 1/2	23.56	25	78.54	60	188.4	95	298.4
6	25.13	26	81.68	61	191.6	96	301.5
6 1/8	26.70	27	84.82	62	194.7	97	304.7
6 1/4	28.27	28	87.96	63	197.9	98	307.8
6 3/8	29.84	29	91.10	64	201.0	99	310.0

To compute the circumference of a diameter greater than any in the above table:

RULE—Divide the dimension by 2, 3, 4, etc., if practicable, until it is reduced to a diameter to be found in table. Take the tabular circumference of this diameter, multiply it by 2, 3, 4, etc., according as it was divided, and the product will be the circumference required.

EXAMPLE.—What is the circumference of a diameter of 125. $125 \div 5 = 25$. Tabular circumference of 25 = 78.54; $78.54 \times 5 = 392.7$, circumference required.

Plumbing Questions and Answers

Miscellaneous Tables

FEET HEAD OF WATER AND EQUIVALENT PRESSURE

Feet Head	Pounds Per Sq. In.	Feet Head	Pounds Per Sq. In.	Feet Head	Pounds Per Sq. In.
1	.43	60	25.99	200	86.62
2	.87	70	30.32	225	97.45
3	1.30	80	34.65	250	108.27
4	1.73	90	38.98	275	119.10
5	2.17	100	43.31	300	129.93
6	2.60	110	47.64	325	140.75
7	3.03	120	51.97	350	151.58
8	3.40	130	56.30	400	173.24
9	3.90	140	60.63	500	216.55
10	4.33	150	64.96	600	259.85
20	8.66	160	69.29	700	303.16
30	12.99	170	73.63	800	346.47
40	17.32	180	77.96	900	389.78
50	21.65	190	82.29	1,000	433.09

PRESSURE AND EQUIVALENT FEET HEAD OF WATER

Pounds Per Sq.In.	Feet Head	Pounds Per Sq.In.	Feet Head	Pounds Per Sq.In.	Feet Head
1	2.31	40	92.36	170	395.52
2	4.62	50	115.45	180	415.61
3	6.93	60	138.54	190	438.90
4	9.24	70	161.63	200	461.78
5	11.54	80	184.72	225	519.51
6	13.85	90	207.81	250	577.24
7	16.16	100	230.90	275	643.03
8	18.47	110	253.08	300	692.69
9	20.78	120	277.07	325	750.41
10	23.09	125	288.62	350	808.13
15	34.63	130	300.16	375	865.89
20	46.18	140	323.25	400	922.58
25	57.72	150	346.34	500	1154.48
30	69.27	160	369.43	1,000	2308.

LOSS BY FRICTION OF WATER PIPES

This table shows the loss in pounds pressure per square inch for each 100 feet in length due to friction when discharging the given quantities of water per minute.

SIZES OF PIPES—INSIDE DIAMETER

SHOWING U. S. GALLONS IN GIVEN NUMBER OF CUBIC FEET

Cubic Feet	Gallons	Cubic Feet	Gallons	Cubic Feet	Gallons
0.1	0.75	50	374.0	9,000	67,324.6
0.2	1.50	60	448.8	10,000	74,805.2
0.3	2.24	70	523.6	20,000	149,610.4
0.4	2.99	80	598.4	30,000	224,415.6
0.5	3.74	90	673.2	40,000	299,220.7
0.6	4.49	100	748.0	50,000	374,025.9
0.7	5.24	200	1,496.1	60,000	448,831.1
0.8	5.98	300	2,244.1	70,000	523,636.3
0.9	6.73	400	2,992.2	80,000	598,441.0
1	7.48	500	3,740.2	90,000	673,246.7
2	14.9	600	4,488.3	100,000	748,051.9
3	22.3	700	5,236.3	200,000	1,496,103.8
4	29.9	800	5,984.4	300,000	2,244,155.7
5	37.4	900	6,732.4	400,000	2,992,207.6
6	44.9	1,000	7,480.0	500,000	3,740,259.5
7	52.4	2,000	14,961.0	600,000	4,488,311.4
8	59.8	3,000	22,441.5	700,000	5,236,363.3
9	67.3	4,000	29,922.0	800,000	5,984,415.2
10	74.8	5,000	37,402.6	900,000	6,732,467.1
20	149.6	6,000	44,883.1	1,000,000	7,480,519.0
30	224.4	7,000	52,363.6	.....	.....
40	299.2	8,000	59,844.1	.....	.....

From the above any cubic feet reading may readily be converted in U. S. gallons as follows:

How many gallons are represented by 53,928 cubic feet?

50,000	cubic feet	=	374,025.9	gallons
3,000	"	=	22,441.5	"
900	"	=	6,732.4	"
20	"	=	149.6	"
8	"	=	59.8	"

53,928 cubic feet = 403,409.2 gallons

Plumbing Questions and Answers

TABLE GIVING LOSS IN PRESSURE

DUE TO FRICTION, IN POUNDS, PER SQUARE INCH, FOR PIPE
100 FEET LONG

BY G. A. ELLIS, C. E.

Gallons Discharged per Minute	$\frac{3}{4}$ Inch	1 Inch	$1\frac{1}{4}$ Inch	$1\frac{1}{2}$ Inch	2 Inch	$2\frac{1}{2}$ Inch	3 Inch	4 Inch
5	3.3	0.84	0.31	0.12	...	...	...	...
10	13.0	3.16	1.05	0.47	0.12	...	...	...
15	28.7	6.98	2.38	0.97	...	...	...	...
20	50.4	12.3	4.07	1.66	0.42	...	...	...
25	78.0	19.0	6.40	2.62	...	0.21	0.10	...
30	...	27.5	9.15	3.75	0.91	...	...	...
35	...	37.0	12.4	5.05	...	...	...	...
40	...	48.0	16.1	6.52	1.60	...	...	...
45	...	...	20.2	8.15	...	...	...	...
50	...	...	24.9	10.0	2.44	0.81	0.35	0.09
75	...	...	56.1	22.4	5.32	1.80	0.74	...
100	...	...	...	3.90	9.46	3.20	1.31	0.33
125	...	...	...	...	14.9	4.89	1.99	...
150	...	...	...	...	21.2	7.0	2.85	0.69
175	...	...	...	...	28.1	9.46	3.85	...
200	...	...	...	...	37.5	12.47	5.02	1.22

TABLE GIVING VELOCITY OF FLOW OF WATER IN FEET PER MINUTE, THROUGH PIPES OF VARIOUS SIZES, FOR VARYING QUANTITIES OF FLOW

Gallons per Minute	$\frac{3}{4}$ Inch	1 Inch	$1\frac{1}{4}$ Inch	$1\frac{1}{2}$ Inch	2 Inch	$2\frac{1}{2}$ Inch	3 Inch	4 Inch
5	218	122½	78½	54½	30½	19½	13½	7½
10	436	245	157	109	61	38	27	15½
15	653	367½	235½	163½	91½	58½	40½	23
20	872	490	314	218	122	78	54	30½
25	1090	612½	392½	272½	152½	97½	67½	38½
30	...	735	451	327	183	117	81	46
35	...	857½	549½	381½	213½	136½	94½	53½
40	...	980	628	436	244	156	108	61½
45	...	1102½	706½	490½	274½	175½	121½	69
50	...	...	785	545	305	195	135	76½
75	...	...	1177½	817½	457½	292½	202½	115
100	...	...	...	1090	610	380	270	153½
125	...	...	...	...	762½	487½	337½	191½
150	915	585	405	230
175	1067½	682½	472½	268½
200	1220	780	540	306½

AMENDMENTS

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Deacidified using the Bookkeeper process.
Neutralizing agent: Magnesium Oxide
Treatment Date: May 2004

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