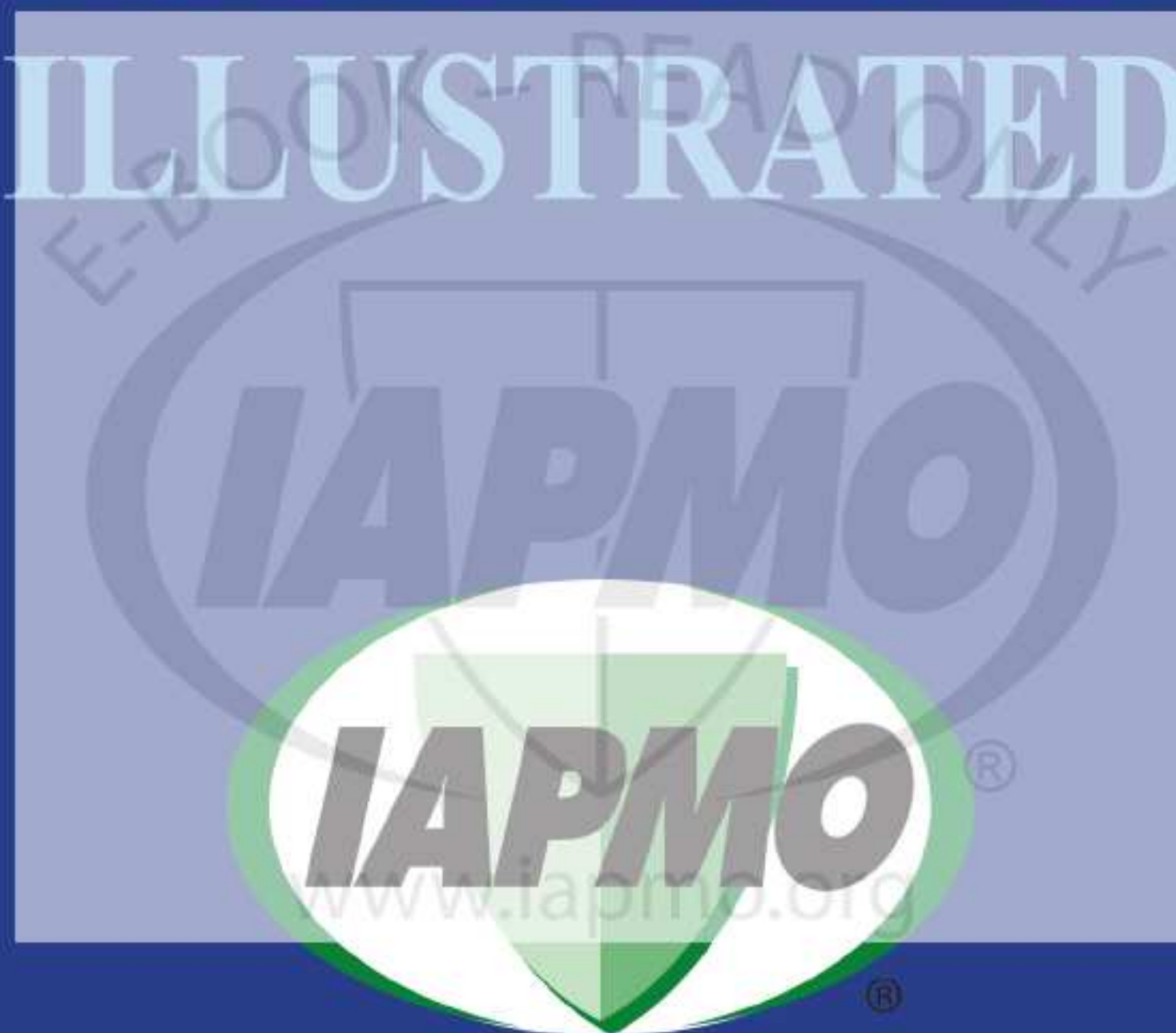


2018

NATIONAL STANDARD PLUMBING CODE ILLUSTRATED



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Comments are presented with a shaded background similar to this note and are intended as supplemental information.

Illustrations are denoted with a border similar to this note.

Comments and Illustrations are intended as supplemental information. This information may or may not be adopted by the Authority Having Jurisdiction and as such, acceptance or application should be verified by the user of this document. All Bold/Italic references in the code to figures are to be considered as comments.

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First Printing - January 2018

NATIONAL STANDARD PLUMBING CODE ILLUSTRATED

Title:

National Standard Plumbing Code – Illustrated

Scope:

The development of a recommended code of plumbing practice, design, and installation, including the establishment of performance criteria predicated on the need for protection of health and safety through proper design, installation, and maintenance of plumbing systems. This scope excludes the development of specific standards related to the composition, dimensions, and/or mechanical and physical properties of materials, fixtures, devices, and equipment used or installed in plumbing systems.

Purpose:

To provide practices and performance criteria for the protection of health and safety through proper design and installation of plumbing systems.

Exceptions:

In case of practical difficulty, unnecessary hardship or new developments, exceptions to the literal requirements may be granted by the Authority Having Jurisdiction to permit the use of other devices or methods, but only when it is clearly evident that equivalent protection is thereby secured.

Disclaimer:

IAPMO is not responsible or liable for any personal injury, property, or other damages of any nature whatsoever directly or indirectly resulting from the publication, use of, or reliance on the National Standard Plumbing Code or its Supplements. IAPMO also makes no guarantee or warranty as to the accuracy or completeness of any information published herein.

FOREWARD

Origin and Development

The advantages of a statewide adopted National Standard Plumbing Code™ are recognized throughout the industry. Disorder in the industry because of widely divergent plumbing practices and the use of many different, often conflicting, plumbing codes by local jurisdictions influenced the National Association of Master Plumbers in 1883, (predecessor of the National Association of Plumbing-Heating-Cooling Contractors (NAPHCC)) to publish the NAMP “Standard Plumbing Code” in 1933 and furnished revised editions until 1942. NAPHCC participated in the development of special standards for war-time plumbing and later was represented on the National Plumbing Code Coordinating Committee, whose work ultimately resulted in the adoption of A40.8 as a standard or model plumbing code in 1955.

NAPHCC served as a sponsor in the early 1960’s of the project which attempted to update the 1955 document. This project was operated through the procedures of the American National Standards Institute. However, the A40.8 revision project was not completed because consensus could not be achieved.

To provide local and state governments, code administrative bodies and industry with a modern, updated code, NAPHCC published the “National Standard Plumbing Code,” in 1971, following the format and sequence of the A40.8 to provide for maximum convenience of users.

With the June 1973 revision, the American Society of Plumbing Engineers joined this effort by co-sponsoring the National Standard Plumbing Code. ASPE maintained its co-sponsorship status until September 1980. Upon ASPE’s withdrawal of co-sponsorship, the Code Committee composition was changed to include not only members of the contracting and engineering communities but also members of the inspection community. Contractors, engineers and inspectors now comprise the National Standard Plumbing Code Committee.

The International Association of Plumbing and Mechanical Officials® (IAPMO) acquired the publishing rights to the NSPC in 2017. IAPMO is maintaining the National Standard Plumbing Code Committee’s close working relationship with the plumbing industry to maintain a document of minimum requirements for plumbing systems that reflect current practices, materials, and techniques, consistent with public health and safety. Contributions to the content of this code consists of diverse interests as consumers, enforcing authorities, installers/maintainers, labor, manufacturers, research/standards/testing laboratories, special experts, and users.

Each revision cycle advances according to a published schedule that includes final dates for all major events and contains four basic steps as follows:

1. Public and Committee Proposal Stage;
2. Comment Stage;
3. Association Technical Meeting;
4. Council Appeals and Issuance of Code.

IAPMO develops “full consensus” codes built on a foundation of maximum participation and agreement by a broad range of interests. This philosophy has led to producing technically sound codes that promote health and safety, yet do not stifle design or development.

It is important to stress that; the process remains committed to the principles of consensus code development where consensus Technical Committees and Correlating Committees revise codes. The public and membership is offered multiple opportunities to debate, provide input and raise concerns through Amending Motions at the annual Assembly Consideration Session. Anyone may submit an appeal related to the issuance of a document through the IAPMO Standards Council.

The written requirements of a Code can sometimes be interpreted differently by different individuals. For this reason, the NSPC Committee developed the NSPC Illustrated, which includes explanatory comments and illustrations to demonstrate the intent of the various Code Sections.

The Committee also realizes that despite the countless hours of preparation and review, perfection may not have been achieved in this document. For this reason, please send any questions, comments, suggestions, or problems to the Code Development, 4755 E. Philadelphia St., Ontario, CA 91761.

The 2018 National Standard Plumbing Code is supported by the ASSE International, the Mechanical Contractors Association of America (MCAA), the Plumbing-Heating-Cooling Contractors National Association (PHCC-NA), the United Association (UA), and the World Plumbing Council (WPC). The presence of these logos, while reflecting support, does not imply any ownership of the copyright to the NSPC, which is held exclusively by IAPMO. Further, the logos of these associations indicate the support of IAPMO’s open consensus process being used to develop IAPMO’s codes and standards.

Comments on Code Text

The comments following the various Sections of the Code text are intended to explain the intent of that Section of the Code. The comments themselves are not Code requirements but are intended to supplement the Code and provide guidance toward its interpretation.

FORWARD

Figures and Figure Notes

The illustrations (figures) are intended to graphically demonstrate the intent or provide an example of the referenced definition or Code Section. The figures are based only on the referenced definition or Code Section and do not necessarily include all details of the complete installation, such as pipe sizes, specific pipe fittings, required pipe supports, required cleanouts, and other details that are not part of the definition or Code Section being illustrated. The figures must not be used to justify work that does not comply with all requirements of the Code.

The figures are not intended to restrict installations to the arrangement shown. In many cases, the figures show only one example or a typical example of an acceptable arrangement. Any arrangement that meets the intent of the referenced Code Section is acceptable.

This Edition

This edition of the National Standard Plumbing Code – Illustrated includes changes from the 2015 Code, the 2015 Green Plumbing and Mechanical Supplement, and the changes that were approved at the March 9, 2017 Public Hearing.

INTRODUCTORY NOTES

The material presented in this Code does not have legal standing unless it is adopted by reference, or by inclusion, in an act of state, county, or municipal government. Therefore, administration of the provisions of this Code must be preceded by suitable legislation at the level of government where it is desired to use this Code.

In some places in this Code, reference is made to “Authority Having Jurisdiction.” The identity of an Authority Having Jurisdiction will be established by the act that gives legal standing to the Code provisions.

Proposed changes to the Code can be submitted by any interested party on forms available from IAPMO. Cutoff dates

for submitting proposed changes are published by IAPMO, along with the dates for public hearings and final voting by the NSPC Committee. The NSPC is revised and reprinted on a three-year cycle.

Personal appearance before the Committee for a hearing on any Code matter can be had by interested parties after a request in writing.

In the course of revision, certain outdated sections may have been deleted. In order to maintain consistency and perpetuity of the numbering system, those deleted sections and numbers have been removed from this printed text, or placed in reserve.

All changes from the previous edition of this Code are marked by a vertical line in the margin.

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ADMINISTRATION

ADM 1.1 TITLE

The regulations contained in the following chapters and sections shall be known as the “National Standard Plumbing Code” and may be cited as such, and hereinafter referred to as “this Code”.

ADM 1.2 SCOPE

The provisions of this Code shall apply to every installation, including the erection, installation, alteration, relocation, repair, replacement, addition to, use or maintenance of the plumbing system as defined within this Code.

ADM 1.3 PURPOSE

This Code establishes the minimum requirements and standards pertaining to the design, installation, use and maintenance of plumbing systems as defined within this Code.

ADM 1.4 APPLICABILITY

ADM 1.4.1 Addition or Repair

Additions, alterations or repairs in compliance to this Code may be made to any existing plumbing system without requiring the existing installation to comply with all the requirements of this Code. Additions, alterations or repairs shall not cause an existing system to become unsafe, insanitary or overloaded.

ADM 1.4.2 Existing Plumbing Installation

Plumbing systems that were lawfully installed prior to the adoption of this Code may continue their use, maintenance or repairs, provided the maintenance or repair is in accordance with the original design, location, and no hazard has been created to life, health or property by such plumbing system.

ADM 1.4.3 Existing Use

The lawful use of any plumbing installation, appliances, fixtures, fittings and appurtenances may have their use continued, provided no hazards to life, health or property have been created by their continued use.

ADM 1.4.4 Maintenance and Repairs

The maintenance of all plumbing systems, materials, appurtenances, devices or safeguards, both existing and new, shall be maintained in a safe and proper condition. The owner, or his designated agent, shall be responsible for the maintenance of the plumbing system. Minor repairs to or replacement of any existing systems are permitted, provided they are made in the same manner and arrangement as the original installation and are approved.

ADM 1.4.5 Change of Building Use

The plumbing systems of any building or structure that is proposed for a change in use or occupancy shall comply to all the requirements of this Code for the new use or occupancy.

ADM 1.4.6 Moved Buildings or Structures

The plumbing system in any building or structure to be moved into this jurisdiction shall comply with the provisions of this Code for new construction.

ADM 1.4.7 Special Historic Buildings

The provisions of this Code relating to the additions, alterations, repair, replacement or restoration of those structures designated as historic buildings shall not be mandatory when such work is deemed to be safe and in the public interest of health, safety and welfare by the Authority Having Jurisdiction.

ADM 1.4.8 Appendices

The provisions in the appendices are intended to supplement the requirements of this Code and are considered to be part of this Code when adopted by the Authority Having Jurisdiction.

ADM 1.5 APPROVALS

ADM 1.5.1 Alternates

The provisions cited in this Code are not intended to prevent the use of any material or method of installation when it is determined to meet the intent of this Code and approved by the Authority Having Jurisdiction.

ADM 1.5.2 Authority Having Jurisdiction

The Authority Having Jurisdiction may approve any such alternate material or method of installation not expressly conforming to the requirements of this Code, provided it finds the proposed material or method of installation is at least the equivalent of that required in this Code. A record of such approval shall be kept and shall be available to the public.

ADM 1.5.3 Tests Required

The Authority Having Jurisdiction shall require sufficient evidence to substantiate any claims made regarding the equivalency of any proposed alternate material or method of installation. When the Authority Having Jurisdiction determines that there is insufficient evidence to substantiate the claims, it may require tests to substantiate the claims made by an approved testing agency at the expense of the applicant.

ADMINISTRATION

ADM 1.5.4 Test Procedure

The Authority Having Jurisdiction shall require all tests be made in accordance with approved standards; but, in the absence of such standards, the Authority Having Jurisdiction shall specify the test procedure.

ADM 1.5.5 Retesting

The Authority Having Jurisdiction may require any tests to be repeated if, at any time, there is reason to believe that any material or method of installation no longer conforms to the requirements on which the original approval was based.

ADM 1.6 ORGANIZATION AND ENFORCEMENT

ADM 1.6.1 Authority Having Jurisdiction

The Authority Having Jurisdiction shall be the individual official, board, department or agency duly appointed by the jurisdiction as having the authority to administer and enforce the provisions of this Code as adopted or amended.

ADM 1.6.2 Deputies

In accordance with the procedures set forth by the jurisdictional authority, the Authority Having Jurisdiction may appoint such assistants, deputies, inspectors or other designated employees to carry out the administration and enforcement of this Code.

ADM 1.6.3 Right of Entry

When inspections are required to enforce the provisions of this Code, or there is reasonable cause to believe there exists in any building, structure or premises, any condition or violation of this Code causing the building, structure or premises to be unsafe, insanitary, dangerous or hazardous, the Authority Having Jurisdiction or its designated representative may enter such building, structure or premises at reasonable times to inspect or perform the duties imposed by this Code. When the building, structure or premises are occupied, proper credentials shall be presented to the occupant when entry is required. In the event the building, structure or premises is unoccupied, and entry is required, a reasonable effort shall be made to locate the owner or his agent in charge of such building, structure or premises. In the event the occupant or owner of such building, structure or premises refuses entry, the Authority Having Jurisdiction shall have recourse to the remedies provided by law to gain entry.

ADM 1.6.4 Stop Work Order

Upon notice from the Authority Having Jurisdiction, work being done on any building, structure or premises contrary to the provisions of this Code, or in an unsafe and dangerous manner, shall be stopped immediately. The stop work notice shall be in writing, served on the owner of the property, or his agent, or to the person doing such work. It shall state the conditions under which the Authority Having Jurisdiction may grant authorization to proceed with the work.

ADM 1.6.5 Authority to Condemn

When the Authority Having Jurisdiction determines that any plumbing system or portion thereof that is regulated by this Code has become insanitary or hazardous to life, health or property, it shall order in writing that such plumbing system or portion thereof be repaired, replaced or removed so as to be in code compliance. The written order shall fix a reasonable time limit for the work to be brought into code compliance, and no person shall use the condemned plumbing system until such work is complete and approved by the Authority Having Jurisdiction.

ADM 1.6.6 Authority to Abate

Any plumbing system, or portion thereof that is found to be insanitary or constitute a hazard to life, health or property is hereby declared to be a nuisance. Where a nuisance exists, the Authority Having Jurisdiction shall require the nuisance to be abated and shall seek such abatement in the manner prescribed by law.

ADM 1.6.7 Liability

The Authority Having Jurisdiction, or any individual duly appointed or authorized by the Authority Having Jurisdiction to enforce this Code, acting in good faith and without malice, shall not thereby be rendered personally liable for any damage that may occur to persons or property as a result of any act, or by reason of any act or omission in the lawful discharge of his duties. Should a suit be brought against the Authority Having Jurisdiction or duly appointed representative because of such act or omission, it shall be defended by legal counsel provided by this jurisdiction until final termination of the proceedings.

ADM 1.6.8 Work Prior to Permit

Where work for which a permit is required by this Code is started prior to obtaining the prescribed permit, the applicant shall pay a double fee. In the event of an emergency where it is absolutely necessary to perform the plumbing work immediately, such as nights, weekends or holidays, said fee shall not be doubled if a permit is secured at the earliest possible time after the emergency plumbing work has been performed.

ADM 1.7 VIOLATIONS AND PENALTIES

ADM 1.7.1 Violations

It shall be unlawful for any individual, partnership, firm or corporation to, or cause to, install, construct, erect, alter, repair, improve, convert, move, use or maintain any plumbing system in violation of this Code.

ADM 1.7.2 Penalties

Any individual, partnership, firm or corporation who shall violate or fail to comply with any of the requirements of this Code shall be deemed guilty of a _____, and if convicted, shall be punishable by a fine or imprisonment or both as established by this jurisdiction. Each day during which a violation occurs or continues, shall constitute a separate offense.

ADM 1.8 PERMITS

ADM 1.8.1 Permits Required

It shall be unlawful for any individual, partnership, firm or corporation to commence, or cause to commence, any installation, alteration, repair, replacement, conversion or addition to any plumbing system, or part thereof, regulated by this Code, except as permitted in Section 1.8.2, without first obtaining a plumbing permit for each separate building or structure, on forms prepared and provided by the Authority Having Jurisdiction.

ADM 1.8.2 Permits Not Required for the Following

a. Permits shall not be required for the following work:

1. The stoppage of leaks in drains or vent pipes. However, should the defect necessitate removal and replacement with new material, it shall constitute new work and a permit shall be obtained and inspection made as required in this Code.
2. The clearing of stoppages.
3. The repairing of leaks in valves or fixtures.
4. The removing and reinstallation of a water closet for a cleanout opening provided the reinstallation does not require replacement or rearrangement of valves, pipes or new fixtures.

b. Exemptions from obtaining a permit required by this Code shall not be construed as to authorize any work to be performed in violation of this Code.

ADM 1.9 PROCESS FOR OBTAINING PERMITS

ADM 1.9.1 Application

a. Applications for a permit shall be made in writing by the person, or his agent, proposing to do such work covered by the permit. The applicant shall file such application in writing on a form prepared and provided by the Authority Having Jurisdiction. Every such permit shall:

1. Describe in detail the work to be done for which the permit was obtained.
2. Describe in detail the parcel of land on which the proposed work is to be done by legal description, street address or other means to definitely locate the site or building where the work is to be performed.
3. List the type of occupancy or use.
4. Provide plans, drawings, diagrams, calculations or other data as required by Section 1.9.2.
5. Be signed by the person or agent making application.
6. Provide any other information the Authority Having Jurisdiction may require.

ADM 1.9.2 Plans

Two or more sets of plans shall be submitted with each permit application. The plans shall contain all the engineering calculations, drawings, diagrams and other data as required for

approval. The Authority Having Jurisdiction may also require that the plans, drawings, diagrams and calculations be designed by an engineer and/or architect licensed by the state in which the work is to be performed. Except that the Authority Having Jurisdiction may waive the submission of plans and other data, provided it is determined that the nature of the work covered by the permit does not require plan review to obtain code compliance.

ADM 1.9.3 Specifications

All specifications required to be on the plans shall be drawn to scale and sufficiently clear to indicate the nature, location and extent of the proposed work so as to show how it will conform to the requirements of this Code.

ADM 1.9.4 Permit Issuance

If, after reviewing the plans and specifications, the Authority Having Jurisdiction finds that they are complete and conform to the requirements of this Code, it shall authorize a permit to be issued upon payment of all the fees specified in Section 1.10.1.

ADM 1.9.5 Approved Plans

When the Authority Having Jurisdiction issues a permit and plans were required, it shall endorse, either in writing or stamp the plans "APPROVED", and all work shall be done in accordance with the plans without deviation.

ADM 1.9.6 Plans Retention

The Authority Having Jurisdiction shall retain one set of approved plans until final approval of the work contained therein. One set of approved plans shall be returned to the applicant and this set of approved plans shall be kept on the job site at all times until final approval of the work contained therein.

ADM 1.9.7 Permit Validity

The issuance of a permit by the Authority Having Jurisdiction is not and shall not be construed to be authorization or approval of any violation of the requirements of this Code. Any presumption of a permit to be authorization to violate or cancel any provisions of this Code shall be invalid. The issuance of a permit based on plans submitted shall not prevent the Authority Having Jurisdiction from requiring the correction of any errors in the plans or preventing the progress of the construction when it is in violation of any provision of this Code.

ADM 1.9.8 Permit Expiration

Every permit issued by the Authority Having Jurisdiction, in accordance with the provisions of this Code, shall expire by limitation and become null and void when such work authorized by the permit has not commenced within _____ days from the date of issuance or if such work is suspended or abandoned for a period of _____ days after commencement of such work. In order for such work to recommence, a new permit shall be obtained and a fee of _____ percent of the orig-

ADMINISTRATION

inal permit fee shall be charged, provided no changes have been made or will be made to the original plans as submitted. The Authority Having Jurisdiction may grant an extension to any permit provided the request is in writing by the permittee stating the reason or circumstances that prevented him from completing such work as required by this Code.

ADM 1.9.9 Revocation or Suspension

At any time, the Authority Having Jurisdiction may suspend or revoke a permit issued in error or on the basis of incorrect information submitted or in violation of any section of this Code. The suspension or revocation of such permit shall be in written form by the Authority Having Jurisdiction stating the reason or purpose of such suspension or revocation.

ADM 1.10 PERMITS

ADM 1.10.1 Fees Schedule

The permit fees for all plumbing work shall be set forth by the Authority Having Jurisdiction of the jurisdiction having authority.

ADM 1.10.2 Plan Review Fees

When plans are reviewed as a requirement prior to issuance of a permit, the fee shall be equal to ____ percent of the total permit fee as set forth in Section 1.10.1.

ADM 1.10.3 Plan Review Expiration

Permit application and plan review for which no permit is issued shall expire by limitation within ____ days following the date of application. All plan review fees shall be forfeited and the plans may be destroyed by the Authority Having Jurisdiction or returned to the applicant.

ADM 1.10.4 Work Without a Permit

When any plumbing work is commenced without first obtaining a permit from the Authority Having Jurisdiction, an investigation of such work shall be made before a permit may be issued. The investigation fee shall be collected whether or not a permit is then or subsequently issued. Any investigation fee shall equal the amount of the permit fee, if a permit were to be issued in accordance with this Code. If the investigation fee is collected, it shall not exempt any person from compliance or penalties set forth in this Code.

ADM 1.10.5 Refunding of Fees

Any fee collected by the Authority Having Jurisdiction that was erroneously paid or collected may be refunded, provided not more than ____ percent of the fee payment shall be refunded when no work has been done. Any request for the refunding of any fee shall be in writing by the applicant no later than ____ days after the date of fee payment.

ADM 1.11 INSPECTIONS

ADM 1.11.1 Required Inspections

All new plumbing systems, and parts of existing systems that require a permit shall be tested and inspected by the Authority Having Jurisdiction prior to being covered or concealed. Where any such work has been covered or concealed, the Authority Having Jurisdiction shall require that such work be exposed for inspection and testing.

All equipment, material and labor required for testing the plumbing system shall be furnished by the permittee. The Authority Having Jurisdiction shall not be liable for any expense incurred by the removal or replacement of materials required to permit inspection or testing. Such expense is the responsibility of the permittee.

Upon completion of the rough plumbing installation, prior to covering or concealing any such work, the Authority Having Jurisdiction shall inspect the work and any such test, as prescribed hereinafter, to disclose any leaks or defects.

After completion of the plumbing system and the plumbing fixtures are set and their traps filled with water, a final inspection shall be conducted as required by this Code. Additional inspections may be required when alternate materials or methods of installation are approved by the Authority Having Jurisdiction.

ADM 1.11.2 Exception:

For moved-in or relocated structures, minor installations and repairs, the Authority Having Jurisdiction may make other such inspections or tests as necessary to assure that the work has been performed and is safe for use in accordance with the intent of this Code.

ADM 1.11.3 Use of Existing Plumbing

The operation of any plumbing installation to replace existing systems or fixtures serving an occupied portion of any building or structure shall not be considered by the requirements of this Code to prohibit such operation, provided a request for inspection has been made to the Authority Having Jurisdiction within 48 hours of such work and before any such work is covered or concealed.

ADM 1.11.4 System Testing

All new plumbing systems and parts of existing systems shall be tested and approved as required elsewhere in this Code.

ADM 1.11.5 Requests for Inspection

The Authority Having Jurisdiction shall be notified by the person doing the work, authorized by the permit, that such work has been subjected to the required tests and is ready for inspection. The method of request, whether in writing or by telephone, shall be established by the Authority Having Jurisdiction. It shall be the duty of the permittee doing the work authorized by a permit to provide reasonable access and means for accomplishing proper inspections.

ADM 1.11.6 Other Inspections

The Authority Having Jurisdiction may require other inspections, in addition to those required by this Code, of any plumbing work in order to ascertain compliance with the requirements of this Code.

ADM 1.11.7 Reinspection Fees

a. The assessment of a reinspection fee may be required for any of the following:

1. For any portion of work not completed for which inspection was requested.
2. For any required corrections that have not been completed and for which reinspection was requested.
3. For not having the approved plans on site and readily available to the inspector.
4. Failure to provide access for inspection on the date inspection was requested.
5. Deviation from the approved plans that would require reapproval of the Authority Having Jurisdiction.
6. Failure to provide correct address.

b. This provision is intended to control the practice of calling for inspections prior to having work ready for inspection and not for the first time job rejection for not complying with the installation requirements.

c. Upon the assessment of a reinspection fee, the applicant shall pay the reinspection fee in accordance with Section 1.10.1 and no additional inspections shall be performed until all fees have been paid.

ADM 1.12 FINAL CONNECTIONS**ADM 1.12.1 Energy or Fuel**

It shall be unlawful for any person to make, or cause to make, any connection to any source of energy or fuel to any plumbing system or equipment regulated by this Code prior to the approval of the Authority Having Jurisdiction.

1 ADM.12.2 Water and Sewer

It shall be unlawful for any person to make, or cause to make, any connection to any water supply or sewer system to any plumbing system or equipment regulated by this Code prior to the approval of the Authority Having Jurisdiction.

ADM 1.12.3 Temporary Connection

By authorization of the Authority Having Jurisdiction, a temporary connection may be made to any plumbing equipment to a source of energy or fuel for testing purposes only.

ADM 1.13 UNCONSTITUTIONALITY

Should any chapter, section, subsection, sentence, clause or phrase of this Code be held for any reason as unconstitutional, such decision shall not affect the validity of the remaining chapters, sections, subsections, sentences, clause or phrases of this Code.

BASIC PRINCIPLES

This Code is founded upon certain basic principles of environmental sanitation and safety through properly designed, acceptably installed, and adequately maintained plumbing systems. Some of the details of plumbing construction may vary but the basic sanitary and safety principles desirable and necessary to protect the health of the people are the same everywhere.

The establishment of trade jurisdictional areas is not within the scope of this Code. This inclusion of material, even though indicated as approved for purposes of this Code, does not infer unqualified endorsement as to its selection or serviceability in any or every installation.

As interpretations may be required, and as unforeseen situations arise which are not specifically covered in this Code, the twenty-two principles which follow shall be used to define the intent.

Principle No. 1

ALL OCCUPIED PREMISES SHALL HAVE POTABLE WATER

All premises intended for human habitation, occupancy, or use shall be provided with a supply of potable water. Such a water supply shall not be connected with unsafe water sources, nor shall it be subject to the hazards of backflow.

Principle No. 2

ADEQUATE WATER REQUIRED

Plumbing fixtures, devices, and appurtenances shall be supplied with water in sufficient volume and at pressures adequate to enable them to function properly and without undue noise under normal conditions of use.

Principle No. 3

HOT WATER REQUIRED

Hot water shall be supplied to all plumbing fixtures which normally need or require hot water for their proper use and function.

Principle No. 4

WATER CONSERVATION

Plumbing shall be designed and adjusted to use the minimum quantity of water consistent with proper performance and cleaning.

Principle No. 5

SAFETY DEVICES

Devices for heating and storing water shall be so designed and installed as to guard against dangers from explosion or overheating.

Principle No. 6

USE PUBLIC SEWER WHERE AVAILABLE

Every building with installed plumbing fixtures and intended for human habitation, occupancy, or use, and located on premises where a public sewer is on or passes said premises within a reasonable distance, shall be connected to the public sewer.

Principle No. 7

REQUIRED PLUMBING FIXTURES

Each family dwelling unit shall have at least one water closet, one lavatory, one kitchen-type sink, and one bathtub or shower to meet the basic requirements of sanitation and personal hygiene. All other structures for human habitation shall be equipped with sufficient sanitary facilities. Plumbing fixtures shall be made of durable, smooth, non-absorbent and corrosion resistant material and shall be free from concealed fouling surfaces.

Principle No. 8

DRAINAGE SYSTEM

The drainage system shall be designed, constructed, and maintained to guard against fouling, deposit of solids and clogging, and with adequate cleanouts so arranged that the pipes may be readily cleaned.

Principle No. 9

DURABLE MATERIALS AND GOOD WORKMANSHIP

The piping of the plumbing system shall be of durable material, free from defective workmanship and so designed and constructed as to give satisfactory service for its reasonable expected life.

Principle No. 10

FIXTURE TRAPS

Each fixture directly connected to the drainage system shall be equipped with a liquid seal trap.

Principle No. 11

TRAP SEALS SHALL BE PROTECTED

The drainage system shall be designed to provide an adequate circulation of air in all pipes with no danger of siphonage, aspiration, or forcing of trap seals under conditions of ordinary use.

Principle No. 12

EXHAUST FOUL AIR TO OUTSIDE

Each vent terminal shall extend to the outer air and be so installed as to minimize the possibilities of clogging and the return of foul air to the building.

BASIC PRINCIPALS

Principle No. 13 **TEST THE PLUMBING SYSTEM**

The plumbing system shall be subjected to such tests as will effectively disclose all leaks and defects in the work or the material.

Principle No. 14 **EXCLUDE CERTAIN SUBSTANCES FROM THE PLUMBING SYSTEM**

No substance that will clog or accentuate clogging of pipes, produce explosive mixtures, destroy the pipes or their joints, or interfere unduly with the sewage-disposal process shall be allowed to enter the building drainage system.

Principle No. 15 **PREVENT CONTAMINATION**

Proper protection shall be provided to prevent contamination of food, water, sterile goods, and similar materials by backflow of sewage. When necessary, the fixture, device, or appliance shall be connected indirectly with the building drainage system.

Principle No. 16 **LIGHT AND VENTILATION**

No water closet, urinal, or bidet shall be located in a room or compartment which is not properly lighted and ventilated.

Principle No. 17 **INDIVIDUAL SEWAGE DISPOSAL SYSTEMS**

If water closets or other plumbing fixtures requiring sewage disposal are to be installed where there is no public sewer within a reasonable distance, an individual sewage disposal system or other approved means of sewage disposal shall be provided.

Principle No. 18 **PREVENT SEWER FLOODING**

Where a plumbing drainage system is subject to backflow of sewage from the public sewer or private disposal system, suitable provisions shall be made to prevent backflow into the building.

Principle No. 19 **PROPER MAINTENANCE**

Plumbing systems shall be maintained in a safe and serviceable condition from the standpoint of both mechanics and health.

Principle No. 20 **FIXTURES SHALL BE ACCESSIBLE**

All plumbing fixtures shall be so installed with regard to spacing as to be accessible for their intended use and for cleaning.

Principle No. 21 **STRUCTURAL SAFETY**

Plumbing shall be installed with due regard to preservation of the strength of structural members and prevention of damage to walls and other surfaces through fixture usage.

Principle No. 22 **PROTECT GROUND AND SURFACE WATER**

Sewage or other waste shall not be discharged into surface or sub-surface water unless it has first been subjected to some acceptable form of treatment.

CHAPTER 1

DEFINITIONS

1.1 GENERAL

For the purpose of this Code, the following terms shall have the meaning indicated in this chapter. No attempt is made to define ordinary words that are used in accordance with their established dictionary meaning, except where it is necessary to define their meaning as used in this Code to avoid misunderstanding.

1.2 DEFINITION OF TERMS

Accessible and Readily Accessible:

Accessible: access thereto without damaging building surfaces, but that first may require the removal of an access panel, door or similar obstructions with the use of tools.

See Figure 1.2.1

Readily accessible: access without requiring the use of tools for removing or moving any panel, door or similar obstruction.

See Figure 1.2.1

Acid Waste: See “Special Wastes”

Adopting Agency: The agency, board or authority having the duty and power to establish codes and regulations that directly and indirectly affect the plumbing work to be performed in a jurisdiction as administered and enforced by an Authority Having Jurisdiction.

Air Break (drainage system): A piping arrangement in which a drain from a fixture, appliance, or device discharges into a receptor at an elevation below the flood level rim and above the trap seal of the receptor. *See Figure 1.2.2 and Section 9.1.3*

Comment: Air breaks are permitted where the waste pipe being drained cannot cause backsiphonage.

Air Gap (drainage system): The unobstructed vertical distance through the free atmosphere between the outlet of the waste pipe and the flood level rim of the receptor into which it is discharging. *See Figure 1.2.4*

Comment: Air gaps are required where backflow can occur due to backsiphonage.

Air Gap (water distribution system): The unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet supplying water to a tank, plumbing fixture, or other device and the flood level rim of the receptor. *See Figure 1.2.5*

Comment 1: The minimum required air gap distance is based on the effective opening of the water supply outlet. The air gap must be increased if the outlet is close to walls or other vertical surfaces. See Section 10.5.2 and Table 10.5.2

Figure 1.2.1
AN EXAMPLE OF ACCESSIBLE AND
READILY ACCESSIBLE

Figure 1.2.2
AIR BREAKS

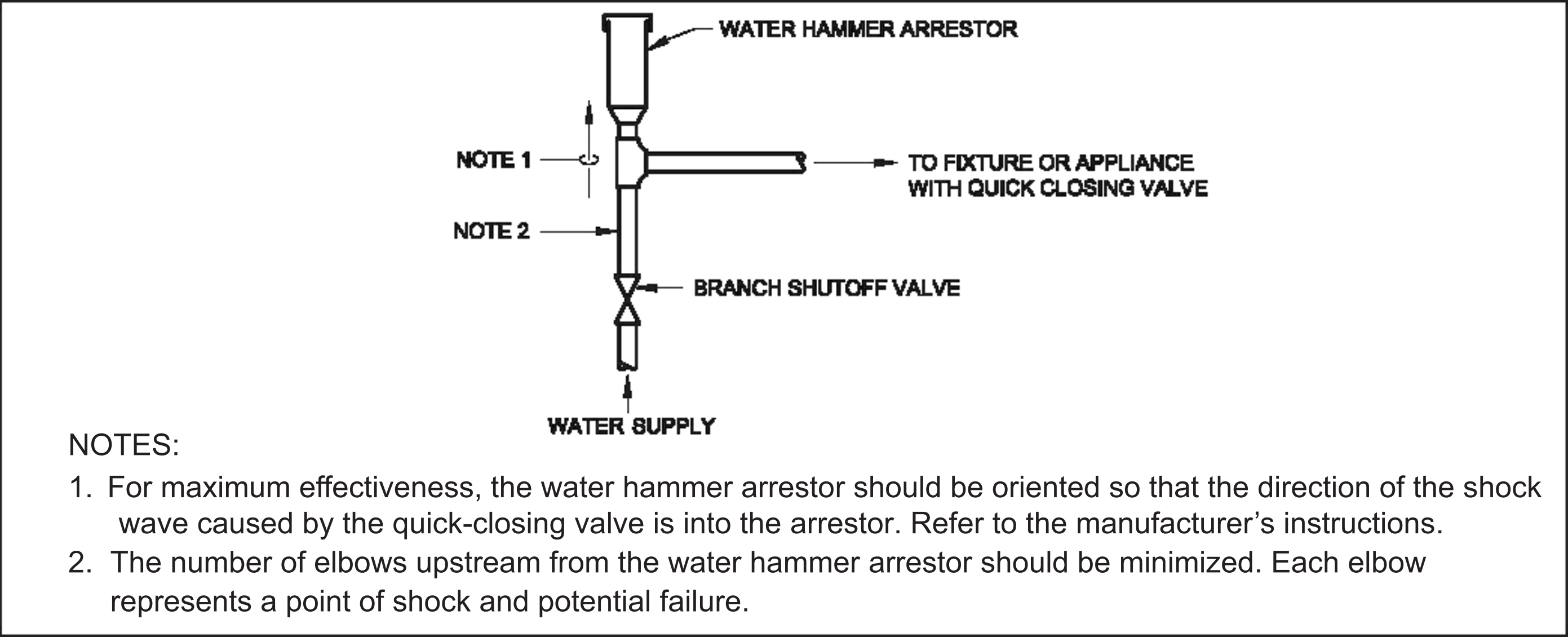


Figure 1.2.3
A WATER HAMMER ARRESTOR

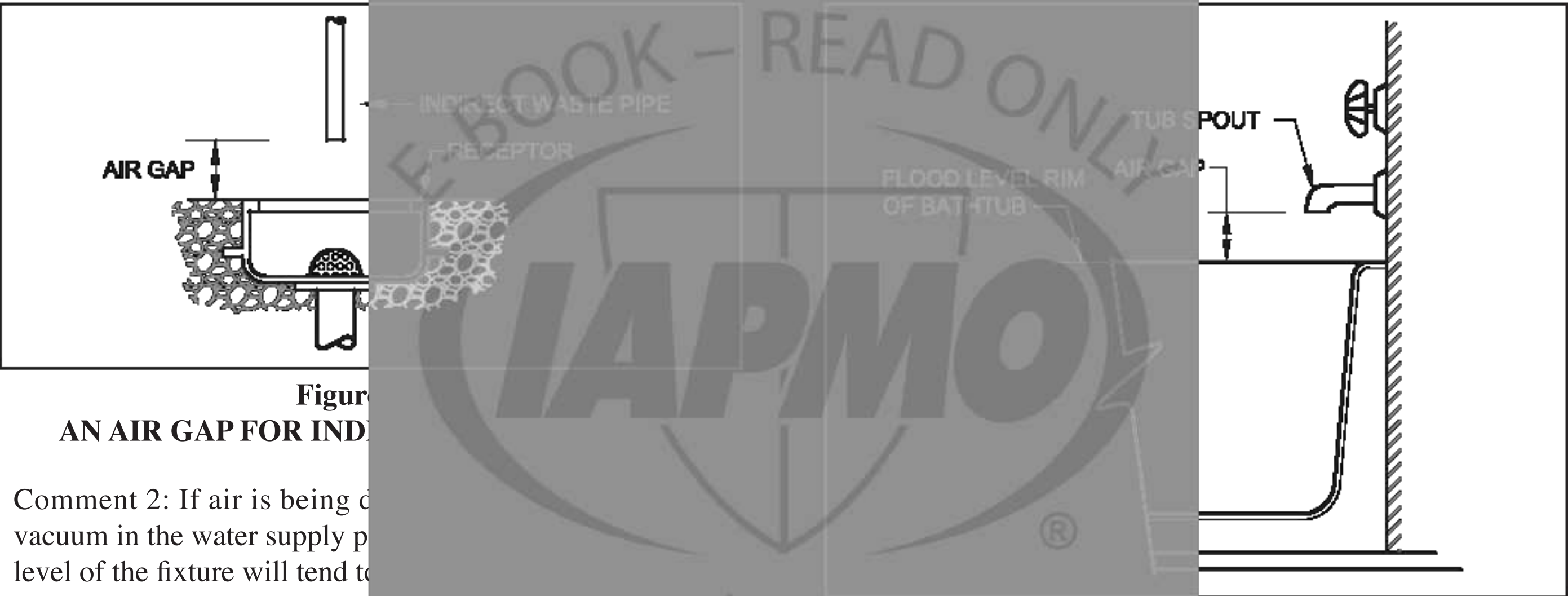


Figure 1.2.5
AN AIR GAP FOR A POTABLE WATER OUTLET

Comment 2: If air is being drawn into the water supply pipe, the level of the fixture will tend to rise above the spout opening by the flow of air. If the spout opening is close to the flood level rim of the bathtub, the air gap will be ineffective.

Approved: Accepted or acceptable under an applicable standard stated or cited in this Code, or accepted as suitable for the proposed use under procedures and powers of the Authority Having Jurisdiction as defined in Section 3.12. *See Sections 3.1.1, 3.1.2, 3.1.3, and 3.12*

Area Drain: A receptor designed to collect surface or storm water from an open area. *See Figures 1.2.6 and 13.1.6*

Aspirator: A fitting or device supplied with water or other fluid under positive pressure that passes through an integral orifice or “constriction” causing a vacuum. *See Figure 1.2.7 and Section 14.13*

Comment: Backflow prevention is required where the fluid supply is potable water.

Authority Having Jurisdiction: An administrative authority. The individual official, board, department or agency established and authorized by a state, county, city or other political sub-division created by law to administer and enforce

the provisions of codes and regulations that directly and indirectly affect the plumbing work to be performed in a jurisdiction as adopted and amended by an Adopting Agency.

Automatic Compensating Valve: A temperature control valve for individual shower and tub/shower combinations designed to minimize thermal shock and reduce the risk of scalding. They are installed at the point of use where the user has access to adjust the water flow and discharge temperature. The valves include Type P (pressure balancing), Type T (thermostatic), and Type T/P (combination), and comply with ASSE 1016/ASME A112.1016/CSA B125.16.

Automatic Flushing Device: A device that automatically flushes a fixture after each use without the need for manual activation.

Auxiliary Floor Drain: A floor drain that does not receive the discharge from any indirect waste pipe or other predictable drainage flows. Auxiliary floor drains have no DFU loading.

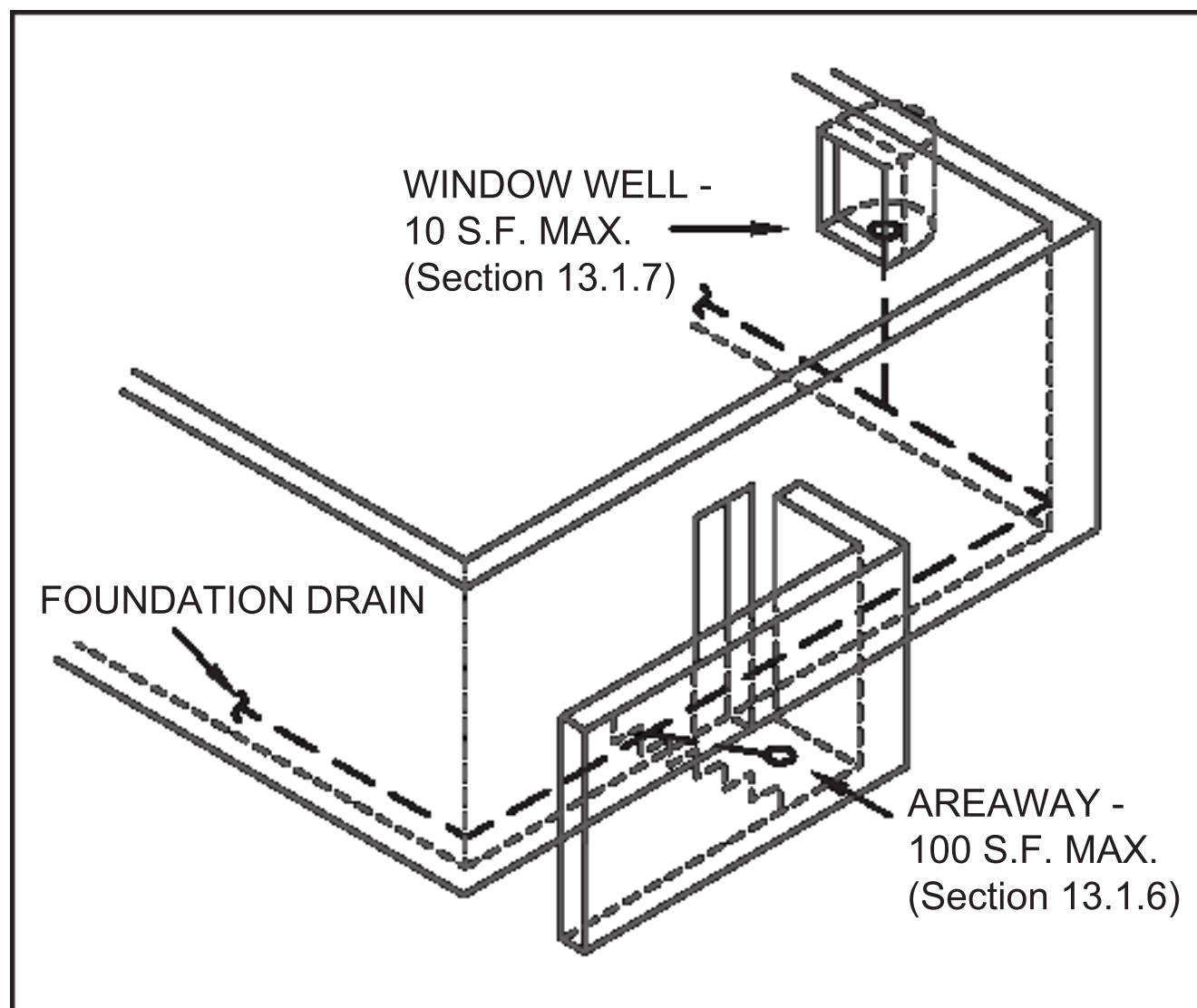


Figure 1.2.6
AREA DRAINS IN WINDOW WELLS
AND STAIRWAYS

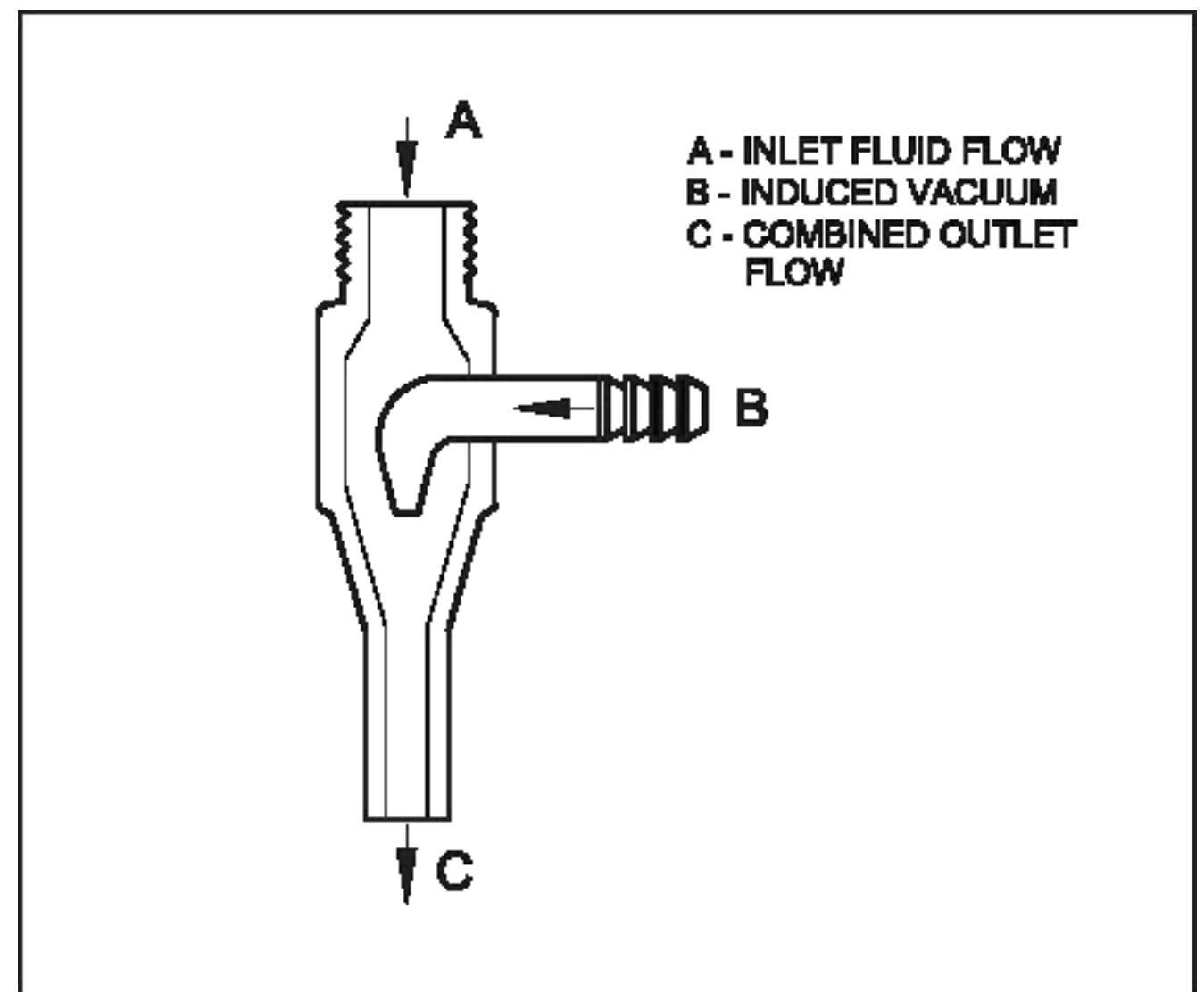


Figure 1.2.7
AN ASPIRATOR FITTING

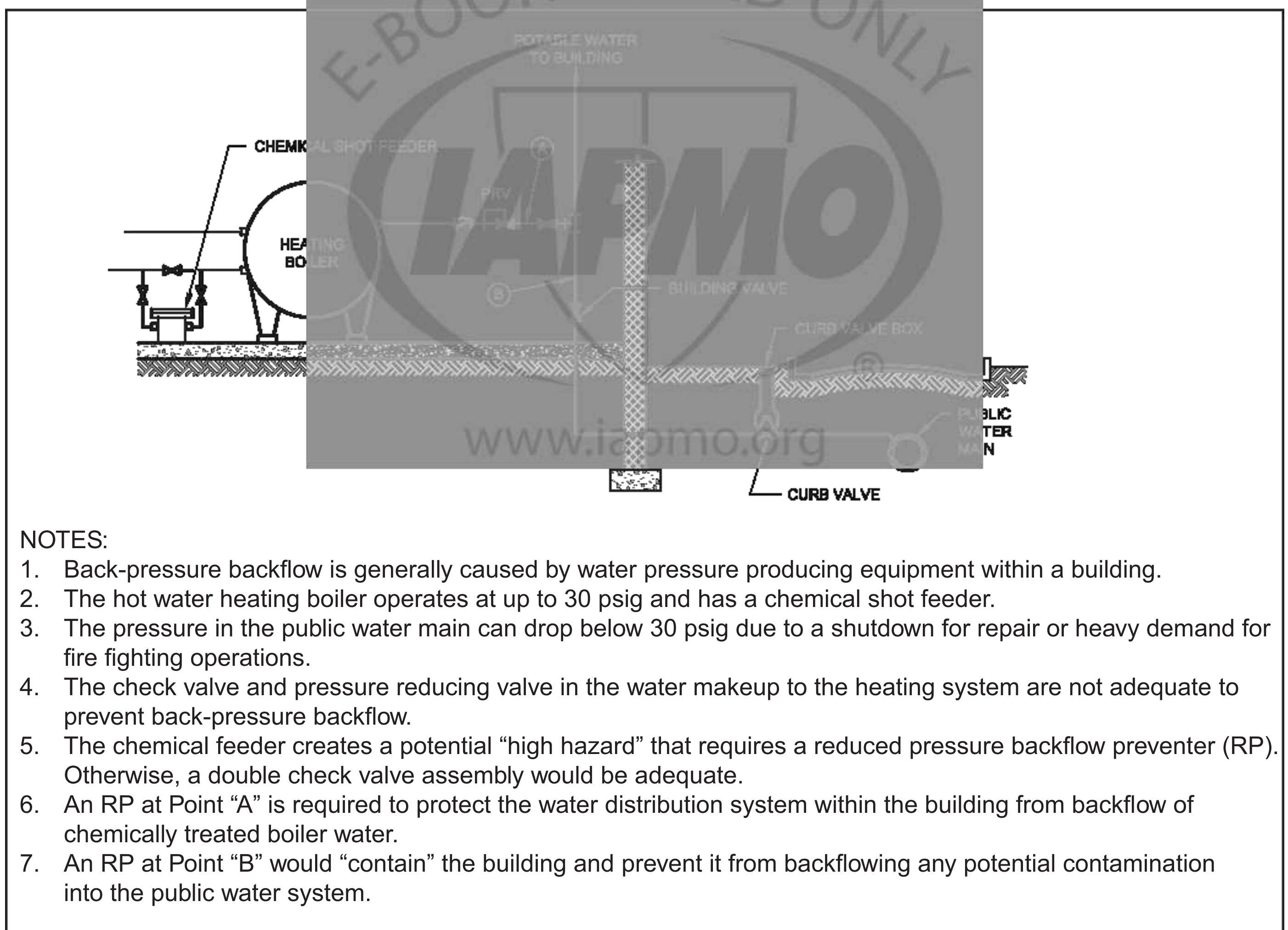


Figure 1.2.8
BACKFLOW CAUSED BY BACK-PRESSURE

DEFINITIONS

Backpressure Backflow: Backflow into potable water piping from a source having a higher pressure than in the potable water piping. *See Figure 1.2.8*

Backsiphonage Backflow: Backflow into potable water piping caused by a vacuum or partial vacuum in the potable water piping. *See Figure 1.2.9*

Backflow Preventer: A device or assembly that prevents backflow into potable water piping caused by backpressure, backsiphonage, or both.

Backwater Valve: A device installed in a drain pipe to prevent reverse flow in the drainage system. *See Figure 1.2.10*

Comment: Backwater valves are swing-type check valves that are installed in drainage pipe to prevent the reversal of flow in the piping and overflows due to stoppages, flooding, or other abnormal conditions. Refer to Section 5.5.1 for where backwater valves are required.

Baptistery: A tank or pool for baptizing by total immersion.

Bathroom Group: A group of fixtures in a bathroom consisting of one water closet, one bathtub, one shower stall, and either one bathtub, one shower stall, or one combination shower stall. Other fixtures within the bathroom are counted separately when determining fixture units and drainage fixture loads for the bathroom.

Bath/Shower Combination: A fixture with shower heads and shower stalls.

Battery of Fixtures: Any group of adjacent fixtures that discharge into a common drain. *See Figure 1.2.11*

Comment: Batteries of fixtures are groups of up to eight fixtures of the same type. *See Figure 1.2.11*

Bedpan Steamer: A fixture for sterilizing bedpans by direct application of steam. *See Section 14.10*

Boiler Blowoff: An outlet on a boiler to permit emptying or discharge of sediment. *See Figure 1.2.12*

Boiler Blowoff Tank: A vessel designed to receive the discharge from a boiler blowoff outlet and to cool the discharge to a temperature that permits its safe discharge to the drainage system. *See Figure 1.2.12*

Comment: Boiler blowoff must be cooled to 140°F or less before being discharged into the drainage system. If potable water is supplied for cooling, the water source must be protected from backflow. An air break can be provided at the discharge from the blowoff tank into the drainage system if the make-up water supply to the boiler is protected against backflow.

Branch Drain: A branch of drain piping, including horizontal fixture branches, horizontal branch drains, horizontal battery-vented drains, and branches of the building drain.

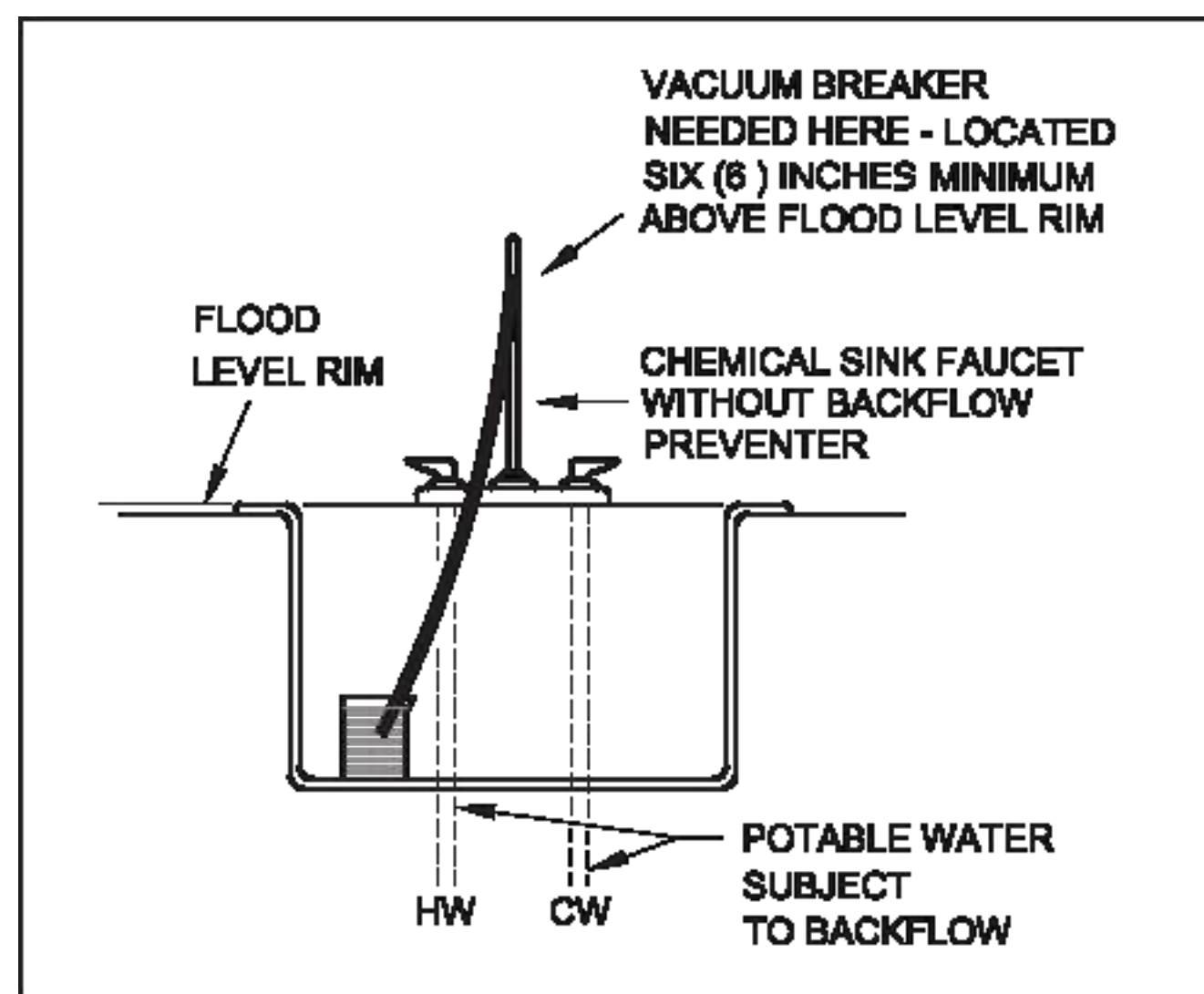


Figure 1.2.9
BACKFLOW CAUSED BY BACK SIPHONAGE

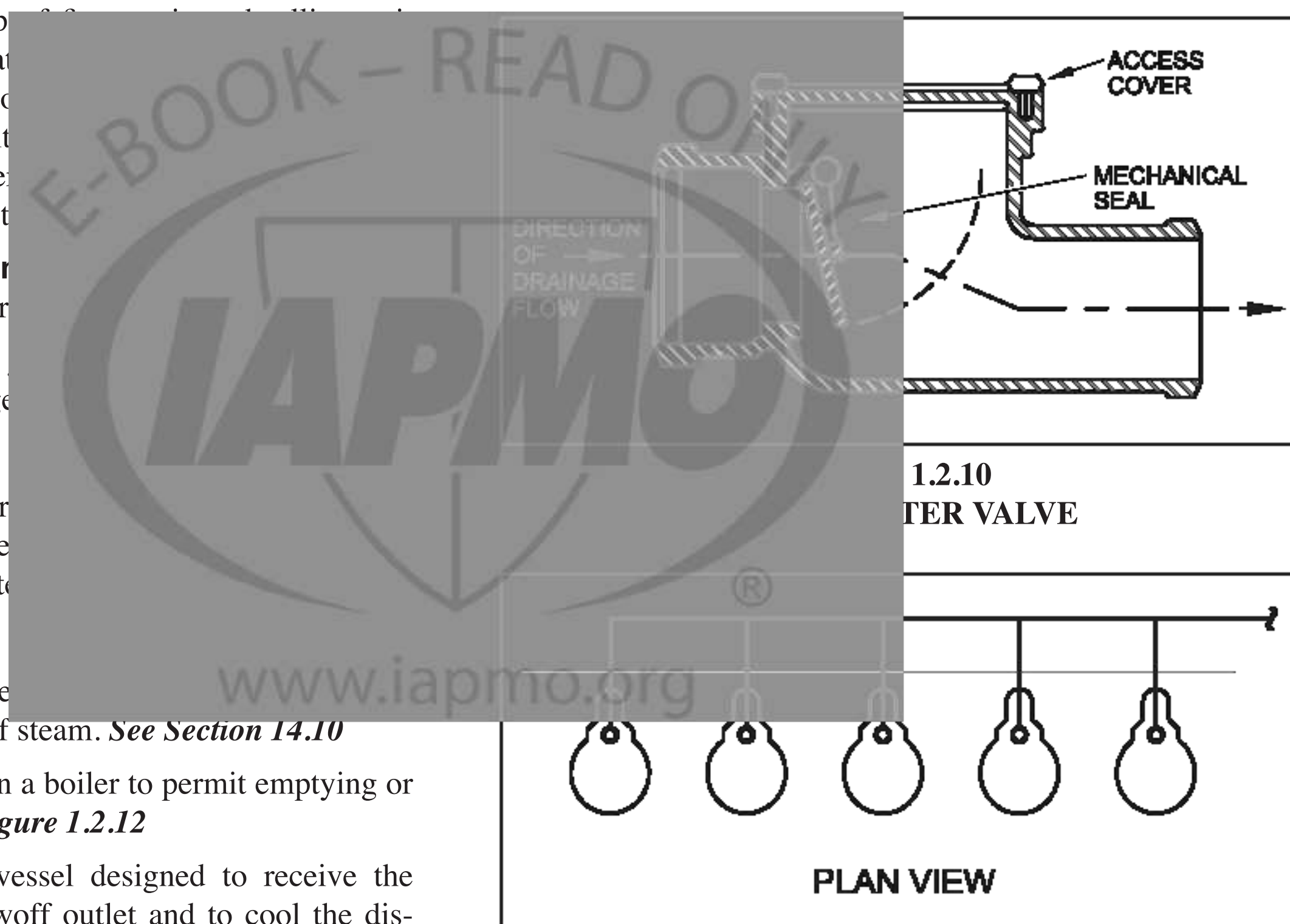


Figure 1.2.11
A BATTERY OF FIXTURES

Branch Interval: A distance along a vertical sanitary drain stack corresponding, in general, to a story height, but in no case less than 8 feet within which the horizontal branches from one floor or story of a building are connected to the stack. *See Figure 1.2.14*

Comment: Branch intervals are used to determine the potential drainage load on stacks for the purpose of sizing the stacks and providing pressure relief.

Branch Vent: See “Vent, Branch”

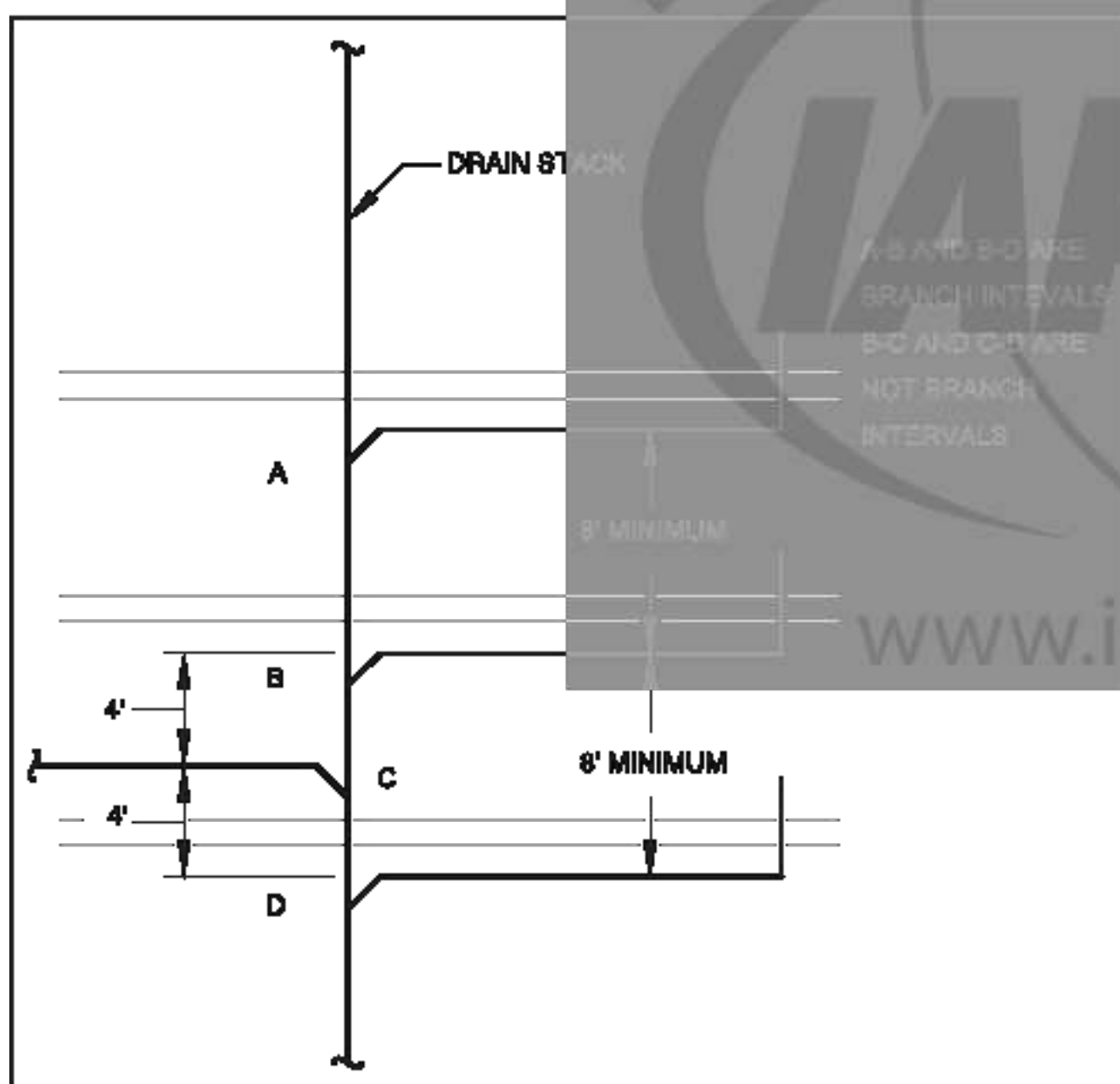
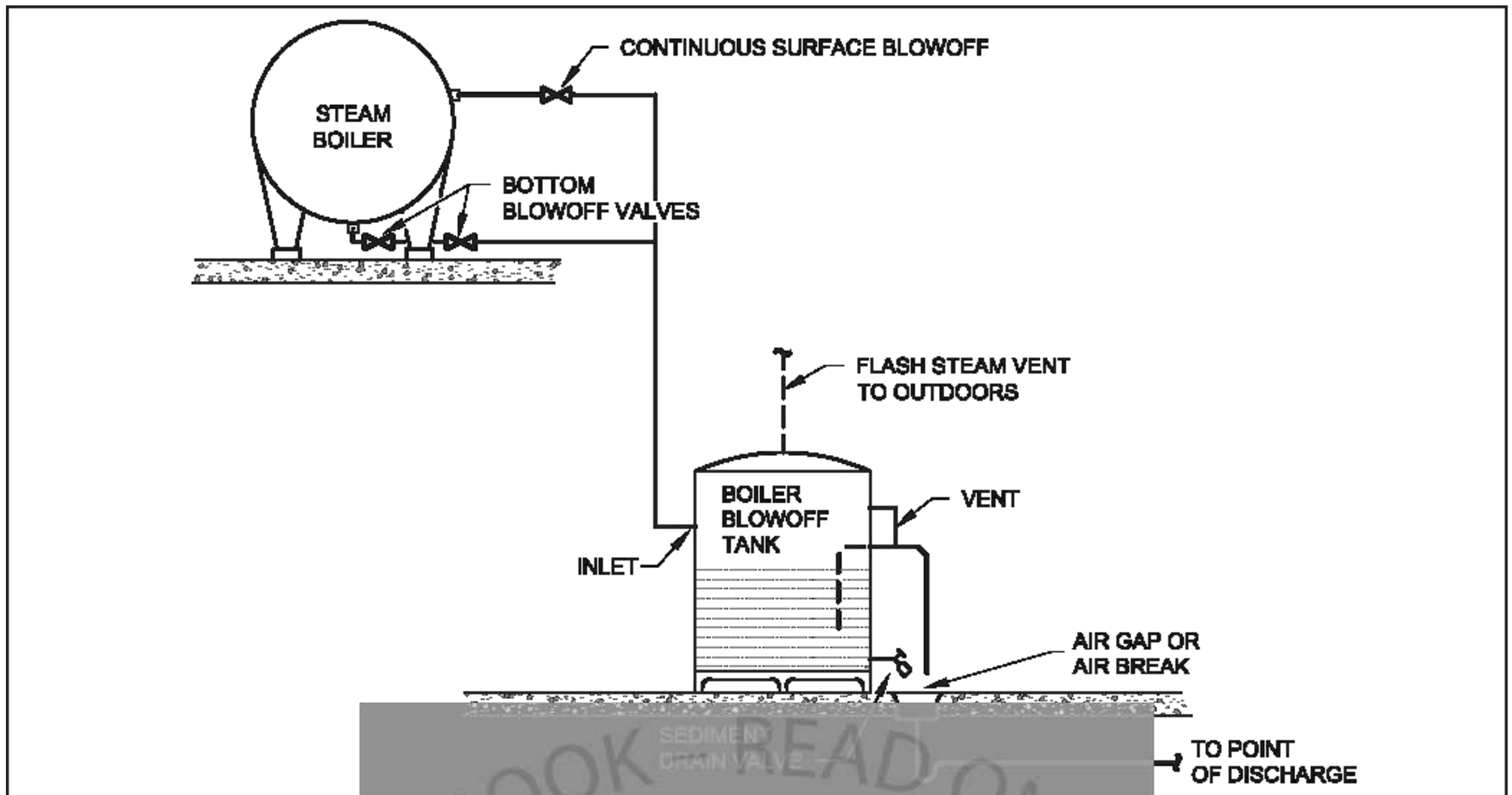


Figure 1.2.14
BRANCH INTERVALS

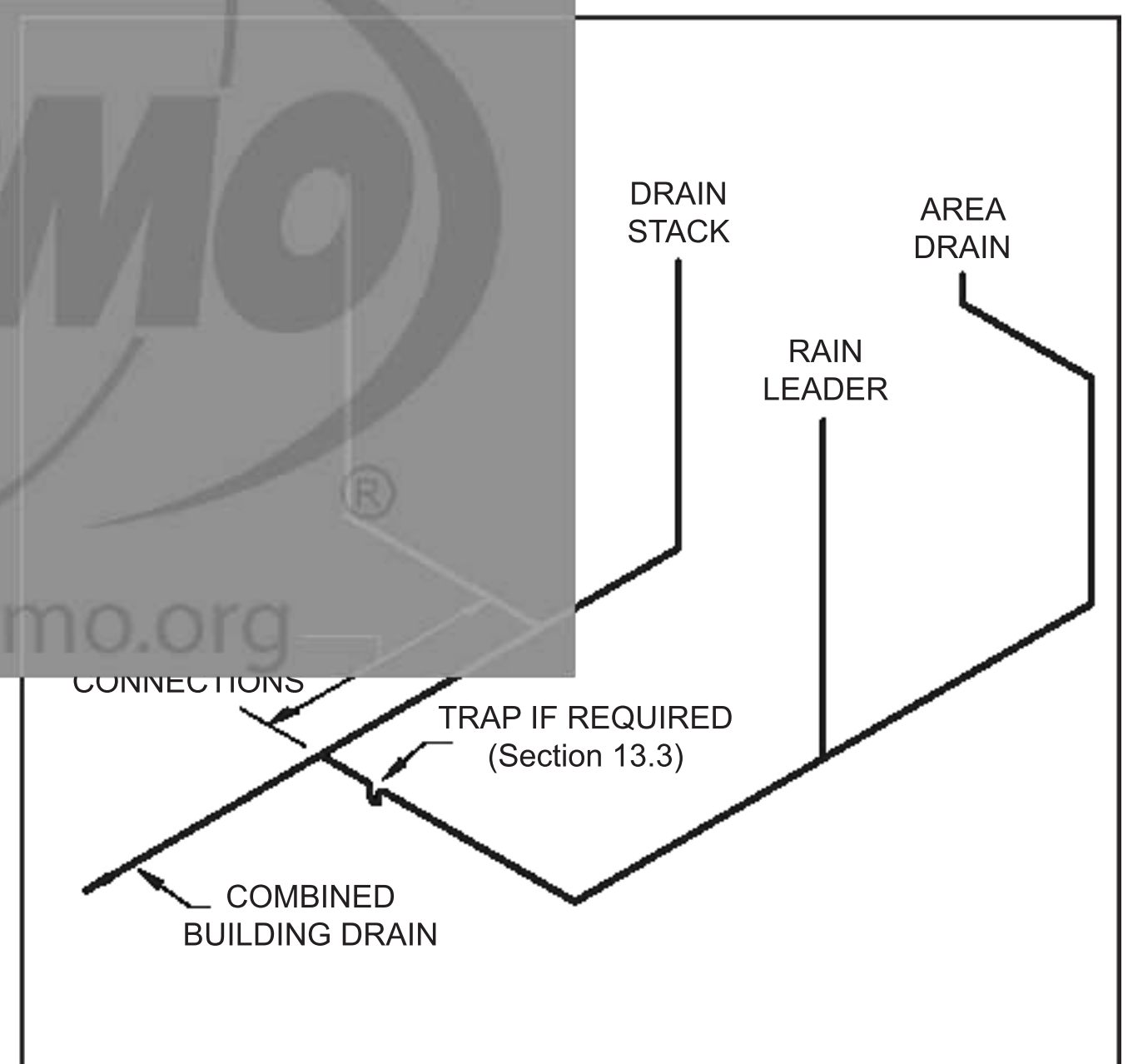


Figure 1.2.15
COMBINED BUILDING DRAINAGE SYSTEM

Building Classification: The arrangement for the designation of buildings according to occupancy based on the applicable building code.

Comment: The building classifications in Table 7.21.1 for the minimum number of required plumbing fixtures include assembly (A), business (B), education (E), factory (F), institutional (I), mercantile (M), residential (R), and storage (S).

Building Drain, Combined: A building drain that conveys both sewage and storm water. *See Figure 1.2.15*

Building Drain, Sanitary: The lowest piping in the building sanitary drainage system that receives the discharge from drain stacks, horizontal branch drains, and fixture drains within the building and conveys the sewage to the building sanitary sewer which begins three (3) feet beyond the outside face of the building. *See Figure 1.2.16*

DEFINITIONS

Building Drain, Storm: A building drain that conveys only storm water from the building to the building storm sewer which begins three (3) feet beyond the outside face of the building. *See Figure 1.2.16*

Building Sewer, Combined: A building sewer that conveys both sewage and storm water. *See Figure 1.2.15*

Building Sewer, Sanitary: That part of the building sanitary drainage system that extends from the end of the sanitary building drain and conveys the sewage to a public sewer, an in-dividual sewage disposal system, or other point of disposal. The building sanitary sewer begins at a point three (3) feet beyond the outside face of the building. It does not extend beyond any property lines if discharging to an off-site public sewer or off-site point of disposal. *See Figure 1.2.16*

Building Sewer, Storm: A building sewer that conveys only storm water from the building storm drain to a public storm sewer or other point of disposal. The building storm sewer begins at a point three (3) feet beyond the outside face of the building. It does not extend beyond any property lines if discharging to an off-site public sewer or off-site point of disposal. *See Figure 1.2.16*

Building Subdrain: That portion of a drainage system that does not drain by gravity into the building drain or building sewer. *See Figure 11.7.2*

Building Trap: A device, fitting, or assembly of fittings, installed in the building drain to prevent circulation of sewer gas between the building sewer and the drainage system in the building. *See Figure 1.2.18*

Comment: Building traps are currently installed only when required by the Authority Having Jurisdiction.

Cesspool: A lined and covered excavation in the ground that receives the discharge of domestic sewage or other organic wastes from a drainage system, so designed as to retain the organic matter and solids, but permitting the liquids to seep through the bottom and sides.

Comment: Chapter 16 does not permit cesspools or cess-pits, into which untreated sewage is discharged and allowed to seep into the ground. Chapter 16 requires septic tanks to retain the sewage until digested and absorption trenches or seepage pits for underground disposal of the effluent.

Chemical Dispensing System: Equipment that mixes potable water with chemicals to provide the user with a chemical solution that is diluted to a fixed or adjustable amount and is ready for use.

Chemical Waste: Includes industrial liquid waste, process waste, diluted and undiluted acid waste and corrosive and non-corrosive chemical liquid waste. *See Sections 2.10, 3.11, and 9.4*

Circuit Vent: See “Vent, Circuit” *See Figure 12.13.1*

Clear Water Waste: Effluent in which impurity levels are less than concentrations considered harmful by the Authority Having Jurisdiction, such as cooling water and condensate

drainage from refrigeration and air conditioning equipment, cooled condensate from steam heating systems, and residual water from ice making processes.

Comment: Refer to Section 9.1.8 for whether a clear water waste requires an air gap or an air break at its discharge into the drainage system.

Clinical Sink: A sink designed primarily to receive wastes from bedpans, having a flushing rim, integral trap with a visible trap seal, and having the same flushing and cleansing characteristics as a water closet. *See Section 14.8*

Combination Waste and Vent System: A designed system of waste piping embodying the horizontal wet venting of one or more sinks or floor drains by means of a common waste and vent pipe adequately sized to provide free movement of air above the flow line of the drain. *See Figure 1.2.20 and Section 12.17*

Comment 1: Combination waste and vent piping systems are permitted where conditions preclude the installation of a conventionally vented system. Such systems are frequently used in exhibition halls and other spaces where long clear spans are required without partitions or pipe chases.

Comment 2: Only floor drains, floor receptors, sinks, lavatories, and standpipes can be discharged into a combination waste and vent piping system.

Combined Building Drain: See “Building Drain, Combined”

Combined Building Sewer: See “Building Sewer, Combined”

Commercial Kitchen: One or more rooms in a building that is licensed to prepare food to be served for consumption or process food to be packaged for distribution.

Common Laundry Room: A laundry facility for personal use by multiple individuals in commercial buildings and buildings having more than two dwelling units.

Common Vent: See “Vent, Common”

Conductor: A pipe within a building that conveys storm water from a roof to its connection to a building storm drain or other point of disposal. *See Figure 1.2.21*

Comment: A vertical stormwater drain pipe on the exterior of a building is a leader.

Contamination (of Potable Water): The impairment of the quality of the potable water that creates a high hazard to the public health through poisoning or through the spread of disease by sewage, industrial fluids or waste. (Refer to the definition of “high hazard”).

Continuous Vent: See “Vent, Continuous”

Continuous Waste Piping: Drain piping from two or three adjacent lavatories or sinks that connects them to a single trap. *See Figures 1.2.22, 5.1-C, 5.1-D*

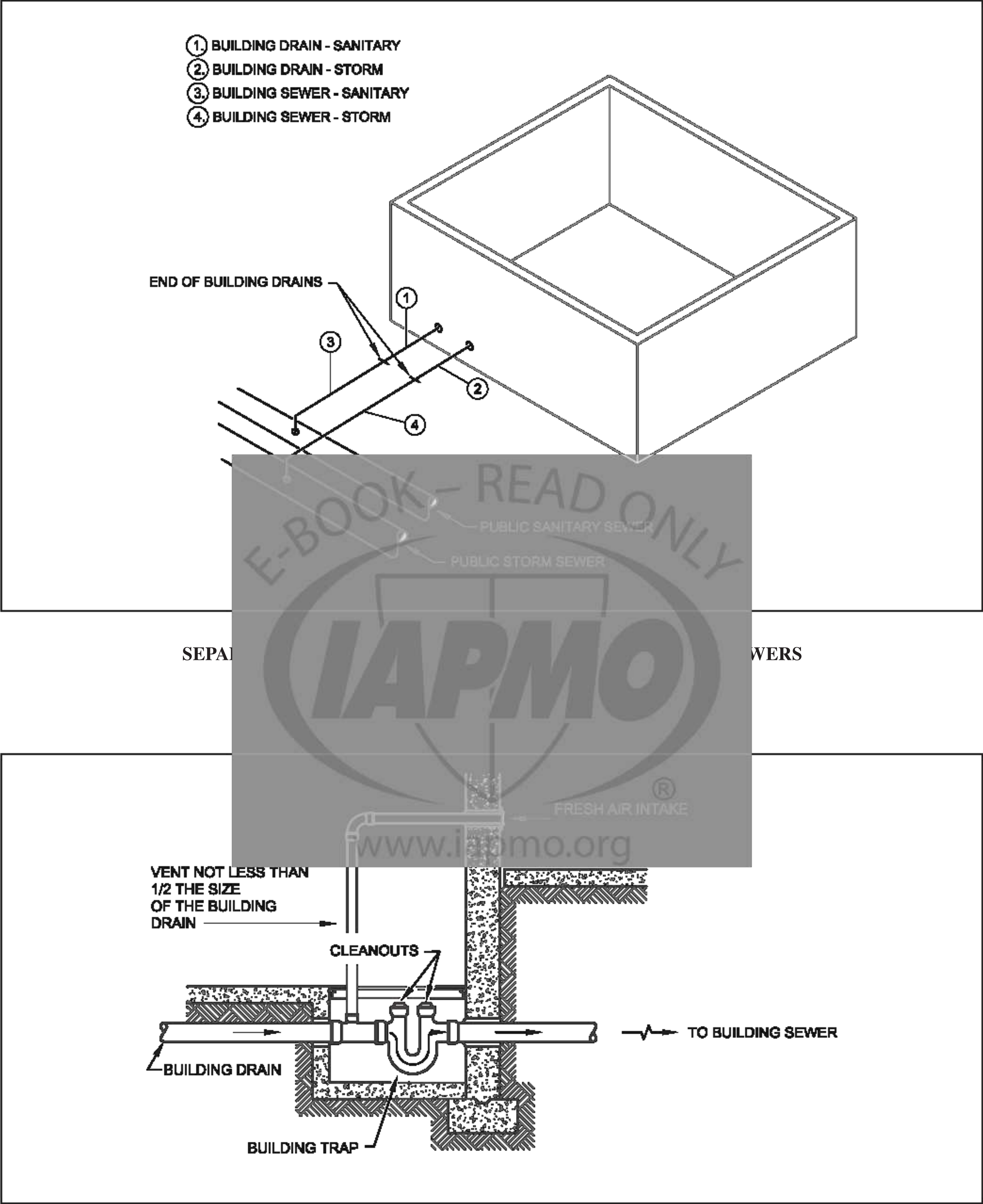


Figure 1.2.18
A BUILDING TRAP

DEFINITIONS

Comment: Continuous waste piping can connect up to three adjacent sinks or lavatories to a single trap if the fixture outlets are no more than 30" apart. See Section 5.1.

Continuous Water Pressure: With regard to the proper application of backflow preventers, continuous pressure is if they are normally subjected to continuous water supply pressure for periods of more than twelve (12) hours.

Critical Level: The marking on a backflow prevention device or vacuum breaker established by the manufacturer, and usually stamped on the device by the manufacturer, that determines the minimum elevation above the flood level rim of the fixture or receptor served at which the device must be installed. When a backflow prevention device does not bear a critical level marking, the bottom of the vacuum breaker, combination valve, or the bottom of any approved device constitutes its critical level. *See Figure 1.2.23 and Sections 10.5.5.b, c, and e*

Cross Connection: Any connection or arrangement between two otherwise separate piping systems, one of which contains potable water and the other either water of questionable safety, steam, gas, or chemical, whereby there may be a flow from one system to the other, the direction of flow depending on the pressure differential between the two systems. (See "Backflow and Backsiphonage"). *See Figures 1.2.8 and 1.2.9*

Comment: The backflow of contamination into a potable water system through a cross connection can occur by backsiphonage caused by the water system or backpressure from the source of contamination.

Crown Venting: Where the distance between the opening of the vent pipe for a fixture is less than two (2) drain pipe diameters from the crown weir of the trap. *See Figures 1.2.62 and 5.3.5*

CTS: An abbreviation for "copper tube size".

Dead End: Inactive drain or vent piping that does not perform a function in the plumbing system.

Developed Length of Piping: The length of a pipe line measured along the center line of the piping and its fittings. Where pipe sizing tables are based on only the developed length of pipe, verify that there has been an allowance for an equivalent pipe length of the fittings.

DFU: See "Fixture Unit (Drainage – DFU)"

DIPS: An abbreviation for "ductile iron pipe size".

Domestic Sewage: Sanitary sewage from assembly, business, educational, institutional, mercantile, and residential facilities. Not industrial or storm water drainage.

Double Check Valve Assembly: A backflow prevention device consisting of two independently acting check valves, internally force loaded to a normally closed position between two tightly closing shut-off valves, and with means of testing for tightness. *See Figure 1.2.25*

Double Offset: See "Offset, Double"

DR: An abbreviation for the "dimension ratio" of OD controlled plastic pipe that is based on the ratio of the outside diameter of the pipe divided by its minimum wall thickness. Lower DR ratings of the same pipe design and material have higher pressure ratings.

Comment: DR equals SDR for the same pipe material composition (designation code) with the same outside diameter and minimum wall thickness. The terms are used interchangeably depending on the pipe manufacturer or standards organization. Pipes of the same material composition with the same DR and SDR have the same pressure ratings regardless of pipe size.

Drain Stack: Vertical drain piping, with or without offsets, that conveys drainage from horizontal drain piping to a lower floor elevation. Drain stacks do not include vertical drain piping from an individual fixture, a wet vented water closet, or a bathroom group that is not more than one story height. Drain stacks require a stack vent.

Dry Vent: See "Vent, Dry"

Dry Well: See "Leaching Well"

Dual Vent: See "Vent, Common"

Dwelling Unit, Multiple: A room, or group of rooms, forming a single habitable unit with facilities that are used, or intended to be used, for living, sleeping, cooking, and eating. Its sewer connections and water supply, within its own premise, are shared with one or more other dwelling units. Multiple dwelling units include apartments, condominiums, and hotel and motel guest rooms.

Dwelling Unit, Single: Rooms forming a single habitable unit with facilities that are used, or intended to be used, for living, sleeping, cooking, and eating. Its sewer connections and water supply are, within its own premise, separate from and completely independent of any other dwelling unit.

DWV: An abbreviation for "drain-waste-vent" referring to sanitary drainage, waste, and venting systems. The term is equivalent to "soil-waste-vent" (SWV).

Effective Opening: The cross-sectional area at the point of water supply discharge, measured or expressed in terms of (1) diameter of a circle, or (2) if the opening is not circular, the diameter of a circle of equivalent cross-sectional area. *See Figures 1.2.26*

Comment: The required air gap distance for a water supply outlet is based on its effective opening. The air gap must be increased if the outlet is near a wall or other vertical surface. Refer to Table 10.5.2 for minimum air gaps for plumbing fixtures.

Equivalent Length of Fittings and Valves: The equivalent length of straight pipe that would produce the same resistance to flow as a specific fitting or valve of the same pipe size.

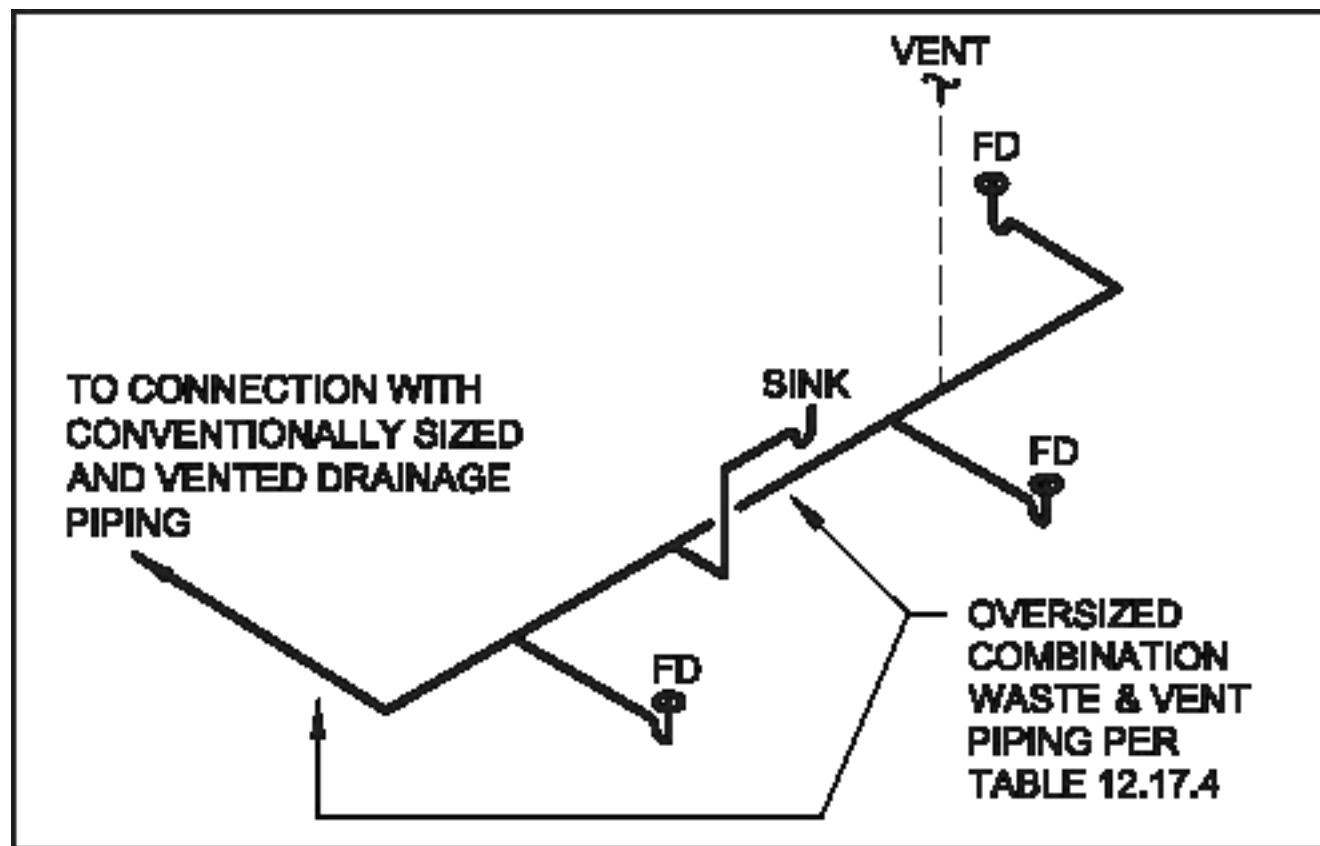


Figure 1.2.20
COMBINATION WASTE AND VENT PIPING

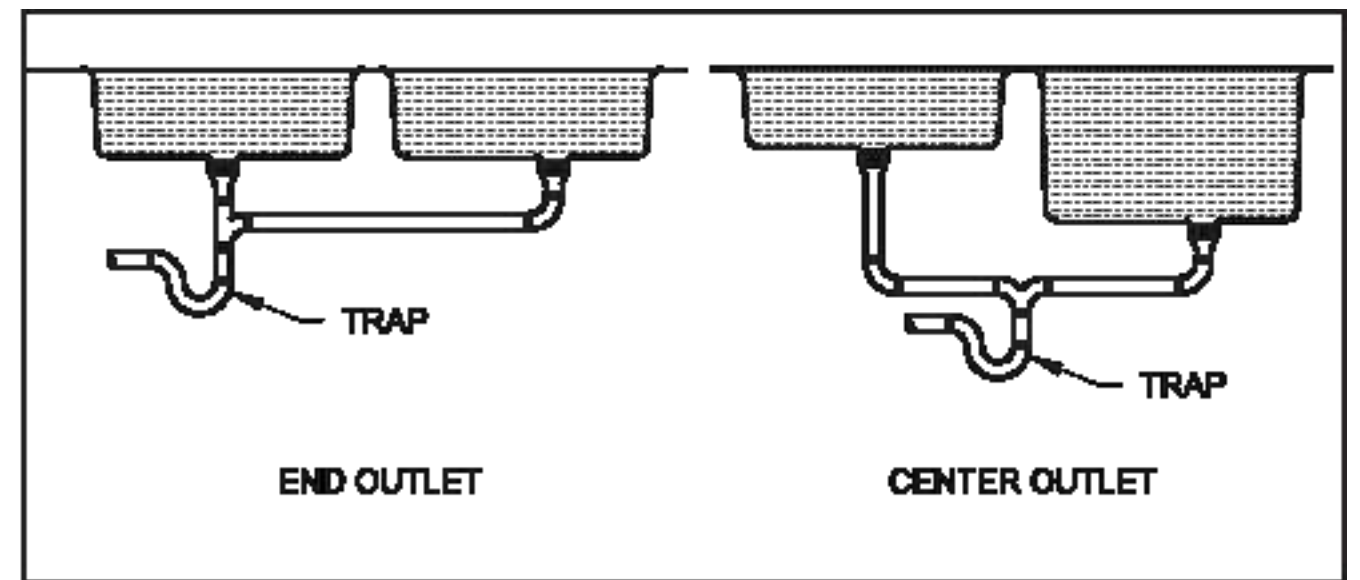


Figure 1.2.22
CONTINUOUS WASTE PIPING

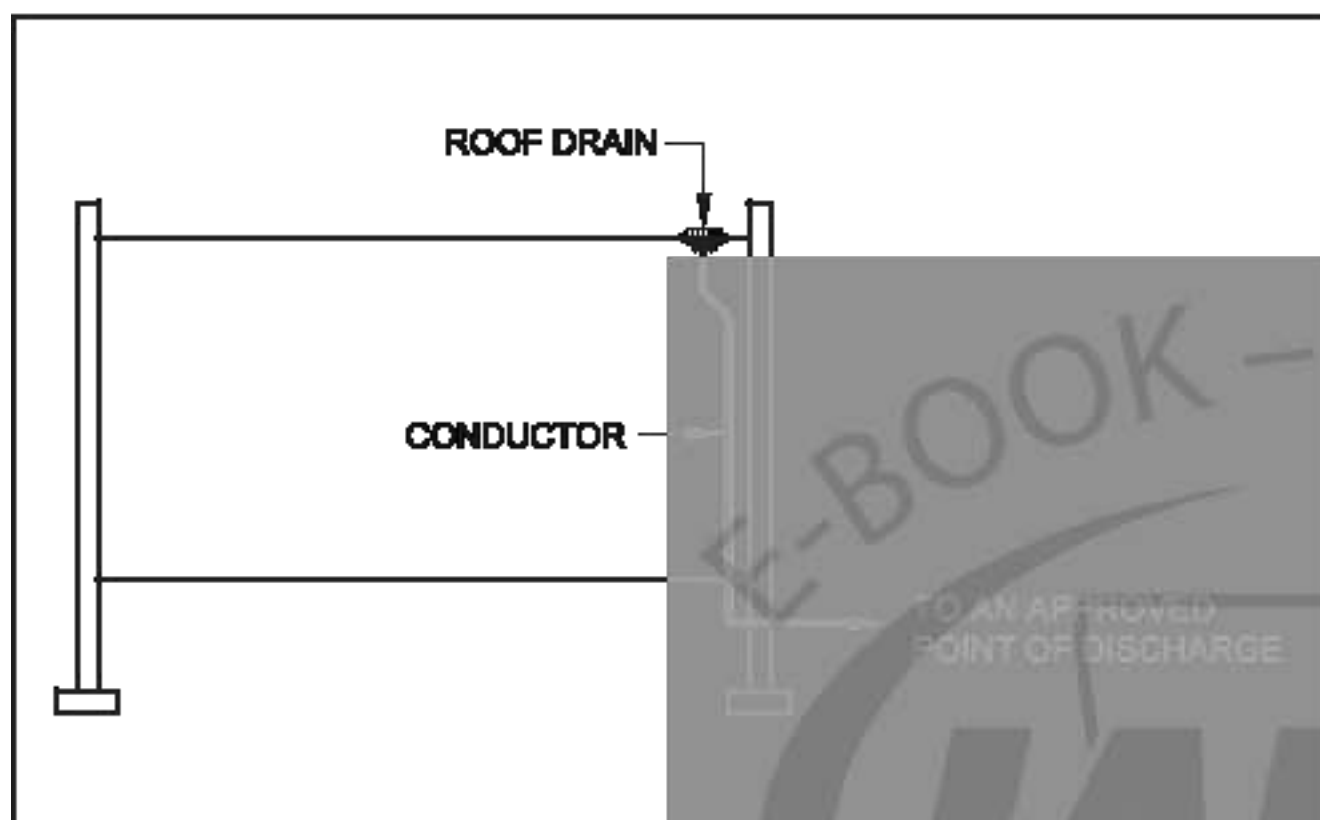


Figure 1.2.21
A STORMWATER

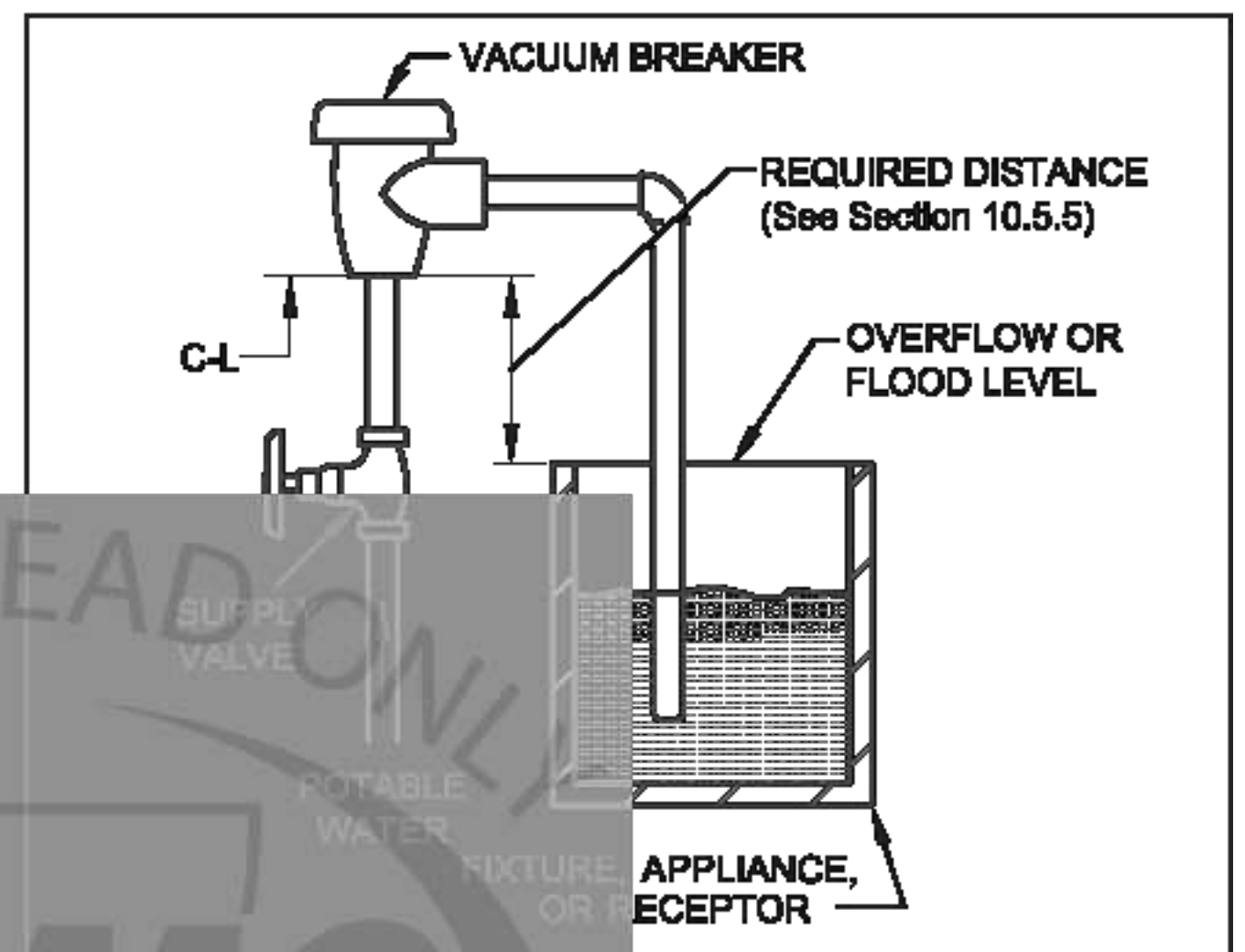


Figure 1.2.23
LEVEL (C-L) OF A
BREAKER

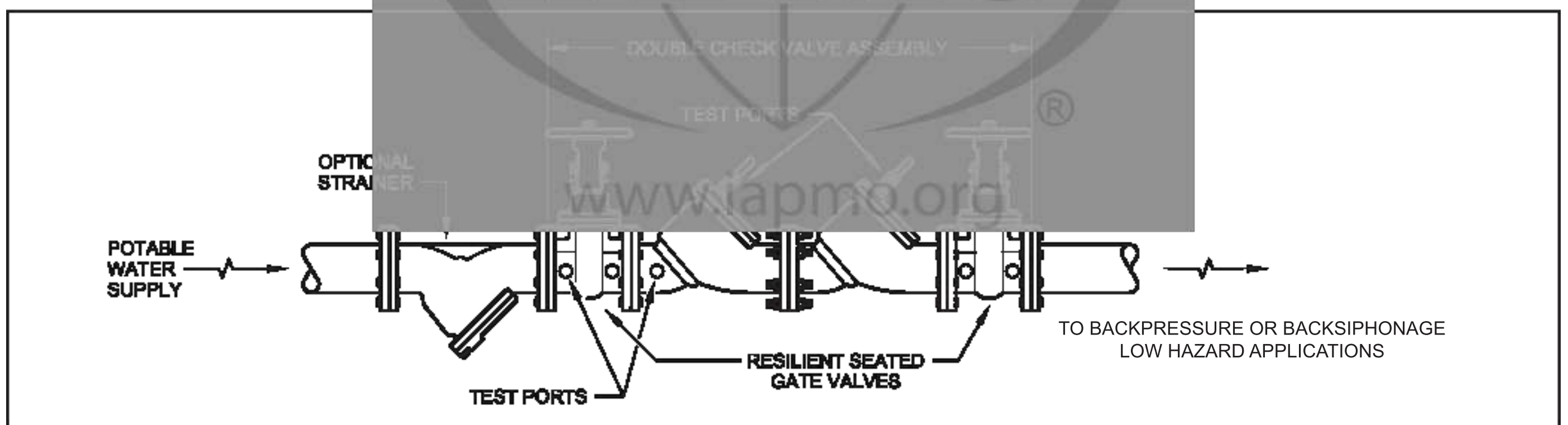


Figure 1.2.25
A DOUBLE CHECK VALVE ASSEMBLY

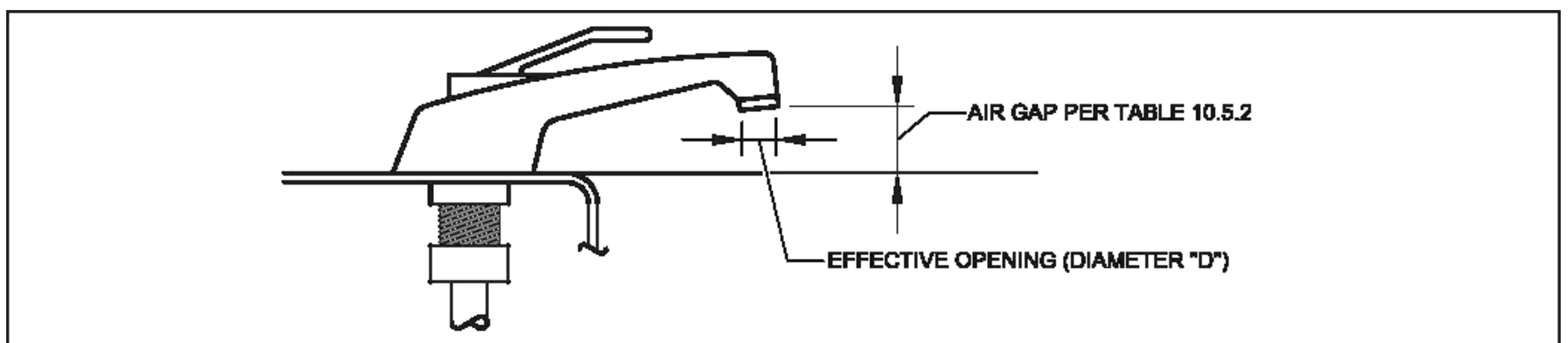


Figure 1.2.26
THE EFFECTIVE OPENING OF A POTABLE WATER OUTLET

DEFINITIONS

Equivalent Length of Pipe, Fittings, and Valves or Total Equivalent Length: The sum of the developed lengths of piping in a pipe line and the equivalent lengths of the fittings and valves in that line.

Existing Plumbing System: A plumbing system, or any part thereof, that has been installed, was complete, and accepted by the Authority Having Jurisdiction for the adopted edition of the plumbing code under which its permit was issued.

Fixture: See “Plumbing Fixture”

Fixture Branch Drain: A branch drain that receives the discharge from two or more fixture drains.

Comment: See Table 11.5.1B for the maximum number of drainage fixture units (DFU) permitted on each size of horizontal fixture branch.

Fixture Drain: The drain from the trap of a fixture to the junction of that drain with any other drain pipe.

Fixture Supply Branch: A branch of the water distribution system supplying one fixture. *See Figure 1.2.29*

Comment: See Table 10.14.2A for minimum fixture supply branch pipe sizes for various fixtures.

Fixture Unit (Drainage - DFU): An index number that represents the load of a fixture on the drainage system so that the load of various fixtures in various applications can be combined. The value is based on the volume or volume rate of drainage discharge from the fixture, the time duration of that discharge, and the average time between successive uses of the fixture. *See Table 11.4.1*

Fixture Unit (Water Supply - WSFU): An index number that represents the load of a fixture on the water supply system so that the load of various fixtures in various applications can be combined. The value is based on the volume rate of supply for the fixture, the time duration of a single supply operation, and the average time between successive uses of the fixture. *See Table 10.14.2A. Also Tables B.5.2 and B.5.3.*

Flexible Water Connector: A connector under continuous pressure in an accessible location that connects a supply fitting, faucet, dishwasher, clothes washer, water heater, water treatment unit, or other fixture or equipment to a stop valve or its water supply branch pipe.

Flood Level Rim: The edge of the receptor or fixture over which water flows if the fixture is flooded. *See Figure 1.2.30*

Flow Pressure: The pressure in the water supply pipe near the faucet or water outlet while the faucet or water outlet is fully open and flowing. *See Figure 1.2.31*

Comment: The minimum required flowing water pressure for most fixtures and appliances is 15 psig. Blowout water closets and blowout urinals require 25 psig minimum. Some one-piece water closets require 30 psig minimum and 1/2” supply tubes

Flush Pipes and Fittings: The pipe and fittings that connect a flushometer valve or elevated flush tank to a water closet, urinal, or bedpan washer.

Flushing Type Floor Drain: A floor drain that is equipped with an integral water supply connection, enabling flushing of the drain trap. *See Figure 1.2.32*

Comment: The water supply to flushing floor drains must be protected from backflow.

Flush Valve: A device located in a water closet flush tank for flushing water closets and similar fixtures. *See Figure 1.2.33*

Flushometer Tank: A water closet flush tank that uses an air accumulator vessel to discharge a predetermined quantity of water into the closet bowl for flushing purposes. *See Figure 1.2.34*

Comment: Flushometer tanks are pressure-assisted flush tanks that store water for flushing water closets at the inlet water supply pressure, as opposed to gravity tanks. The discharge rate from flushometer tanks is approximately 35 gallons per minute.

Flushometer Valve: A device that discharges a predetermined quantity of water to fixtures for flushing and is closed by direct water pressure or other means. *See Figure 1.2.35*

Comment: Flushometer valves are typically used on public water closets and public urinals. They can be manually operated or electronically operated.

FOG: The abbreviation for fats, oil, and grease in the waste drainage from food handling facilities.

Force Main: A main that delivers waste water under pressure from a sewage ejector or pump to its destination.

Foundation Drain: A drainage system installed near the footings under foundation walls to drain ground water away from the foundation walls to prevent water leakage into building spaces below grade.

Full-way valve: Full-way valves include gate valves, full port ball valves, and other valves that are identified by their manufacturer as full port or full bore.

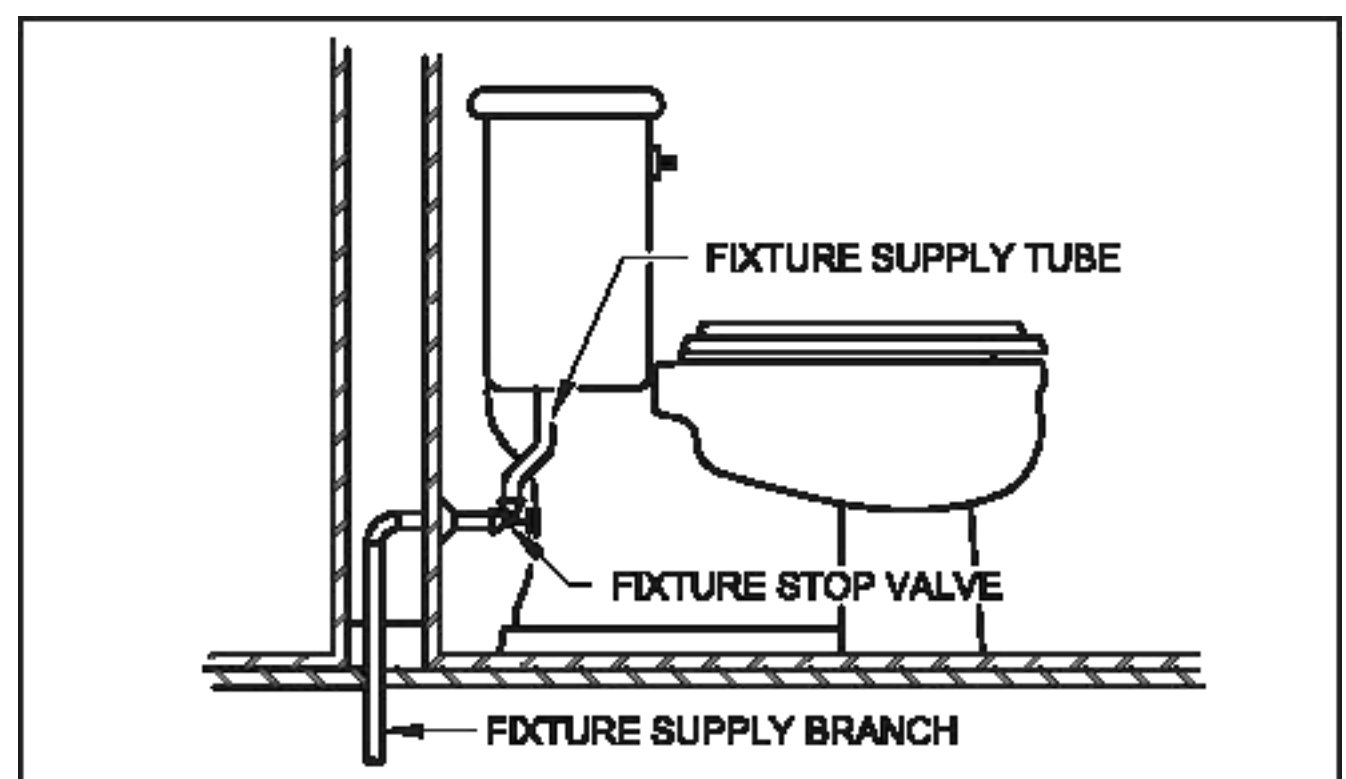


Figure 1.2.29
A FIXTURE SUPPLY BRANCH AND
FIXTURE SUPPLY TUBE

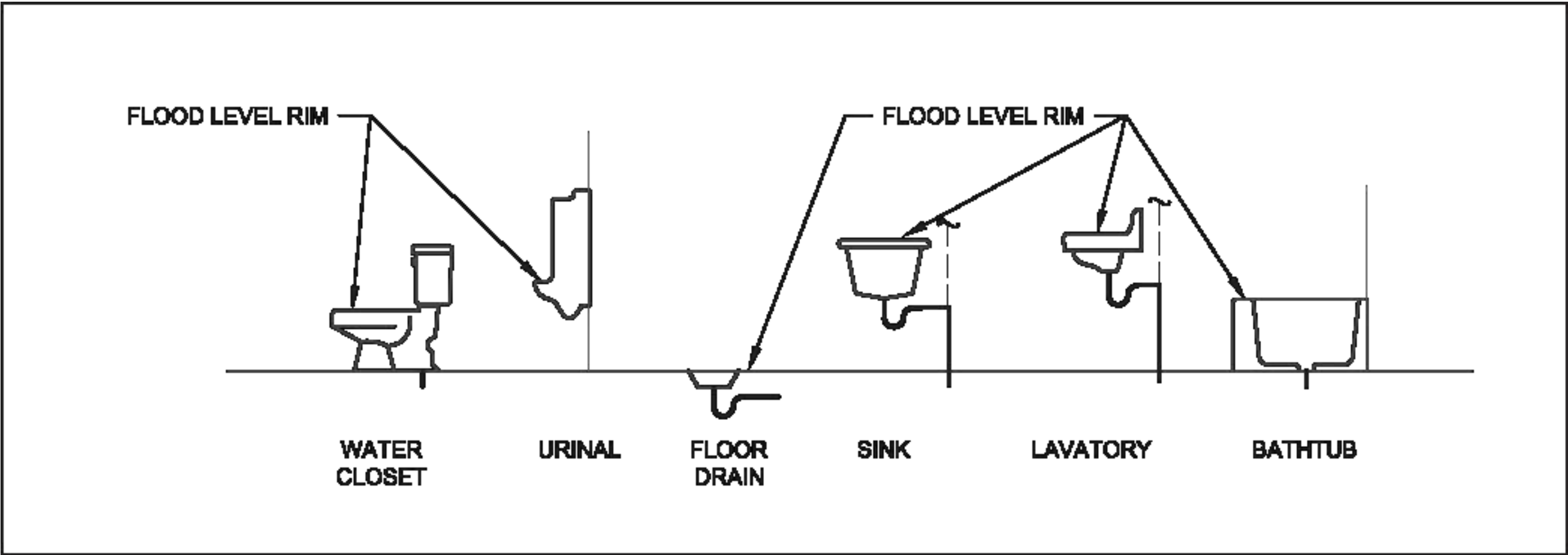
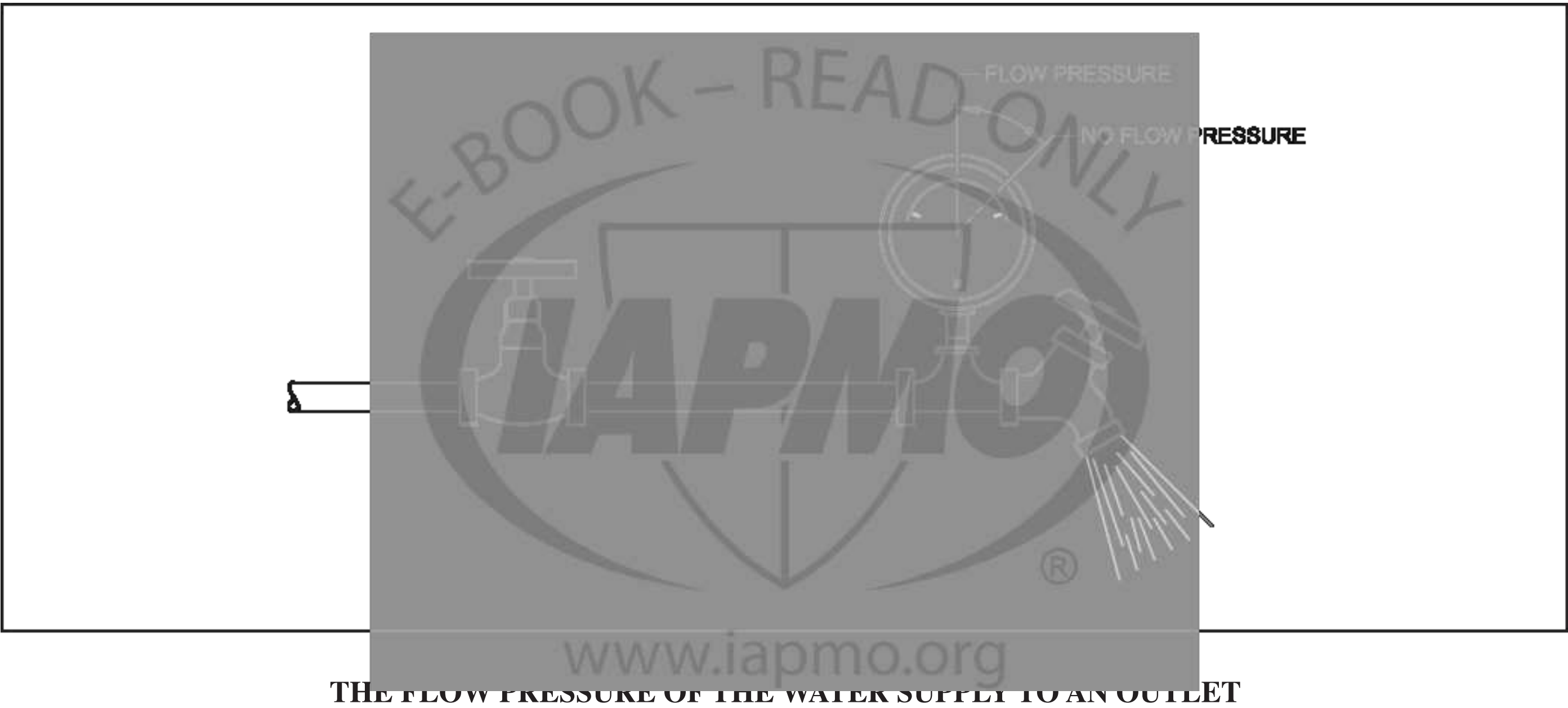


Figure 1.2.30
THE FLOOD LEVEL RIM OF FIXTURES



THE FLOW PRESSURE OF THE WATER SUPPLY TO AN OUTLET

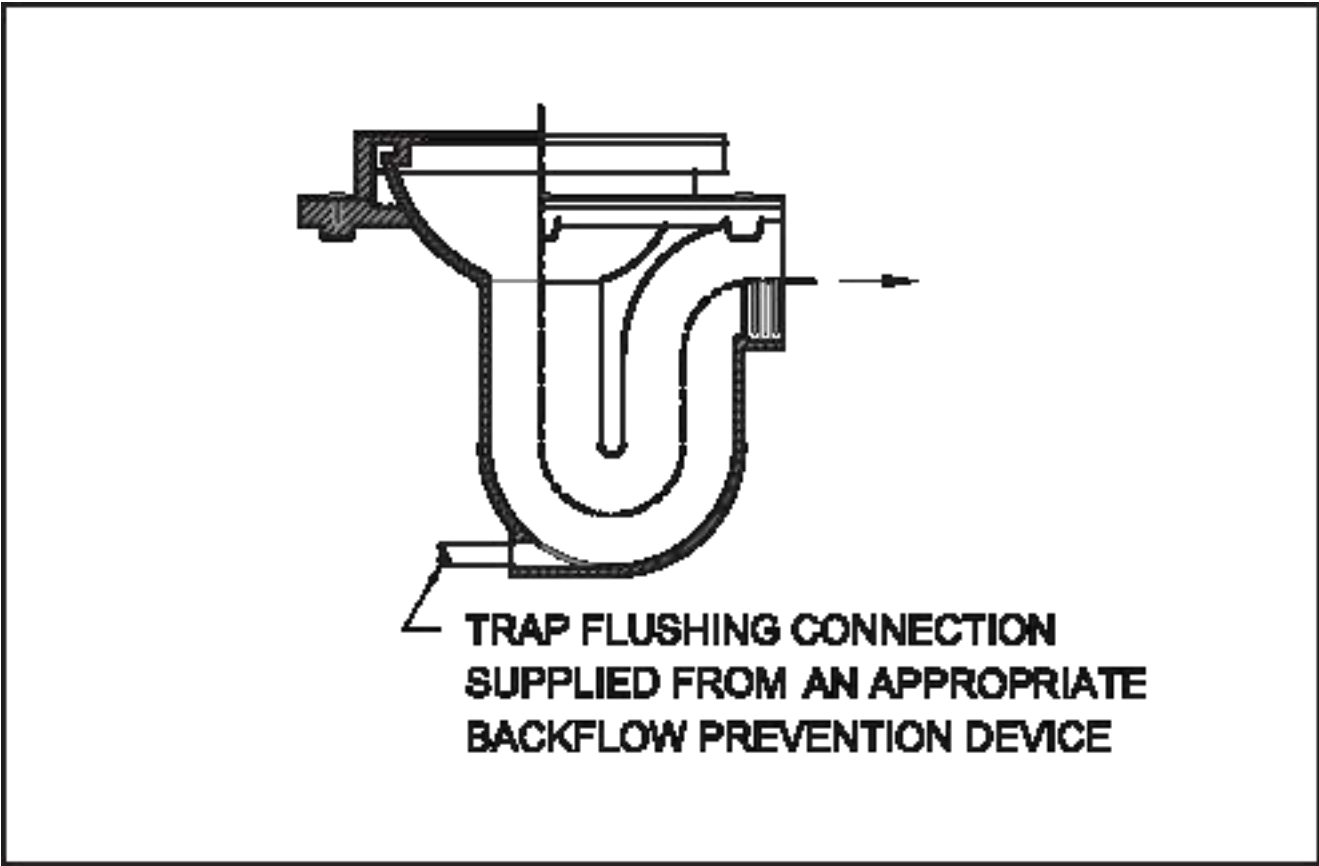


Figure 1.2.32
A FLUSHING TYPE FLOOR DRAIN

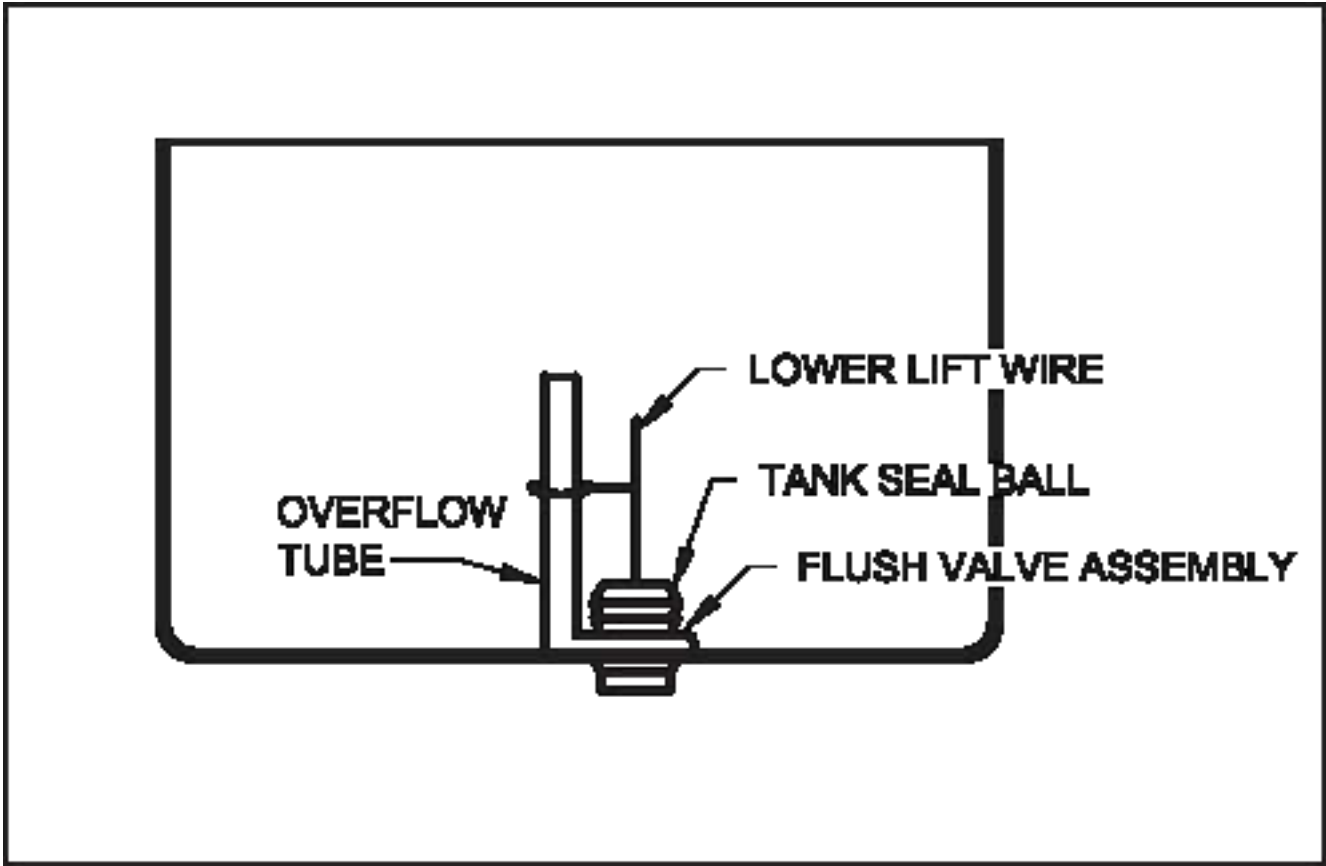


Figure 1.2.33
A FLUSH VALVE IN A WATER CLOSET FLUSH TANK

DEFINITIONS

GGI: The abbreviation for “gravity grease interceptor”.

GPF: The abbreviation for the rated “gallons per flush” for water closets and urinals.

Grade: The fall (slope) of a line of pipe in reference to a horizontal plane. *See Figure 1.2.36*

Comment: See Table 11.5.1A for sizing sloping building drains, branches of the building drain, and building sewers. See Table 13.6.2 for sizing sloping stormwater drains.

Graywater: Wastewater from lavatories, bathtubs, showers, and clothes washers that is collected and stored for use as non-potable water in the same facility.

Grease Interceptor: A plumbing appurtenance that is installed in the sanitary drainage system to intercept oily and greasy wastes from wastewater discharges typically in commercial kitchens and food processing plants. Such equipment has the ability to intercept commonly occurring free-floating fats and oils.

Grease Removal Device

tenance that is installed in the sanitary drainage system to intercept and remove free-floating oils and greases from wastewater discharges typically in commercial kitchens and food processing plants. Such equipment has the ability to intercept commonly occurring free-floating fats and oils on an automatic or event-controlled basis and intercept the entire range of commonly occurring oils and greases automatically without the need for manual intervention except for maintenance. The device is designed to be water-free, which allows for recirculation of the water.

Grease Trap: See “Interceptor”.

GRD: The abbreviation for “gravity grease interceptor”.

Grinder Pump: A pump for solids in the sewage that it pumps.

Ground Water: Subsurface water in saturation.

Confined ground water - a body of ground water overlaid by material sufficiently impervious to prevent free hydraulic connection with overlying ground water.

Free ground water - ground water in the zone of saturation extending down to the first impervious barrier.

Half-Bath: A room that contains one water closet and one lavatory within a dwelling unit.

Harvested Rainwater: Rainwater from the roof of a building that is collected and stored for use as non-potable water in the same facility.

HGI: The abbreviation for “hydromechanical grease interceptor”.

High Hazard: A condition in the plumbing system that could contaminate the supply and distribution of potable water if not protected by the necessary backflow prevention.

Horizontal Battery-Vented Drain: A horizontal drain that connects battery-vented fixtures to a drain stack, the building drain, or a branch of the building drain.

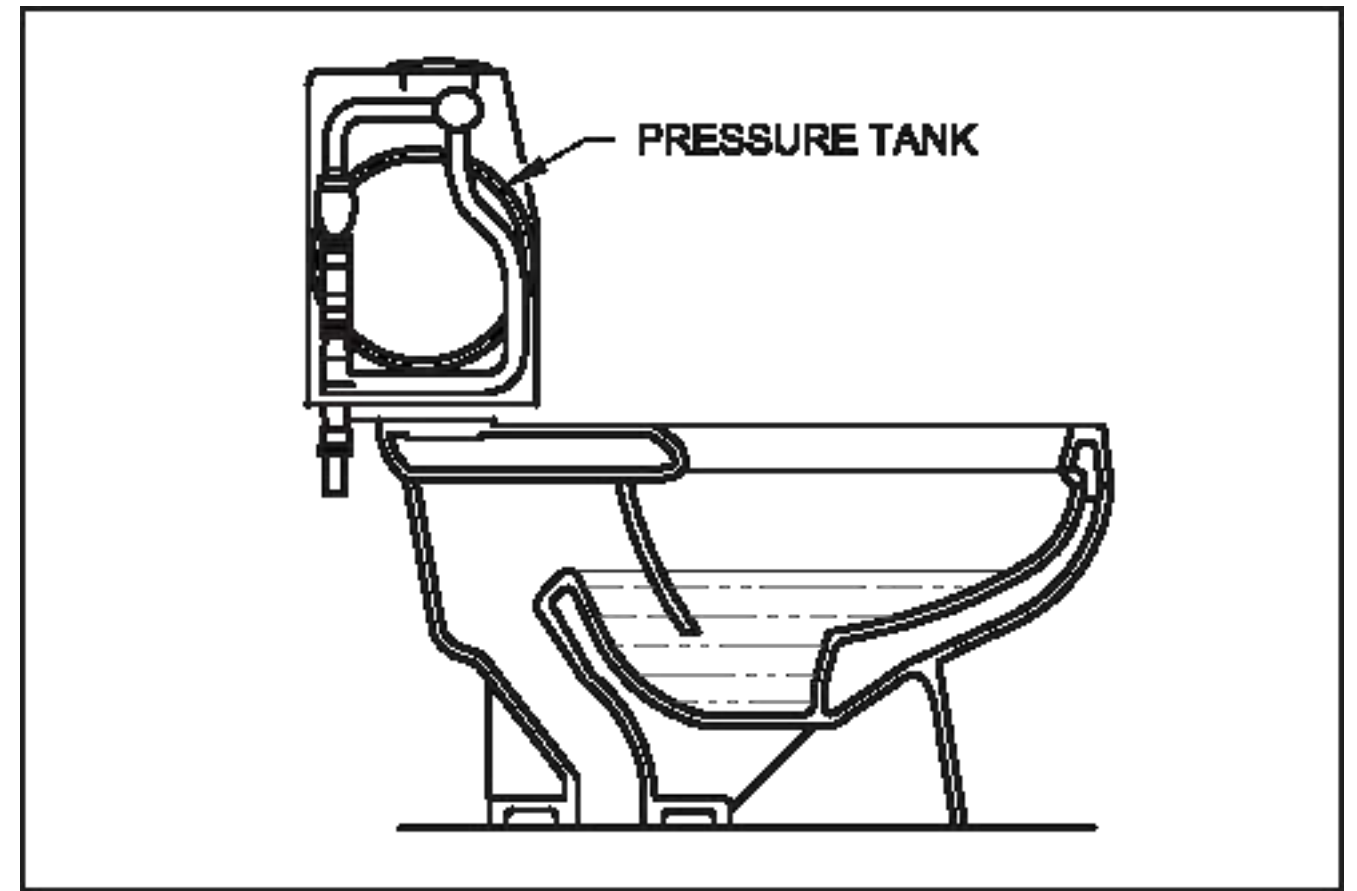


FIGURE 1.2.34
A PRESSURE-ASSISTED WATER CLOSET WITH A FLUSHOMETER TANK



1.2.35
FLUSHOMETER VALVE

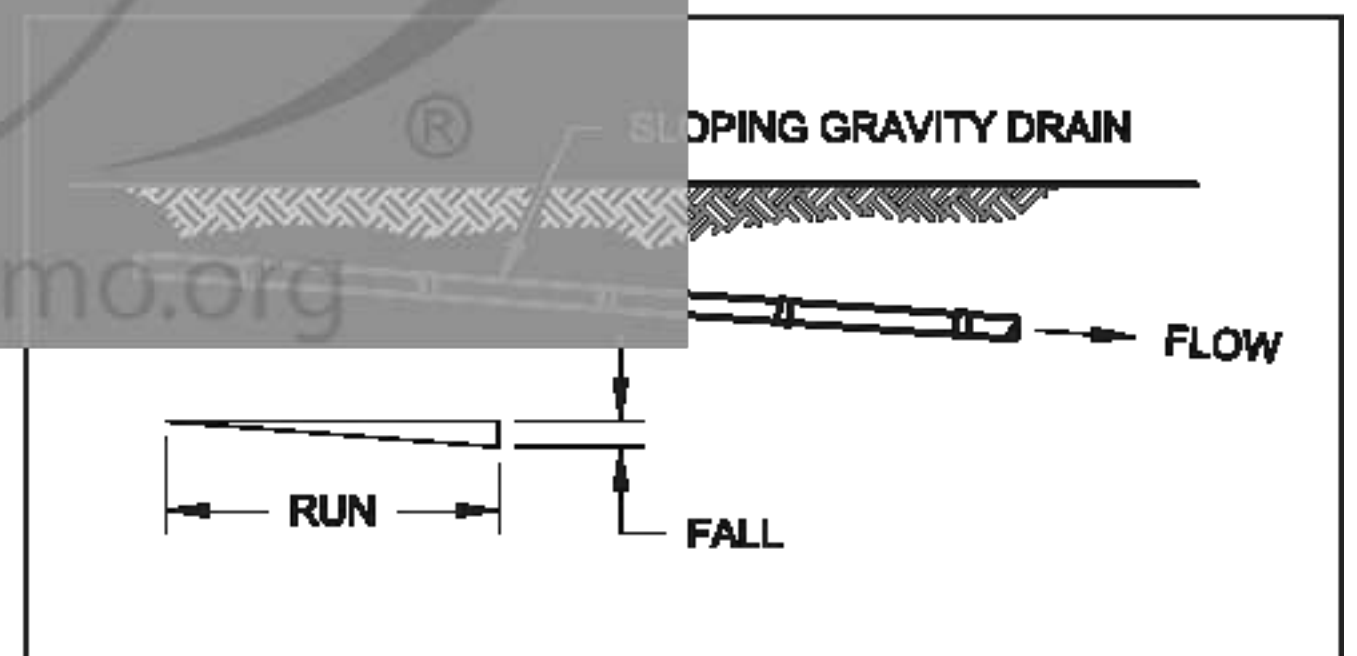


Figure 1.2.36
GRADE ON A SLOPING GRAVITY DRAIN

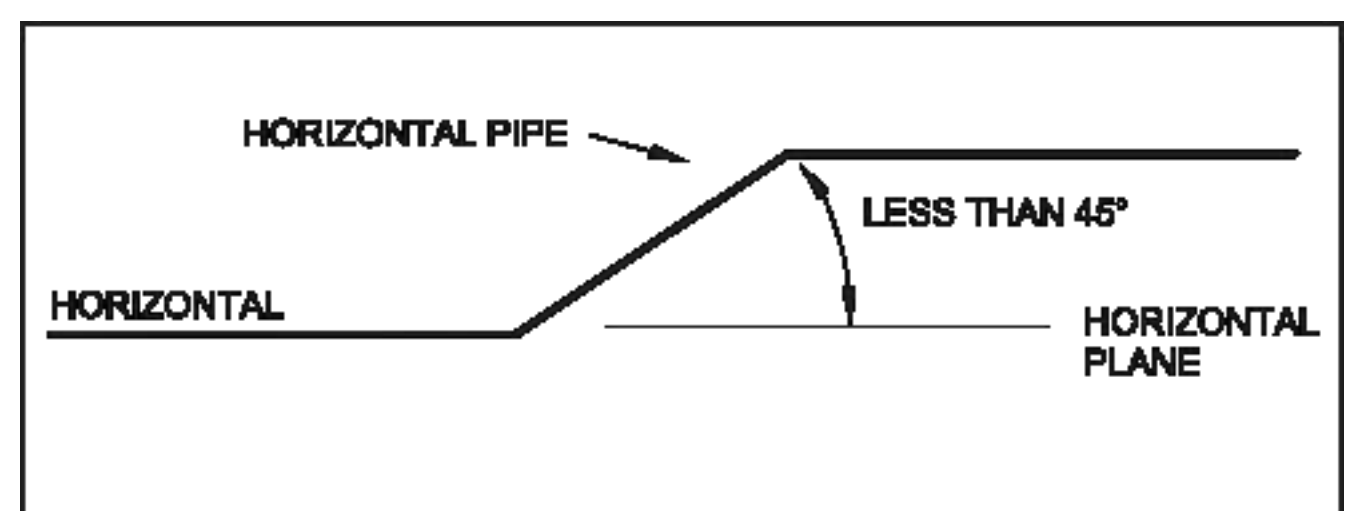


Figure 1.2.37
THE DEFINITION OF “HORIZONTAL PIPE”

Horizontal Branch Drain: Horizontal drain piping, with or without offsets, that receives the discharge from two or more fixture drains and conveys the drainage to the building drain or a branch of the building drain. Horizontal branch drains do not connect to drain stacks.

Horizontal Fixture Branch: Horizontal drain piping, with or without offsets, that receives the discharge from two or more fixture drains and conveys the drainage to a vertical drain stack with the reduced allowable DFU loading for the branch as indicated in Table 11.5.1B.

Comment: The reduced DFU loading for the branch is to prevent the branch flow from impacting the flow in the stack, causing turbulence in the stack and restricted flow in the branch.

Horizontal Pipe: Any pipe or fitting that makes an angle of less than 45° with the horizontal. *See Figure 1.2.37*

Comment: The sizing of offsets in drain stacks varies depending on whether the offset is horizontal or vertical. See Section 11.6.

Hot Water: Potable water that is used for bathing, washing, cleaning, and maintenance.

IDR: An abbreviation for the International Drainage and Waste Pipe Institute. It is a controlled plastic pipe that is 1/2 inch in diameter of the pipe divided by the minimum wall thickness. Lower IDR ratings of the same material indicate higher pressure ratings.

Comment: IDR equals SIDR (Standard Interchangeable Drainage Rating) composition (designation of material, diameter and minimum wall thickness) interchangeably depending on the standards organization. Pipe with the same composition with the same IDR rating has the same pressure ratings regardless of the material.

Indirect Connection (Waste): The introduction of waste into the drainage system by means of an air gap or air break.

Indirect Waste Pipe: A waste pipe that does not connect directly with the drainage system, but which discharges into the drainage system through an air break or air gap into a trap, fixture, receptor or interceptor. *See Figure 1.2.38*

Individual Vent: See “Vent, Individual”

Industrial Wastes: Liquid or liquid-borne wastes resulting from the processes employed in industrial and commercial establishments.

Comment: Industrial wastes must not be discharged into public sewers if they will damage the sewer or interfere with the operation of the sewage treatment plant.

Interceptor: A device designed and installed so as to separate and retain deleterious, hazardous, or undesirable

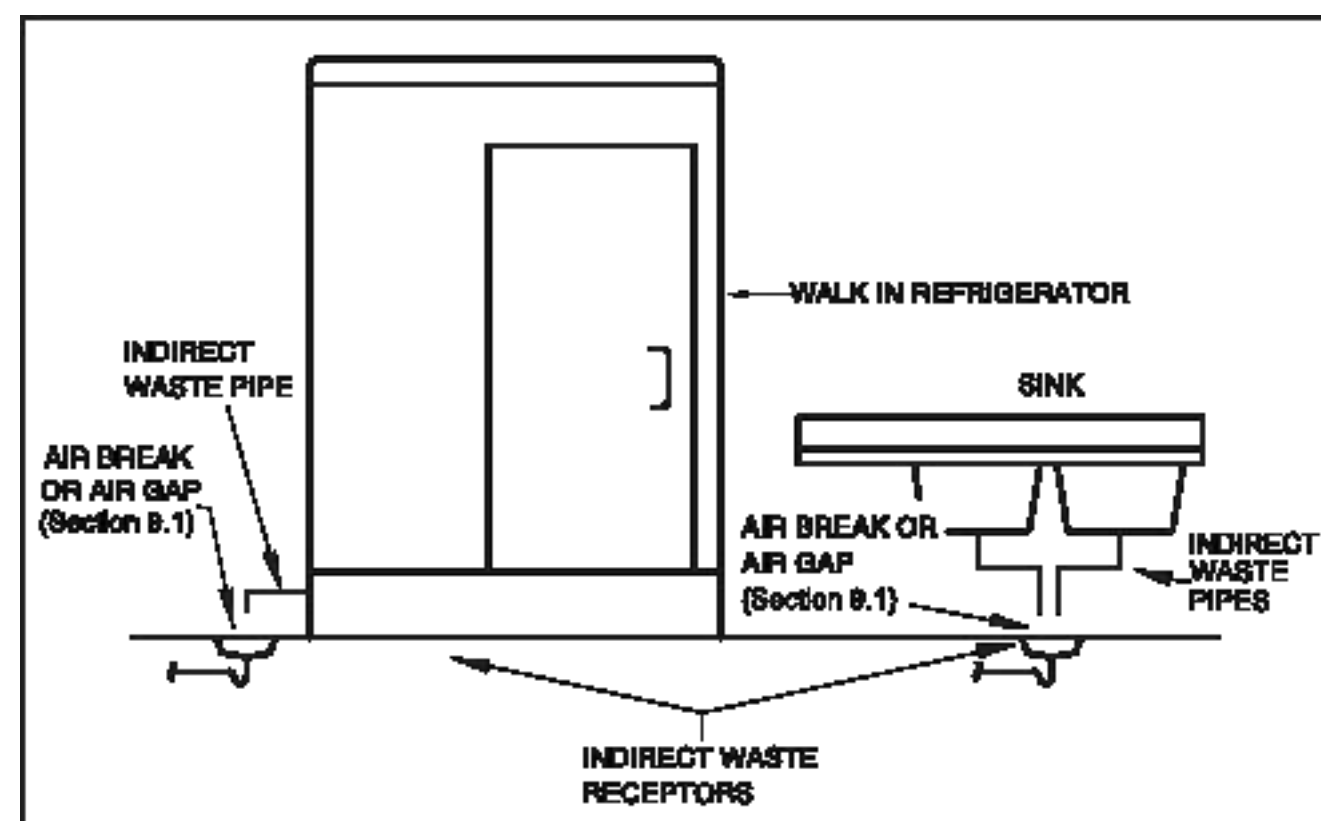
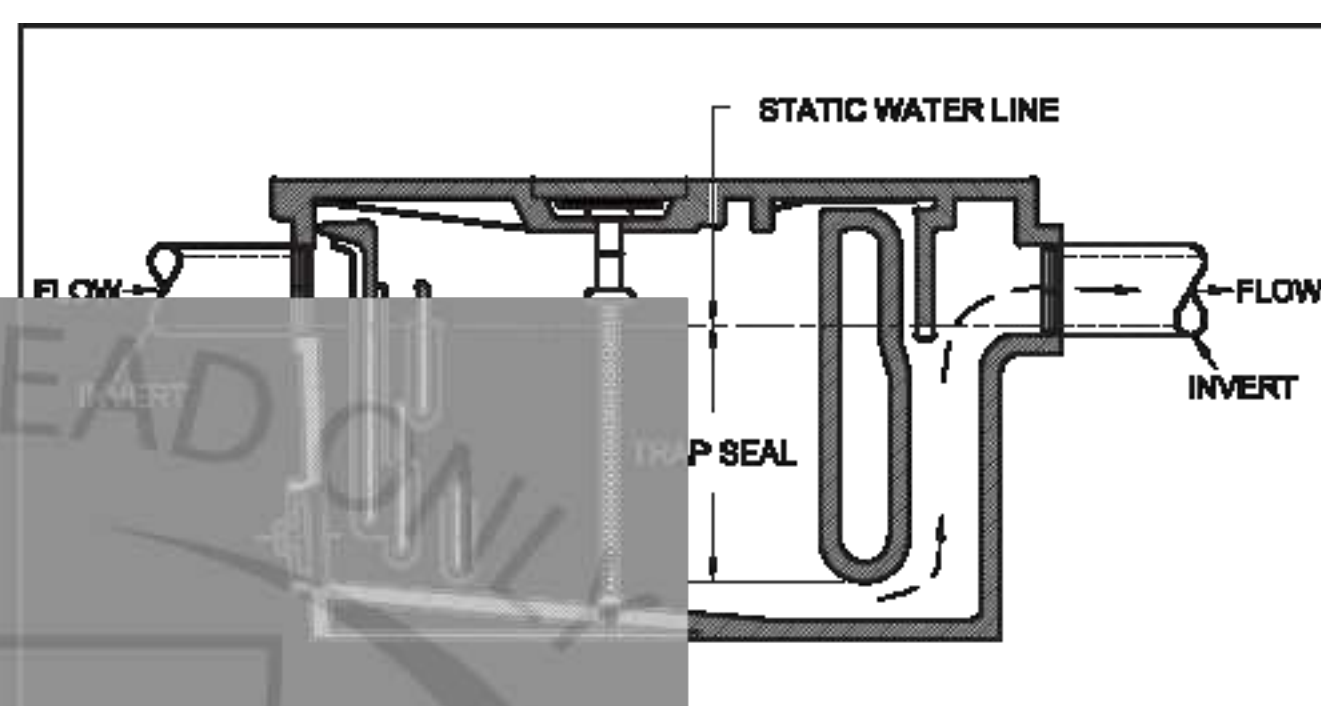


Figure 1.2.38
INDIRECT WASTE PIPES



1.2.39
RECEPTOR

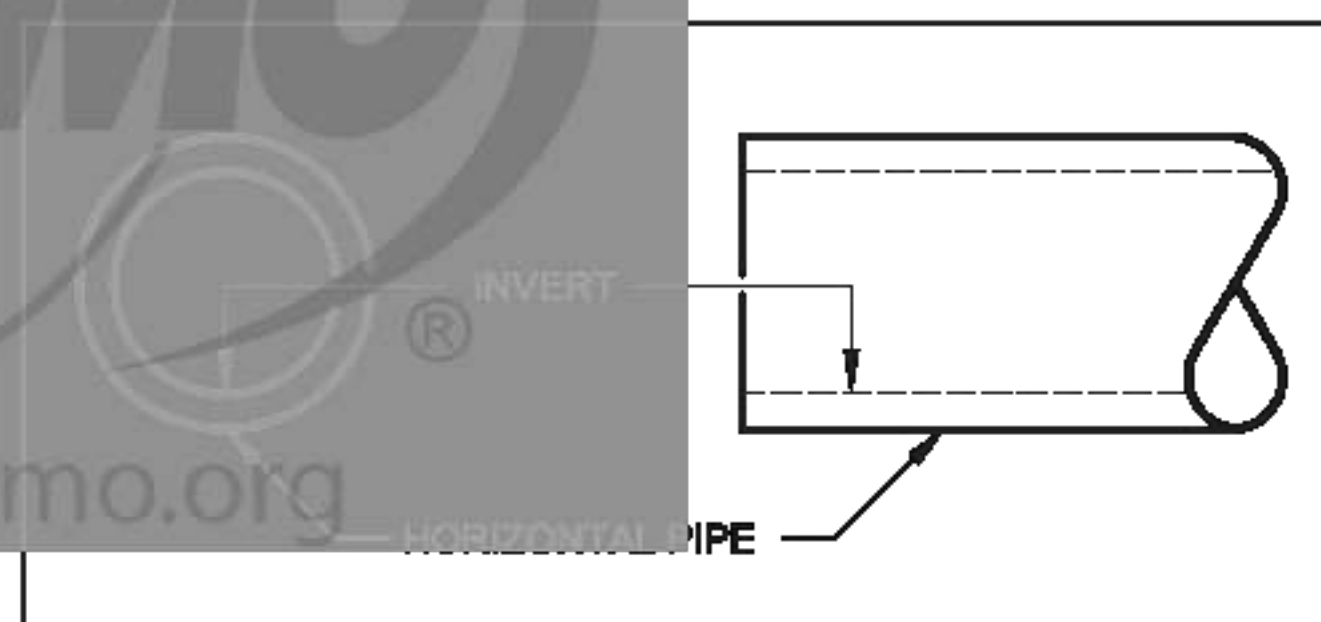


Figure 1.2.40
THE INVERT OF A DRAIN PIPE

matter from normal wastes while permitting normal sewage or liquid wastes to discharge into the drainage system by gravity. *See Figure 1.2.39*

Comment: Interceptors include grease interceptors, oil/water separators, sand interceptors, solids interceptors, and neutralizing or dilution tanks.

Invert: The lowest portion of the inside of a horizontal pipe. *See Figure 1.2.40*

Comment: Invert elevations are used to design and install drainage pipe at the required grade or slope.

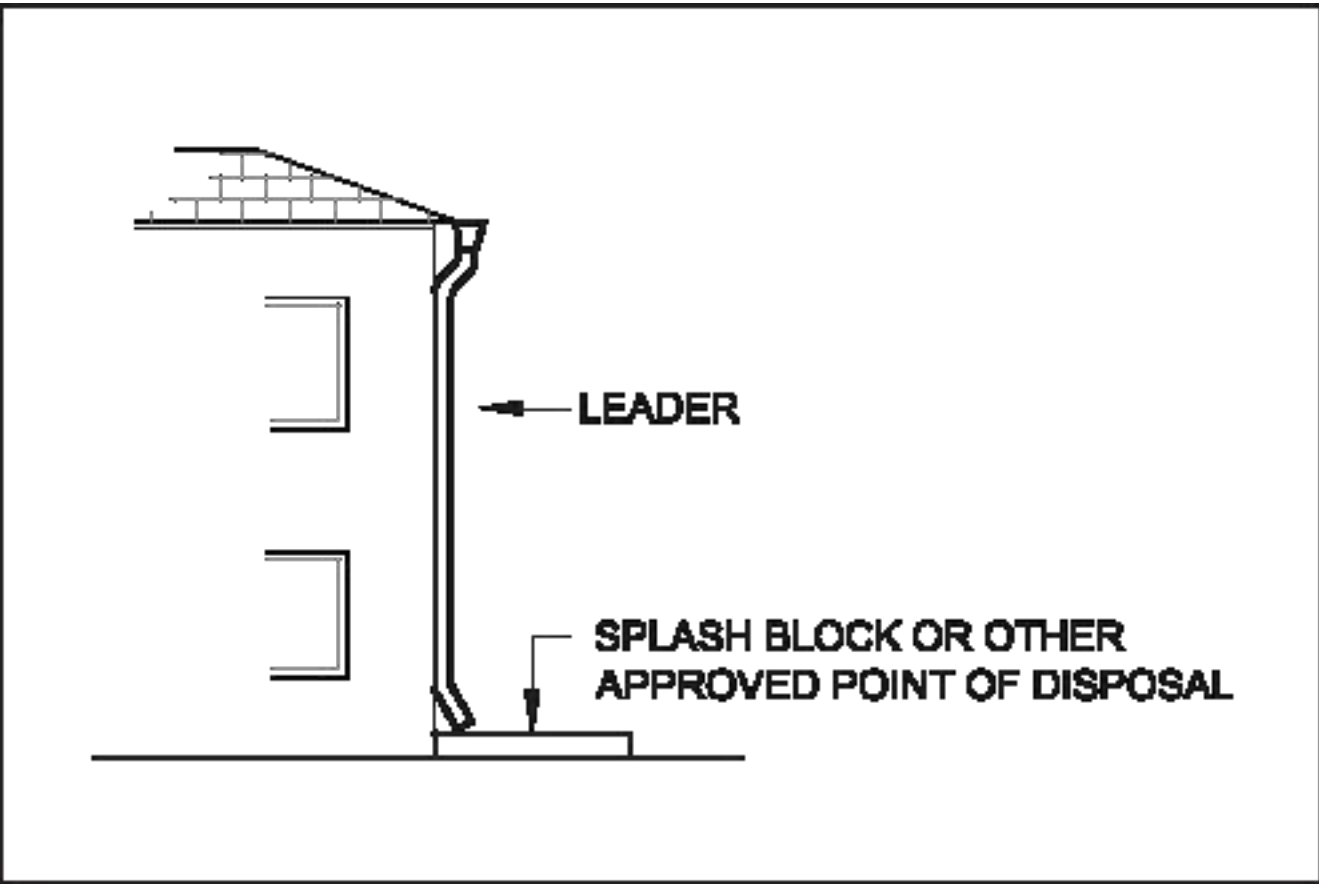
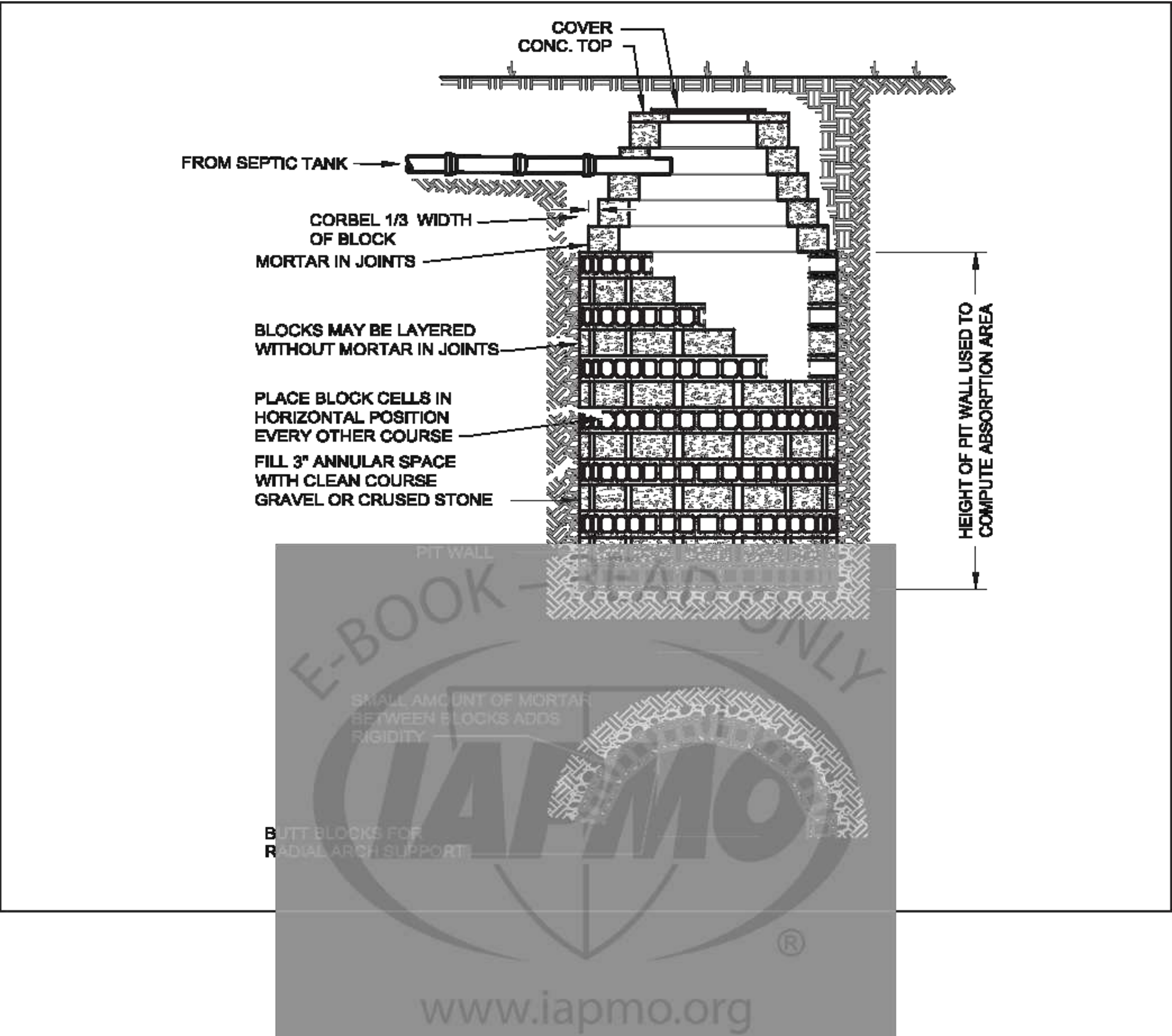


Figure 1.2.42
A STORMWATER LEADER

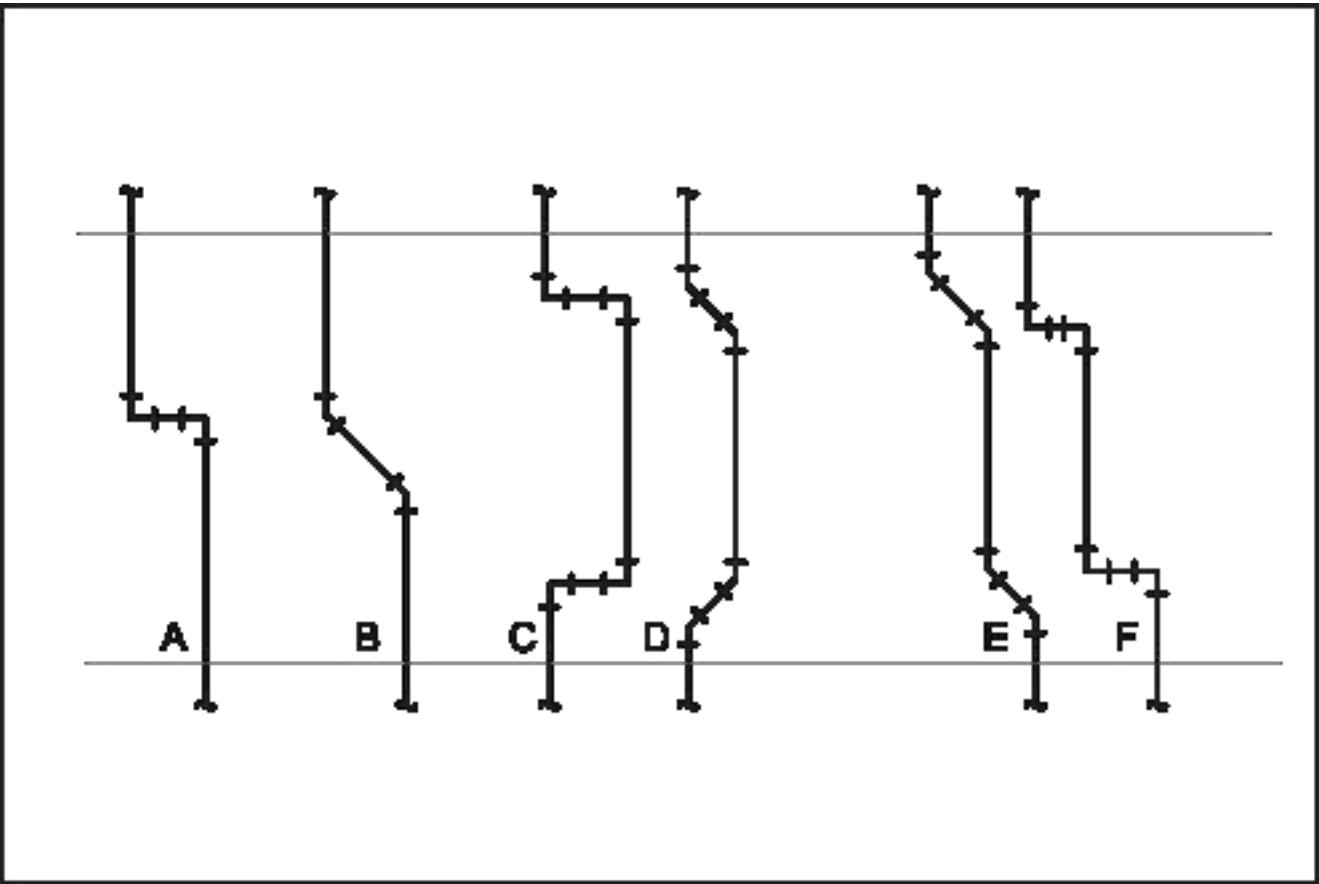


Figure 1.2.44
OFFSETS IN PIPING

IPS: An abbreviation for “iron pipe size”.

Leaching Well or Pit: A pit or receptor having porous walls that permit the liquid contents to seep into the ground. *See Figure 1.2.41*

Comment: Leaching wells or pits are used to disperse the effluent from septic tanks into the ground for secondary treatment. They may supplement or be used in lieu of absorption trenches. Leaching wells or pits can only be used where there is very deep soil of good permeability and considerable depth to groundwater.

Lead Content: Materials used in potable water supply systems, including piping, faucets, and valves, shall be “lead-free” as defined by current Federal Law. Drinking water system components shall comply with the lead leachate requirements of NSF 61. Refer to Section 3.1.5 for components that are within the scope of NSF 61.

Leader: An exterior vertical drain pipe for conveying stormwater from roof or gutter drains. *See Figure 1.2.42*

Loop Vent: See “Vent, Loop”

Low Hazard: A condition in the plumbing system that could pollute the supply and distribution of potable water if not protected by the necessary backflow prevention.

Macerating Toilet System: A system that collects drainage from a single water closet, lavatory and/or bathtub located in the same room. It consists of a receiving container, a grinder pump, and associated level controls. The system pumps shredded or macerated sewage up to a point of discharge.

May: The word “may” is a permissive term.

Medical Gas System: The complete system used to convey medical gases for direct application from central supply systems (bulk tanks, manifolds and medical air compressors) through piping networks with pressure and operating controls, alarm warning systems, etc., and extending to station outlet valves at use points.

Medical Vacuum Systems: A system consisting of central vacuum producing equipment with pressure and operating controls, shut-off valves, alarm warning systems, gauges and a network of piping extending to and terminating with suitable station inlets at locations where vacuum may be required.

Non-Potable Water: Water not safe for drinking, personal or culinary use.

Nominal Size: (Pipe or Tube): The industry-recognized size of a plumbing pipe or tube that is not necessarily an actual dimension. It indicates the size of the pipe or tube as indicated in its material standard listed in Table 3.1.3.

Nuisance: Public nuisance at common law or in equity jurisprudence; whatever is dangerous to human life or detrimental to health; whatever building, structure, or premises is not sufficiently ventilated, sewerage, drained, cleaned, or lighted in reference to its intended or actual use; and whatever renders the air, human food, drink or water supply unwholesome.

Offset: A combination of elbows or bends that brings one section of the pipe out of line but into a line parallel with the other section. *See Figure 1.2.44 - Parts A and B* for single offsets

Comment: Offsets can occur in vertical and horizontal piping. Offsets can consist of 90-degree, 45-degree, or other angle fittings. Single offsets have one change of alignment.

Offset, Double: Two offsets installed in succession or series in a continuous pipe. *See Figure 1.2.44 - Parts E and F*

Comment: Double offsets have two offsets, both away from the original alignment of the pipe.

Offset, Return: A double offset installed so as to return the pipe to its original alignment. *See Figure 1.2.44 - Parts C and D*

Comment: Return offsets have two offsets, both in different directions. The second offset does not necessarily bring the pipeline back into exact alignment with the first. The alignment of the piping on both sides of the offset is not necessarily exactly the same.

Oil Interceptor: See “Interceptor”

Pitch: See “Grade”

Plenum: An enclosed portion of the building structure, other than an occupiable space being conditioned, that is designed to allow air movement, and thereby serve as part of an air distribution system.

Plumbing: The practice, materials, and fixtures within or adjacent to any building structure or conveyance, used in the installation, maintenance, extension, alteration and removal of piping, plumbing fixtures, plumbing appliances, and plumbing appurtenances in connection with any of the following:

- a. Sanitary drainage system and its related vent system
- b. Storm water drainage facilities
- c. Public or private potable water supply systems
- d. The initial connection to a potable water supply upstream of any required backflow prevention devices and the final connection that discharges indirectly into a public or private disposal system
- e. Medical gas and medical vacuum systems
- f. Indirect waste piping including refrigeration and air conditioning drainage
- g. Liquid waste or sewage and water supply of any premises to their connection with an approved water supply system or to an acceptable disposal facility
- h. Reclaimed water piping
- i. Graywater systems
- j. Harvested rainwater systems

NOTE: The following are excluded from the definition of plumbing:

1. All piping, equipment or material used exclusively for environmental control.

DEFINITIONS

2. Piping used for the incorporation of liquids or gases into any product or process for use in the manufacturing or storage of any product, including product development.
3. Piping used for the installation, alteration, repair or removal of automatic sprinkler systems installed for fire protection only.
4. The related appurtenances or standpipes connected to automatic sprinkler systems or overhead or underground fire lines beginning at a point where water is used exclusively for fire protection.
5. Piping used for lawn sprinkler systems downstream from backflow prevention devices.

Plumbing Appliance: A removable device that; (1) performs a specific domestic function in a facility, (2) is provided for use by the occupants, and (3) requires a water supply and/or drainage connection to the plumbing system.

Comment: Plumbing appliances include clothes washers, dishwashers, ice makers, and coffee machines. Refer to Table 3.1.3 - Part VII for listed plumbing appliances.

Plumbing Appurtenance: A manufactured device, a prefabricated assembly, or an on-the-job assembly of component parts, that is an adjunct to the basic piping system and plumbing fixtures. An appurtenance demands no additional water supply, nor does it add any discharge load to a fixture or to the drainage system. It is presumed that an appurtenance performs some useful function in the operation, maintenance, servicing, economy, or safety of the plumbing system.

Comment: Some examples of plumbing appurtenances are water filters, backflow prevention devices, backwater valves, interceptors, separators, and neutralizing or dilution tanks. Refer to Table 3.1.3 - Part VIII for listed appurtenances. Plumbing appurtenances do not change the load on the water supply or drainage system.

Plumbing Code: These regulations and any deletions, modifications, and additions made by the Adopting Agency.

Plumbing Equipment: A fixed, pipe-connected plumbing device that performs a specific operational function in the performance of a plumbing system.

Comment: Plumbing equipment includes food waste disposers, commercial warewashers, water softeners, and water heaters. Refer to Table 3.1.3 - Part VII for listed plumbing equipment.

Plumbing Fixture: A plumbing device or combination of devices in a facility that; (1) is installed for personal use by the occupants, (2) requires water supply and/or drainage, (3) is pipe-connected to the plumbing system, and (4) is a fixed, functional part of the facility.

Comment: Plumbing fixtures include water closets (toilets), urinals, bidets, lavatories, bathtubs, whirlpool baths, showers, bath/shower combinations, wash fountains, kitchen sinks,

laundry sinks, service sinks, specialty sinks, emergency showers, hose bibbs, sill cocks, yard hydrants, and drinking fountains. Refer to Table 3.1.3 - Part V for listed plumbing fixtures.

Plumbing System: Includes the water supply and distribution piping, plumbing fixtures and traps, drain and vent piping, sanitary and storm drains and building sewers, including their respective connections, devices and appurtenances within the property lines of its site.

Pollution (of Potable Water): An impairment of the quality of the potable water to a degree that does not create a high hazard to public health but that does adversely affect the aesthetic qualities of the potable water for domestic use. (Refer to the definition of “low hazard”).

Potable Water: Water free from impurities present in amounts sufficient to cause disease or harmful physiological effects and conforming in its bacteriological and chemical quality to the requirements of the Public Health Service Drinking Water Standards or the regulations of the public health authority having jurisdiction.

Powder Room: See “Half-Bath”

Press-Connect Fitting: A permanent mechanical connection for joining metallic tubing utilizing an elastomeric seal or elastomeric seal with corrosion-resistant grip ring or rings. Fitting connections are made by mechanically compressing the wall of the fitting end over the tube utilizing a pressing tool and jaws or press rings approved by the fitting manufacturer.

Pressure Assisted Water Closet: See “Water Closet, Pressure Assisted”

Pressure Balancing Compensating Valve: An automatic compensating valve that senses its incoming hot and cold water pressures and compensates for fluctuations in order to stabilize its adjusted outlet water temperature. See “Automatic Compensating Valve”.

Private Sewage Disposal System: A system for disposal of domestic sewage by means of a septic tank or mechanical treatment, designed for use apart from a public sewer to serve a single establishment or building. *See Chapter 16*

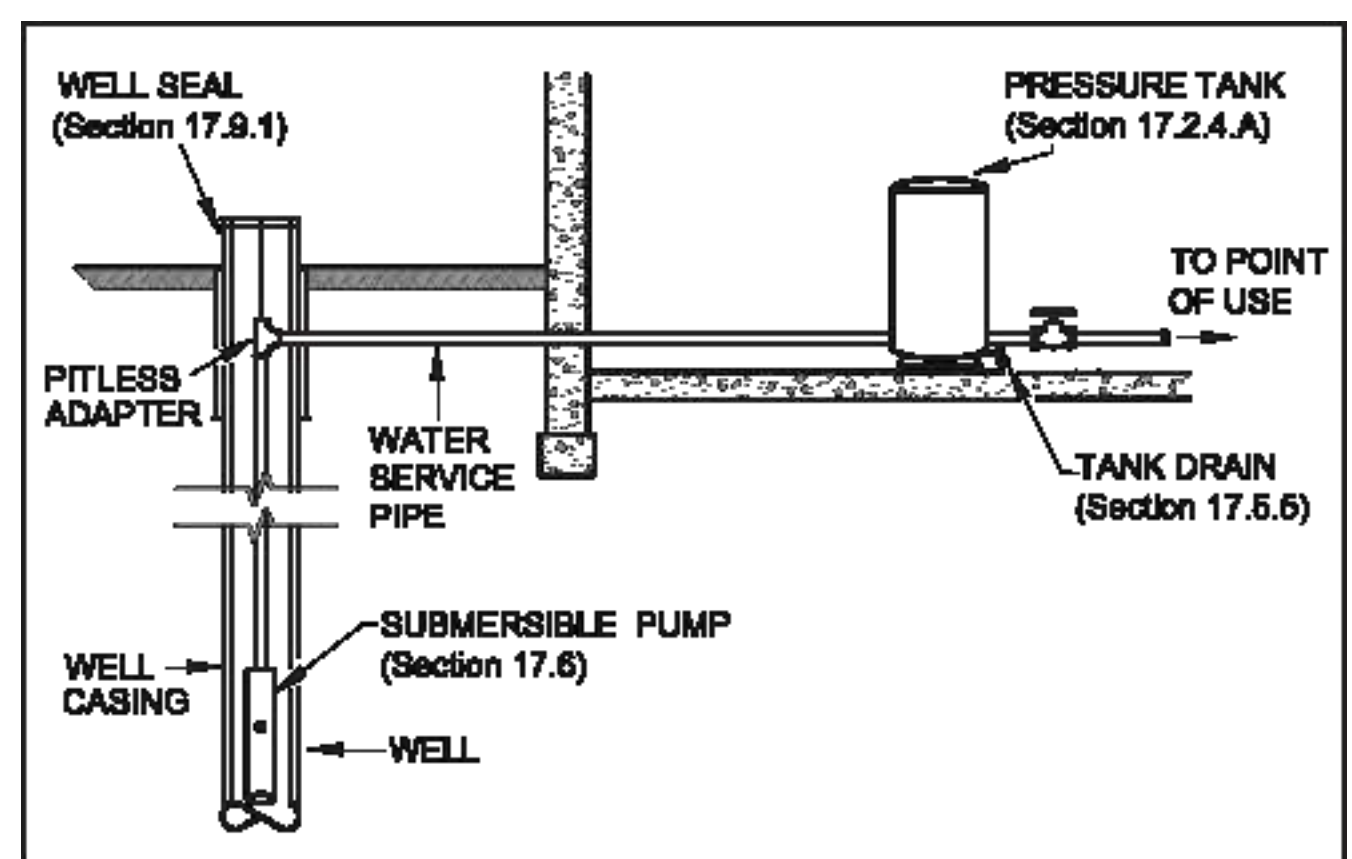


Figure 1.2.46
A TYPICAL PRIVATE WATER SUPPLY SYSTEM

Private Use, Public Use:

Private Use - Plumbing facilities for the private and restricted use of one or more individuals in dwelling units (including hotel and motel guest rooms) and other plumbing facilities that are not intended for public use. Refer to the definition of “Public Use”.

Public Use - Plumbing facilities intended for the unrestricted use of more than one individual (including employees) in assembly occupancies, business occupancies, public buildings, transportation facilities, schools and other educational facilities, office buildings, restaurants, bars, other food service facilities, mercantile facilities, manufacturing facilities, military facilities, and other plumbing installations that are not intended for private use. Refer to the definition of “Private Use”.

Private Water Supply: A supply, other than an approved public water supply, which serves one or more buildings. *See Figure 1.2.46 and Chapter 17*

Property Line: The recorded boundary of a plot of land.

PS: An abbreviation for the ratio “Stiffness” based on the ratio of the pipe that is based on the ratio of the pipe stiffness and flexural modulus of elasticity of the pipe for the same pipe design and material.

Public Toilet Room: Toilet room intended for public use in accordance with the definition of “Public Use”.

Public Use: See “Private Use”.

Pump Assisted Water Closet: A water closet that is assisted by a pump.

Push-Fit Fitting: A type of fitting used with copper, CPVC, and PEX that is designed to be inserted into a pipe and may be used separately or in conjunction with other devices used in domestic or commercial water distribution systems.

Radon Gas: A colorless, odorless, chemically inert gas that is naturally produced through the normal decay of uranium, which decays to radium, which then decays to radon.

Readily Accessible: See “Accessible and Readily Accessible”.

Receptor: A fixture or device which receives the discharge from indirect waste pipes. *See Figure 1.2.47*

Reclaimed Non-Potable Water: Effluent from a wastewater treatment facility that complies with the requirements of the Authority Having Jurisdiction for reuse as non-potable water for flushing water closets, urinals, landscape irrigation, and other approved uses.

Reduced Pressure Backflow Preventer Assembly: A backflow prevention assembly with shutoff valves consisting of two independently acting check valves, internally force loaded to a closed position and separated by an intermediate chamber (or zone) in which there is an automatic relief means of venting to atmosphere, internally loaded to a normally open position, and with means for testing for tightness of the checks and opening of the relief means. *See Figure 1.2.48*

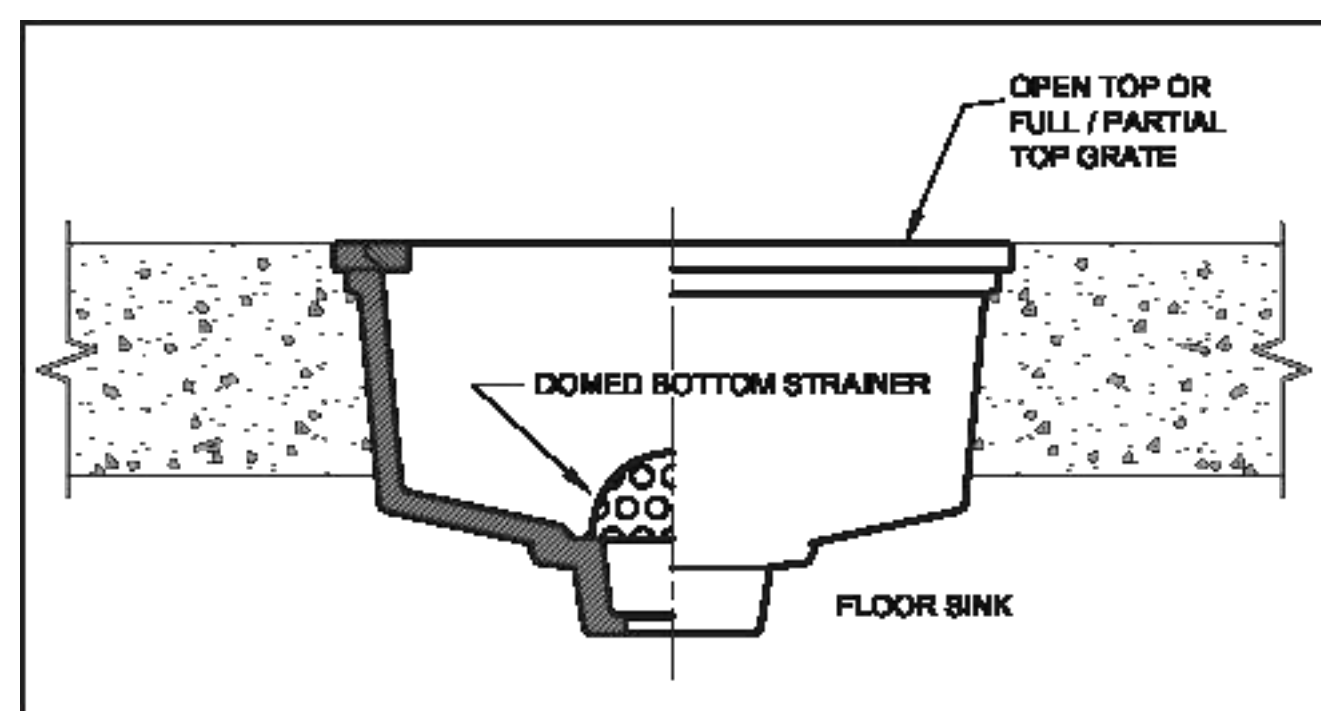


Figure 1.2.47
AN INDIRECT WASTE RECEPTOR

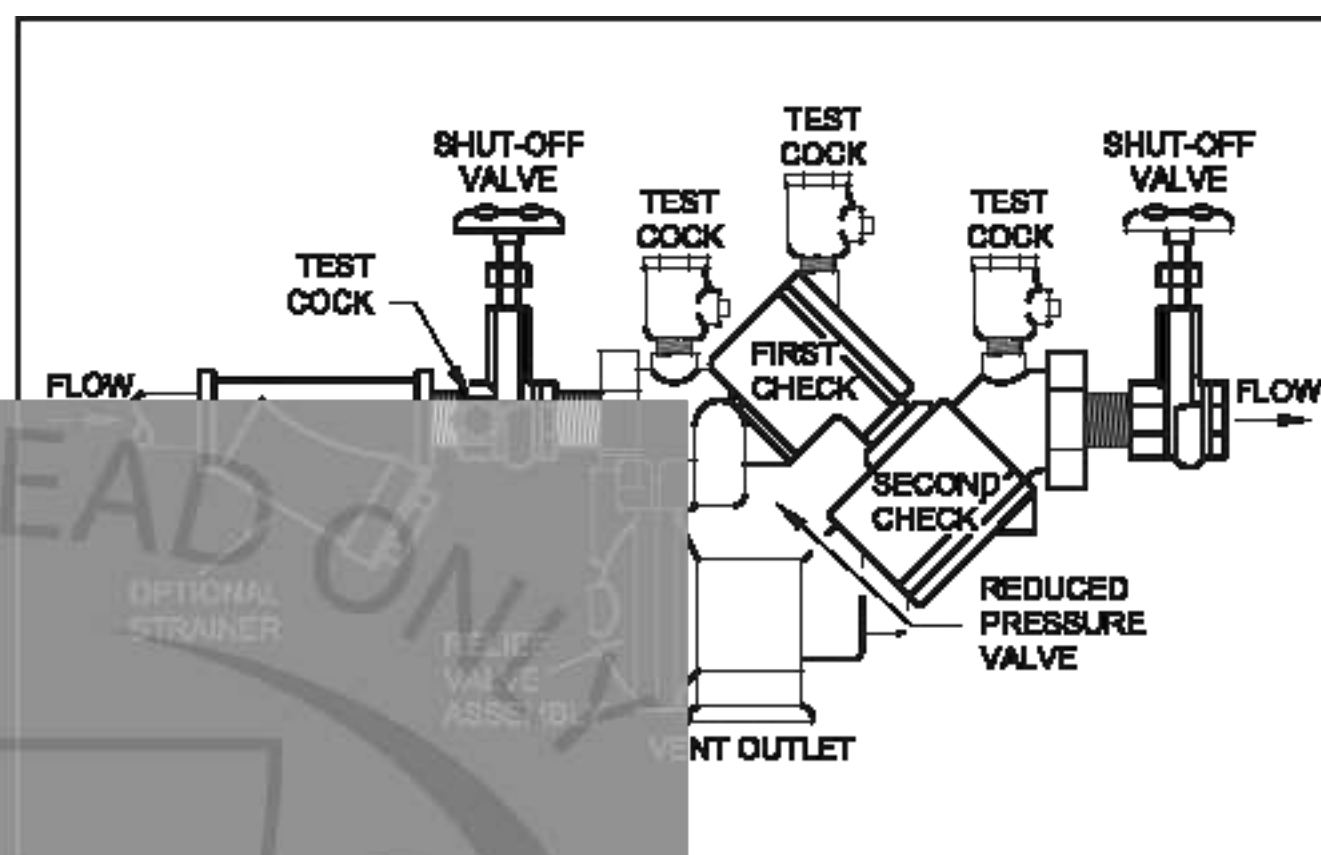


Figure 1.2.48
REDUCED PRESSURE BACKFLOW PREVENTER ASSEMBLY

principle preventers provide protection against backpressure and backflow. The test cocks on these assemblies are used for tight close-off for testing and are made to drain any discharge from the relief vent outlet, which may occur due to normal variations in system pressure.

Relief Vent: See “Vent, Relief”.

Riser, Water Supply: A water supply pipe that extends vertically one full story or more with branches to convey water to plumbing fixtures and water-supplied equipment. *See Figure 1.2.49*

Roof Drain: A drain installed to receive rainwater collecting on the surface of a roof and to discharge it into a conductor or leader. *See Figure 1.2.50*

Comment: Roof drains include flat deck drains and scupper drains.

Rough Plumbing: The installation of all parts of the plumbing system that can be completed prior to the installation of fixtures. This includes drainage, water supply, and vent piping, and the necessary fixture supports, or any fixtures that are built into the structure.

DEFINITIONS

Sand Filter: A treatment device or structure, constructed above or below the surface of the ground, for removing solid or colloidal material of a type that cannot be removed by sedimentation from septic tank effluent. *See Figure 1.2.51 and Section 16.12*

Comment: Sand filters provide additional treatment of septic tank effluent. They are used where the soil depth is shallow and cannot provide sufficient secondary treatment of the effluent.

Sand Interceptor: “See “Interceptor” and Section 6.4.”

Comment: Sand interceptors (or sand traps) are associated with oil/water separators in Chapter 6.

Sanitary Sewer: A system of public or private drain piping or conduits that convey sewage from one or more properties to a point of treatment or disposal.

SDR: An abbreviation for the “standard dimension ratio” of OD controlled plastic pipe that is based on the ratio of the outside diameter of the pipe divided by its wall thickness. Lower SDR ratings of the pipe indicate that the pipe has higher pressure ratings.

Comment: SDR equals DR for pipe with a standard wall thickness (designation code) and is a function of the pipe material and minimum wall thickness. SDR can changeably depending on the pipe material and the organization. Pipes of the same SDR and DR have the same wall thickness, regardless of pipe size.

Seepage Well or Pit: See “Interceptor” and Section 6.4.”

Self-draining: With regard to piping that will drain by gravity, a piping system is self-draining if its associated drainage piping is installed so that the piping can drain by gravity.

Septic Tank: A watertight receptacle or structure, designed and constructed so as to separate solids from the liquid, digest organic matter through a period of detention, and allow the liquids to discharge into the soil outside of the tank through a system of open joint or perforated piping, or a seepage pit. *See Figure 1.2.52 and Section 16.6*

Comment: Figure 1.2.52 shows baffles at the inlet and outlet connections with two access covers.

Service Sink: A sink or receptor intended for custodial use that is capable of being used to fill and empty a janitor’s bucket. Included are mop basins, laundry sinks, utility sinks, and similar fixtures. *See Table 7.21.1*

Sewage: Liquid discharged into the plumbing drainage system from a fixture, appliance, or other connection that contains urine and/or fecal matter.

Sewage Ejector, Pneumatic Type: A unit that uses compressed air to discharge and lift sewage to a gravity sewage system. *See Sections 11.7 and 12.14.3*

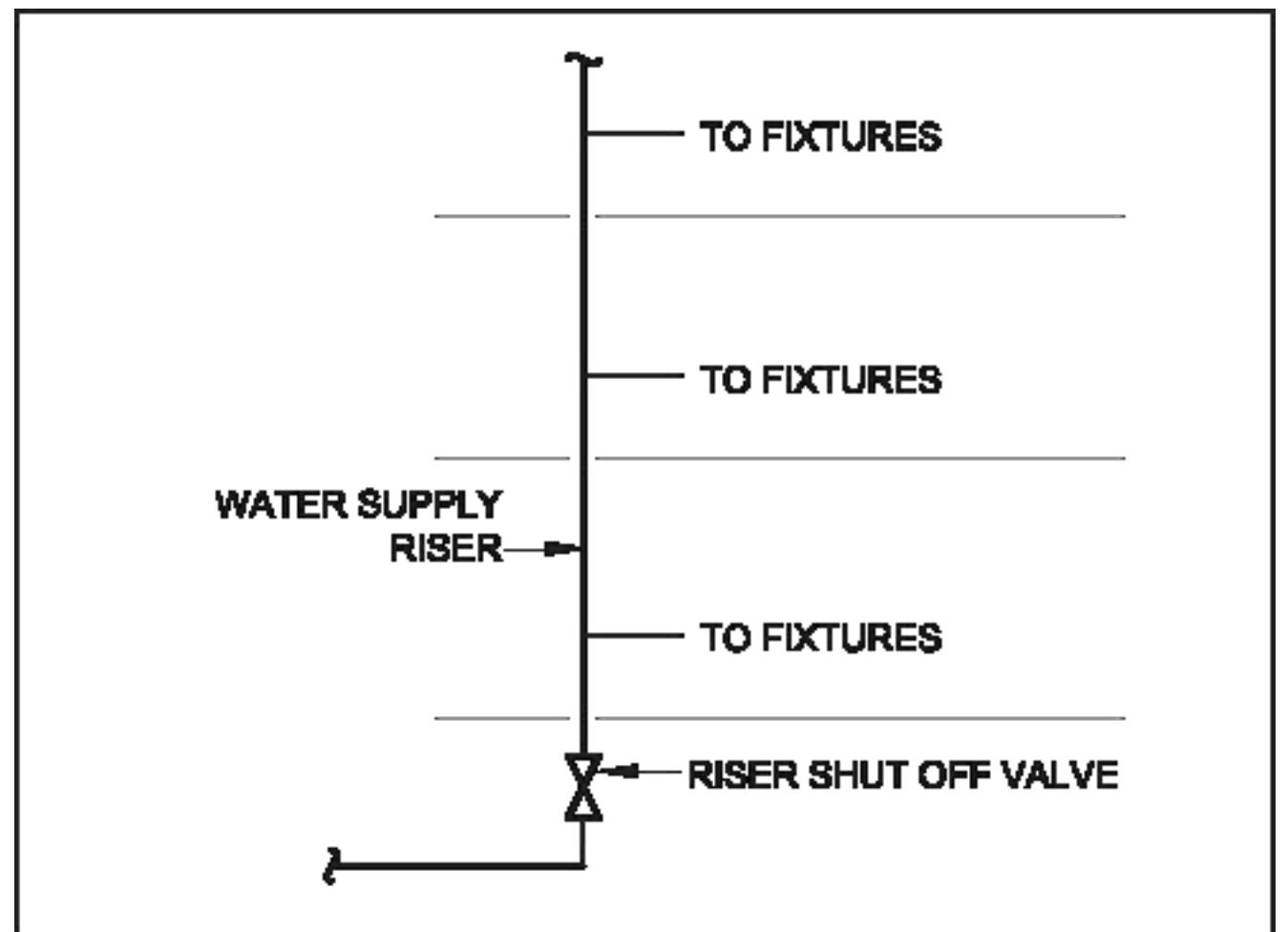
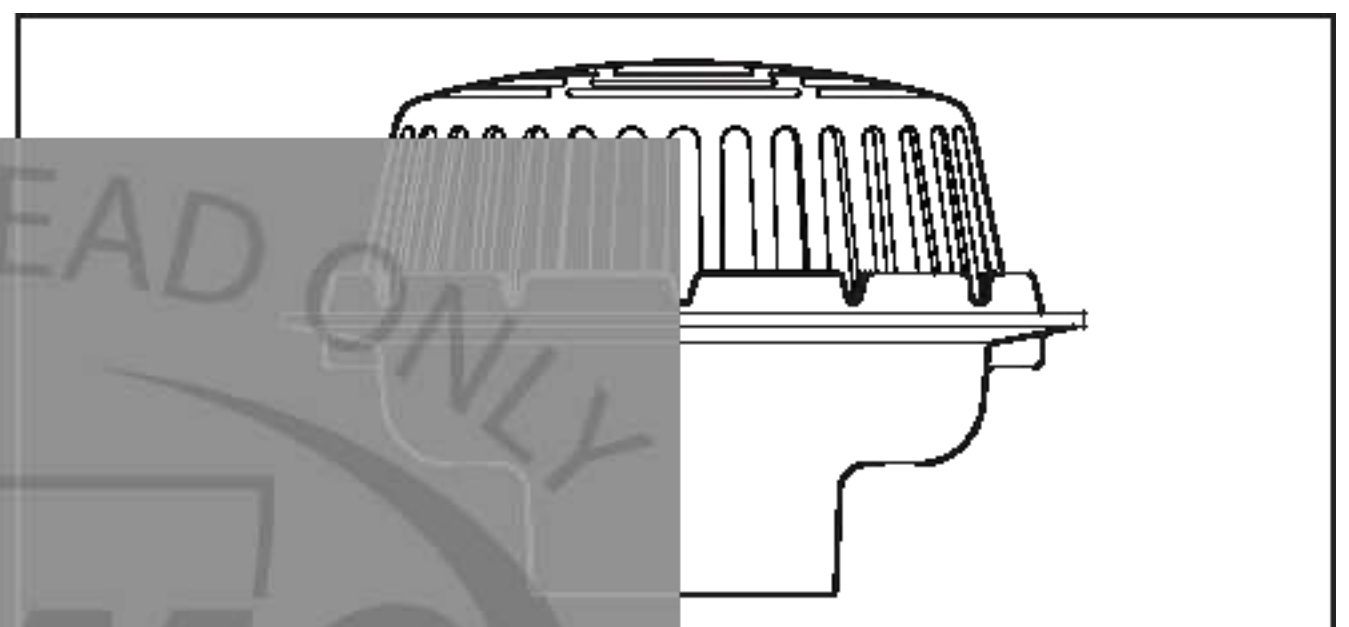


Figure 1.2.49
A WATER SUPPLY RISER



1.2.50
ROOF DRAIN

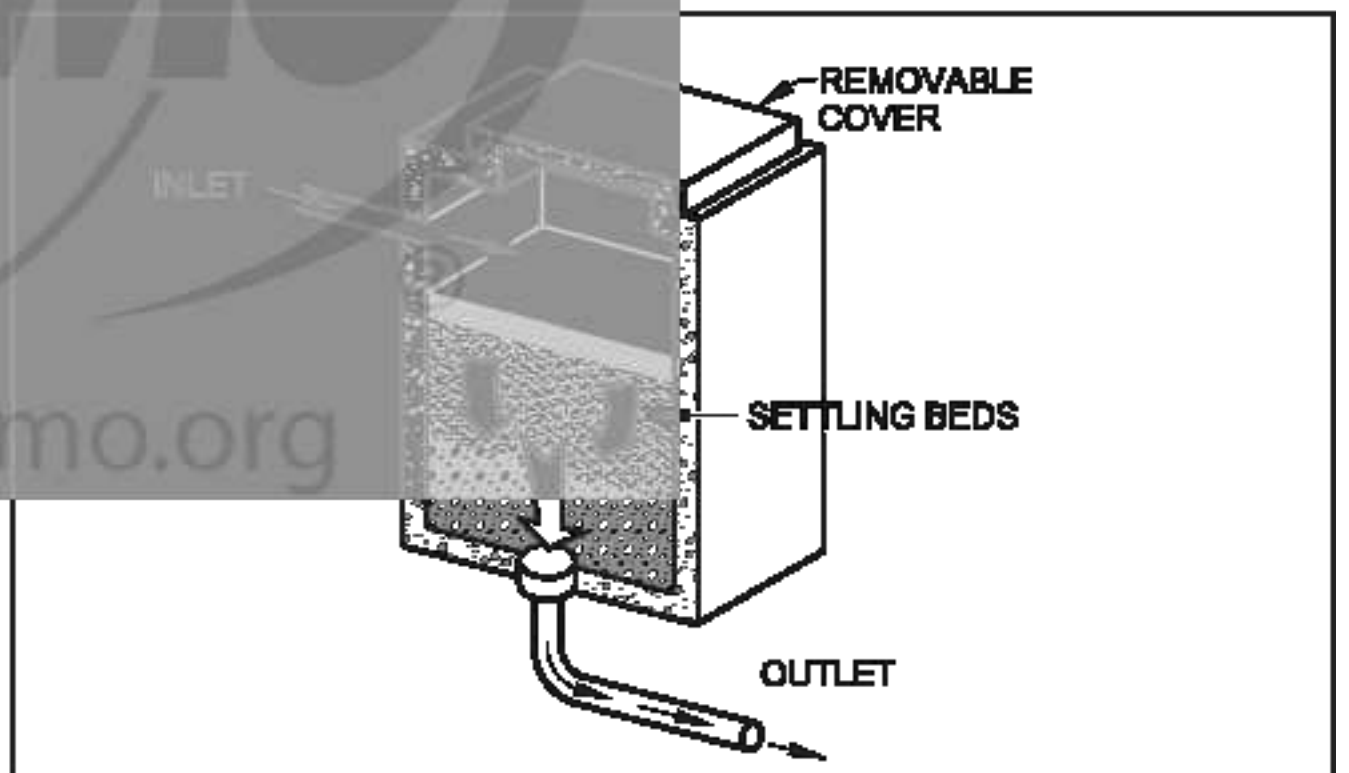


Figure 1.2.51
A SAND FILTER FOR SEPTIC TANK EFFLUENT

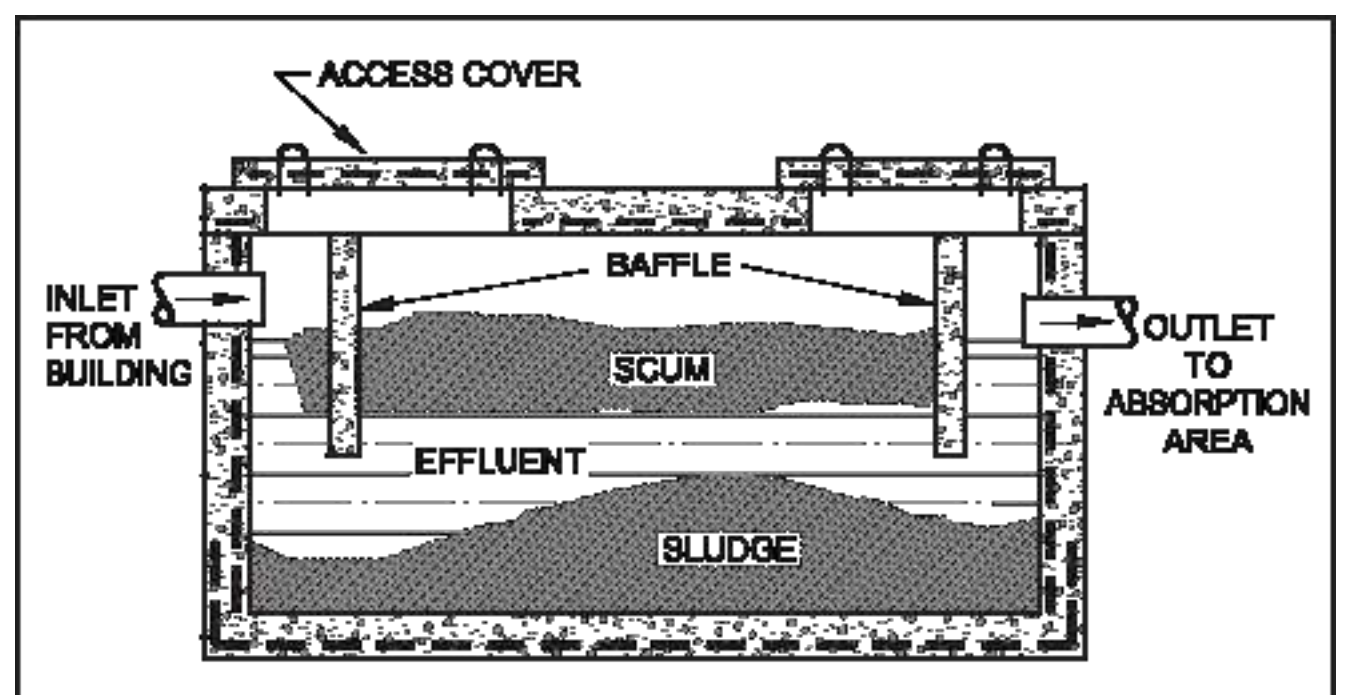


Figure 1.2.52
A TYPICAL SEPTIC TANK

Sewage Pump or Pump-Type Ejector: A non-clog or grinder-type sewage pump or ejector. Sewage pumps and pump-type ejectors are either the submersible or vertical type. *See Figure 1.2.54 and Section 11.7*

Comment: Figure 1.2.54 shows a pedestal-type sewage pump. Sewage pumps can also be submersible pumps or dry pit centrifugal pumps.

Shall: “Shall” is a mandatory term.

Short Term: A period of time not more than 30 minutes.

Shut-off Valve: A gate, ball, plug, butterfly, or other full-way valve used to shut off the flow in a pipe.

SIDR: An abbreviation for the “standard inside dimension ratio” of ID controlled plastic pipe that is based on the inside diameter of the pipe divided by its minimum wall thickness. Lower SIDR ratings of the same pipe design and material have higher pressure ratings.

Comment: SIDR equals IDR for the same pipe material composition (designation of material, diameter and minimum wall thickness) and can be used interchangeably depending on the standards organization. SIDR and IDR are not interchangeable with the same SIDR or IDR ratings regardless of the material composition.

Sink, Commercial: A sink used in a commercial application. Commercial sinks include:

1. pot sinks
2. scullery sinks
3. sinks used in photography
4. laboratory sinks

Size of Pipe and Tubing,

size requirements are mentioned in the code. The following sizes is recognized, even if all sizes are not commercially available: 1/4, 3/8, 1/2, 3/4, 1, 1 1/4, 1 1/2, 2, 2 1/2, 3, 4, 4-1/2, 5, 6, 7, 8, 10, 12, 15, 18, 24, 30, 36, 42, 48, 60, 72, 84, 96, 108, 120, 144, 168, 192, 216, 240, 270, 300, 360, 420, 480, 540, 600, 660, 720, 780, 840, 900, 960, 1020, 1080, 1140, 1200, 1260, 1320, 1380, 1440, 1500, 1560, 1620, 1680, 1740, 1800, 1860, 1920, 1980, 2040, 2100, 2160, 2220, 2280, 2340, 2400, 2460, 2520, 2580, 2640, 2700, 2760, 2820, 2880, 2940, 3000, 3060, 3120, 3180, 3240, 3300, 3360, 3420, 3480, 3540, 3600, 3660, 3720, 3780, 3840, 3900, 3960, 4020, 4080, 4140, 4200, 4260, 4320, 4380, 4440, 4500, 4560, 4620, 4680, 4740, 4800, 4860, 4920, 4980, 5040, 5100, 5160, 5220, 5280, 5340, 5400, 5460, 5520, 5580, 5640, 5700, 5760, 5820, 5880, 5940, 6000, 6060, 6120, 6180, 6240, 6300, 6360, 6420, 6480, 6540, 6600, 6660, 6720, 6780, 6840, 6900, 6960, 7020, 7080, 7140, 7200, 7260, 7320, 7380, 7440, 7500, 7560, 7620, 7680, 7740, 7800, 7860, 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DEFINITIONS

Storm Drain: A drain that conveys only storm water.

Storm Sewer: An underground drain that conveys only rainwater, surface water, and ground water.

Storm Water: Rainwater, surface water, and ground water.

Sump: A tank or pit that receives only liquid wastes, located below the elevation of a gravity discharge, that is emptied by pumping.

Sump, Drainage (sewage): A liquid and air-tight tank that receives sewage and/or liquid waste, located below the elevation of a gravity drainage system, that is emptied by pumping. *See Figure 1.2.54*

TAFR: The abbreviation for ASSE 1062 temperature actuated flow reduction valves, which provide protection from scalding for individual plumbing supply fittings.

Tempered Water: A mixture of hot and cold water to reach a desired temperature for its intended use, typically 95°F - 105°F.

Thermostatic Compensating Valve: An automatic compensating valve that senses its outlet water temperature and compensates for fluctuation in water temperature. *See “Automatic Compensating Valve”.*

Thermostatic/Pressure Compensating Valve: An automatic compensating valve that senses its outlet water temperature and cold water pressures and compensates to stabilize its adjusted outlet water temperature. *See “Thermostatic/Pressure Compensating Valve”.*

Toilet Facility: A room or connected spaces in other than a bathroom or more water closets and associated spaces to identify its intended use.

Trap: A fitting or device that prevents the emission of sewer gasses while allowing the flow of sewage or waste water. *See Sections 5.1, 5.2, and 5.3.*

Trap Arm: That portion of a fixture drain between a trap and its vent. *See Figure 1.2.63*

Comment: Refer to Table 12.8.1 for the maximum allowable length of trap arms to avoid trap siphonage.

Trap Primer: A device complying with ASSE 1018 or ASSE 1044 to maintain a water seal in a trap. *See Figures 1.2.64 and 1.2.65. Also Section 7.16.2 c & d*

Trap Seal: The maximum vertical depth of liquid that a trap will retain, measured between the crown weir and the top of the dip of the trap. *See Figure 1.2.62 and Section 5.3.2*

Tub/Shower: A bathtub, shower, bath/shower combination, or whirlpool bath.

Vacuum Assisted Water Closet: See “Water Closet, Vacuum Assisted”.

Vacuum Breaker, Atmospheric Type: A vacuum breaker that is not designed to be subject to continuous line pressure.

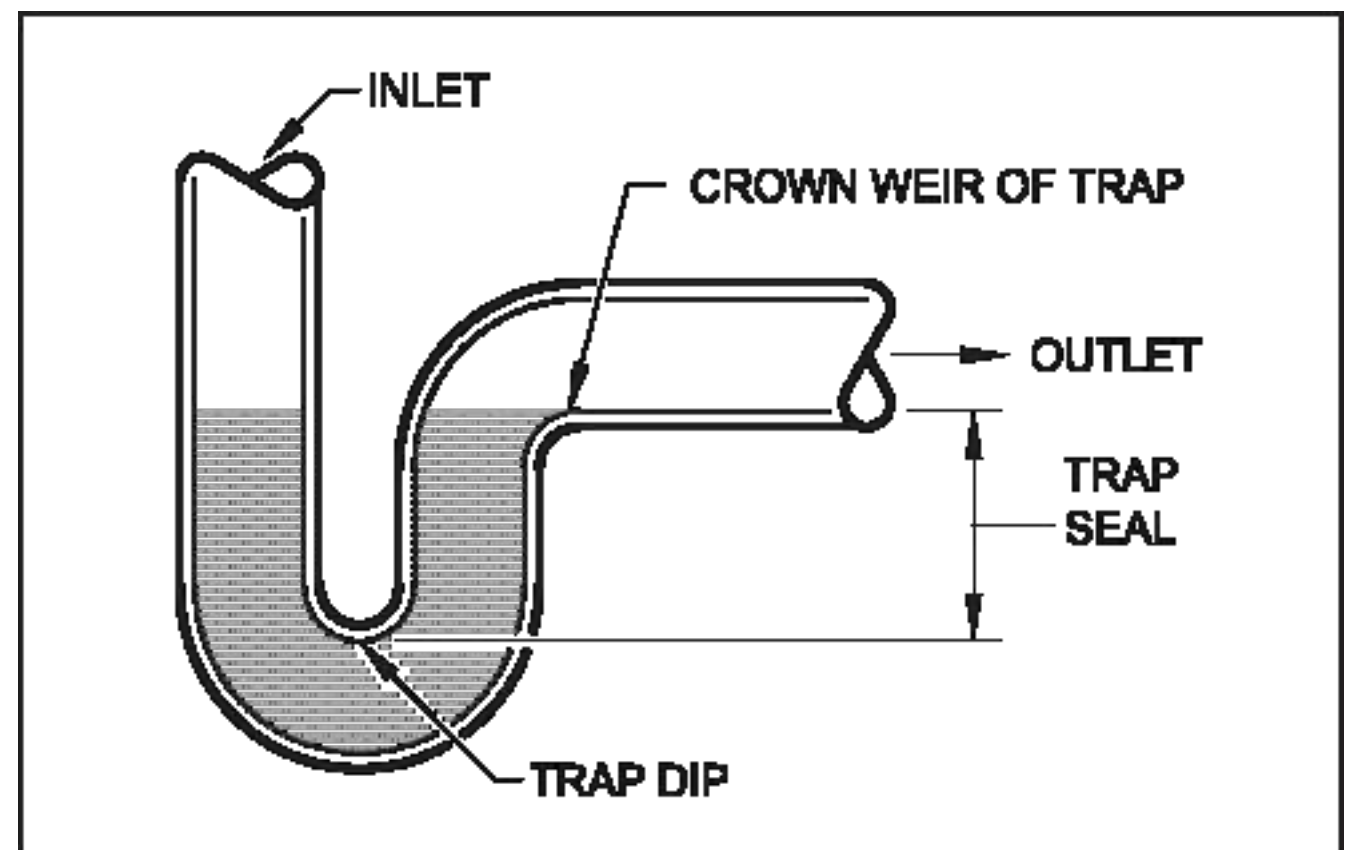


Figure 1.2.62
ELEMENTS OF A FIXTURE TRAP

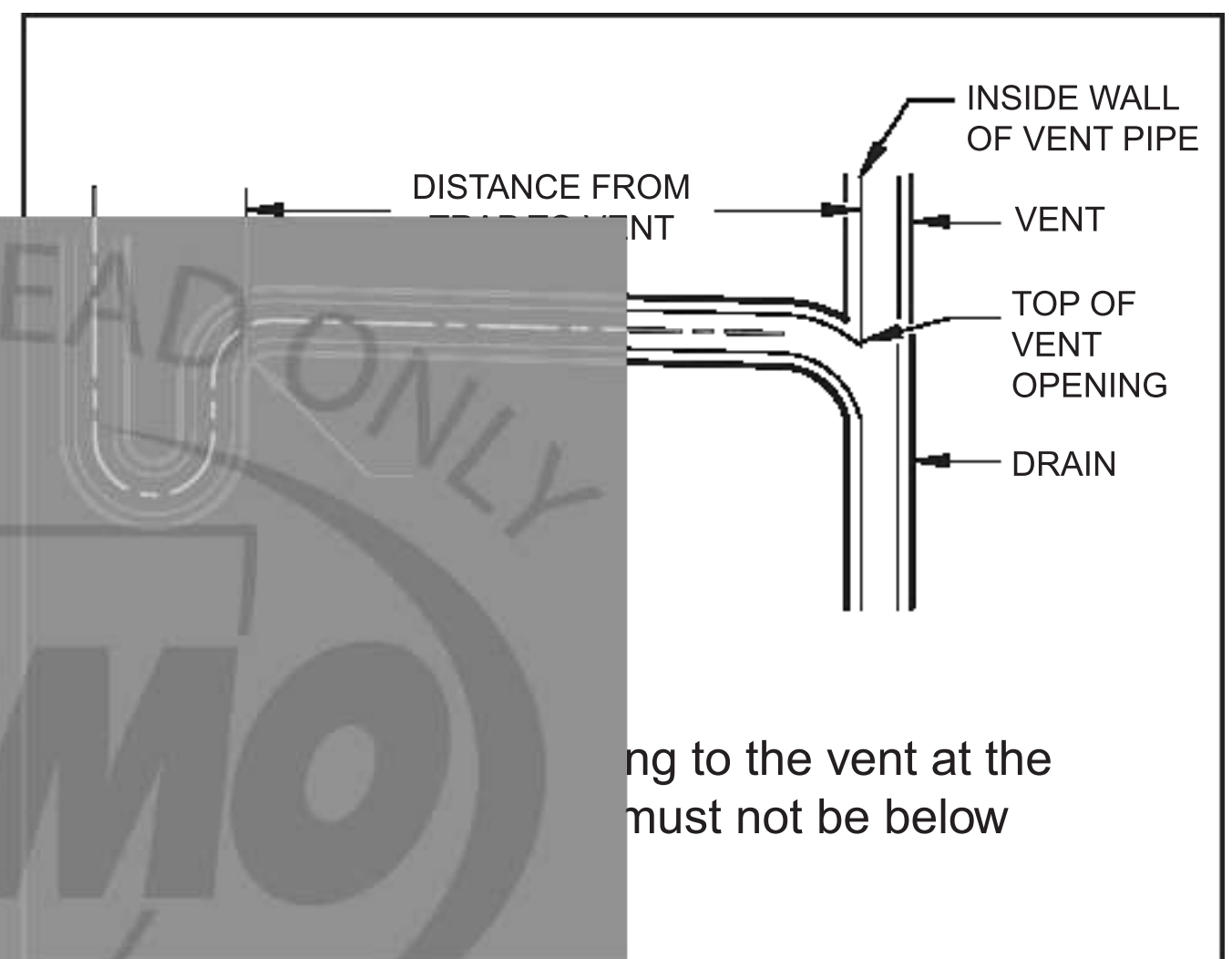


Figure 1.2.63
ELEMENTS OF A TRAP ARM

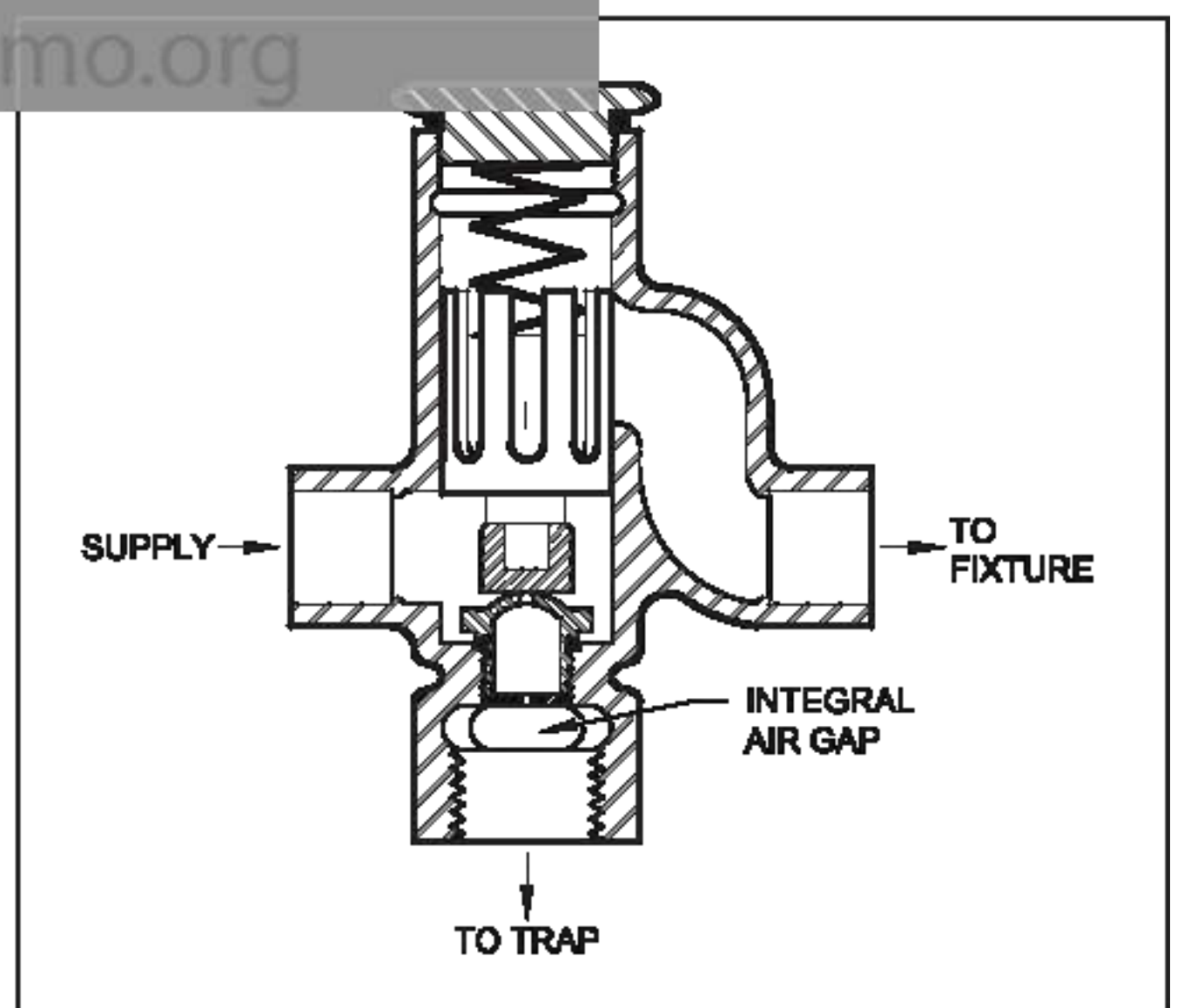


Figure 1.2.64
A FLOW-ACTIVATED TRAP PRIMER

Vacuum Breaker, Pressure Type: A vacuum breaker assembly designed to operate under continuous line pressure. *See Figure 1.2.67*

Vacuum Breaker, Spill-resistant (SVB): A pressure-type vacuum breaker specifically designed to avoid spillage during operation, consisting of one check valve force-loaded closed and an air inlet vent valve force-loaded open to atmosphere, positioned downstream of the check valve, located between two shutoff valves, and including a means for testing.

Comment: SVB vacuum breakers are spill-resistant, not spill-proof.

Vacuum Relief Valve: A device to prevent vacuum in a pressure vessel. *See Section 10.16.7*

Vent, Branch: A vent connecting vents from two or more fixtures. *See Figure 1.2.70*

Vent, Circuit: The vent for a group of battery-vented fixtures that is connected to their horizontal drain branch between the first two upstream fixtures and extends to a vent stack or other vertical vent. *See Figure 1.2.71*

Vent, Common: A continuous vent connecting two or more fixtures to a common drain. *See Figure 1.2.72*

Vent, Continuous: A vertical vent pipe that extends from the drain to which it connects.

Vent, Dry: A vent that does not discharge into the sewage or waste.

Vent Header: Vent piping that connects two or more vents or vent stacks to an outdoor vent terminal.

Vent, Individual: A pipe, or combination of pipes, installed to vent a single fixture.

Vent, Local: Vent piping for a single fixture or washers that extends to the outdoor vent terminal or connection of vapor vents from other fixtures.

Vent, Loop: A circuit vent that connects to its stack vent instead of its vent stack. *See Figures 1.2.75 and 12.13.1*

Vent, Relief: An auxiliary vent that is required for each ten branch intervals of a drain stack. Refer to Section 12.3.2. *See Figures 1.2.78 and 12.3.2*

Vent Riser: A vertical vent pipe with connections from fixture vents, branch vents, and circuit vents on different floor levels that connects to a stack vent, vent stack, or outdoor vent terminal. Not a vent stack.

Vent Stack: A vertical pipe that is connected to the base of a drain stack having five or more branch intervals. It extends up and connects to the stack vent or an outdoor vent terminal to relieve the pressure at the base of the drain stack. It is sized according to Section 12.16.4. *See Figure 12.3.1*

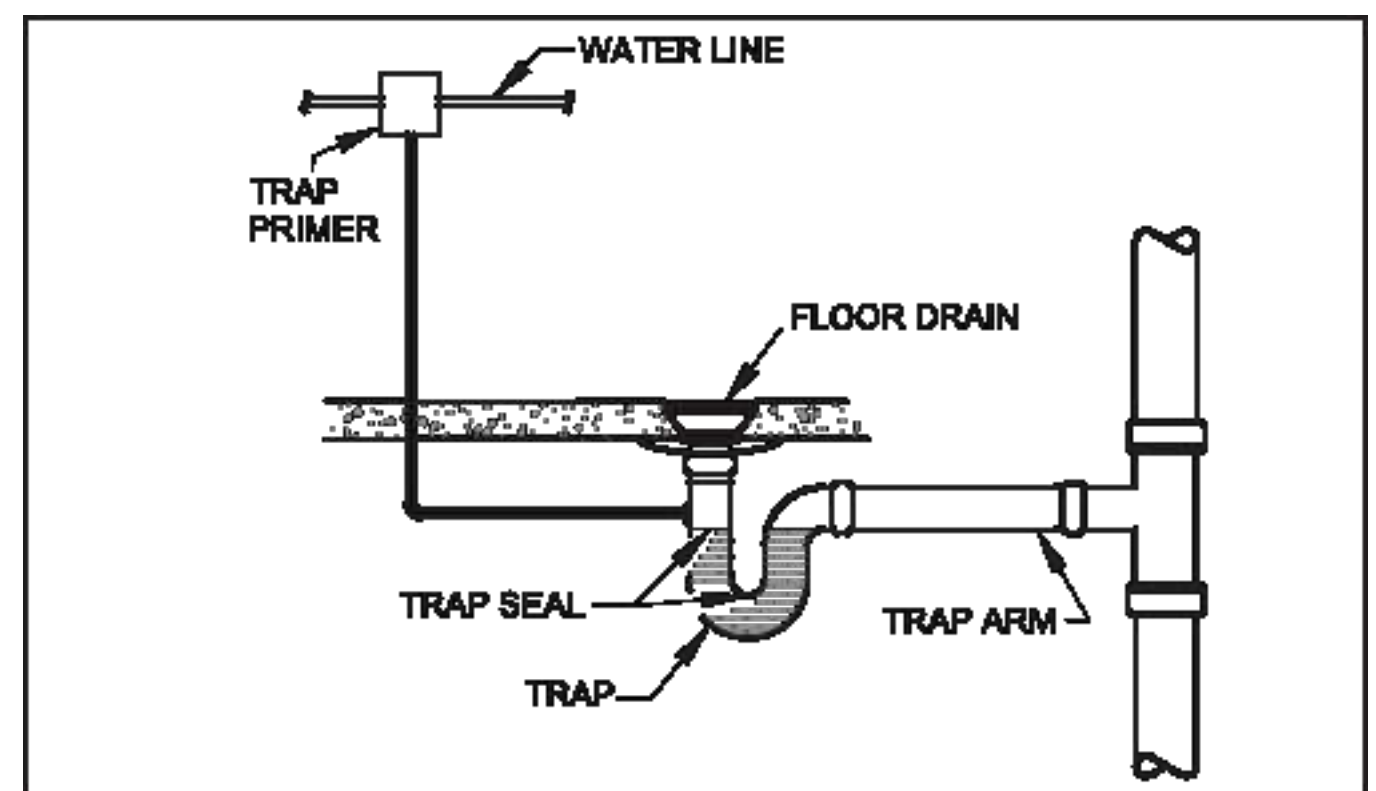


Figure 1.2.65
CONNECTION OF A TRAP PRIMER TO A TRAP

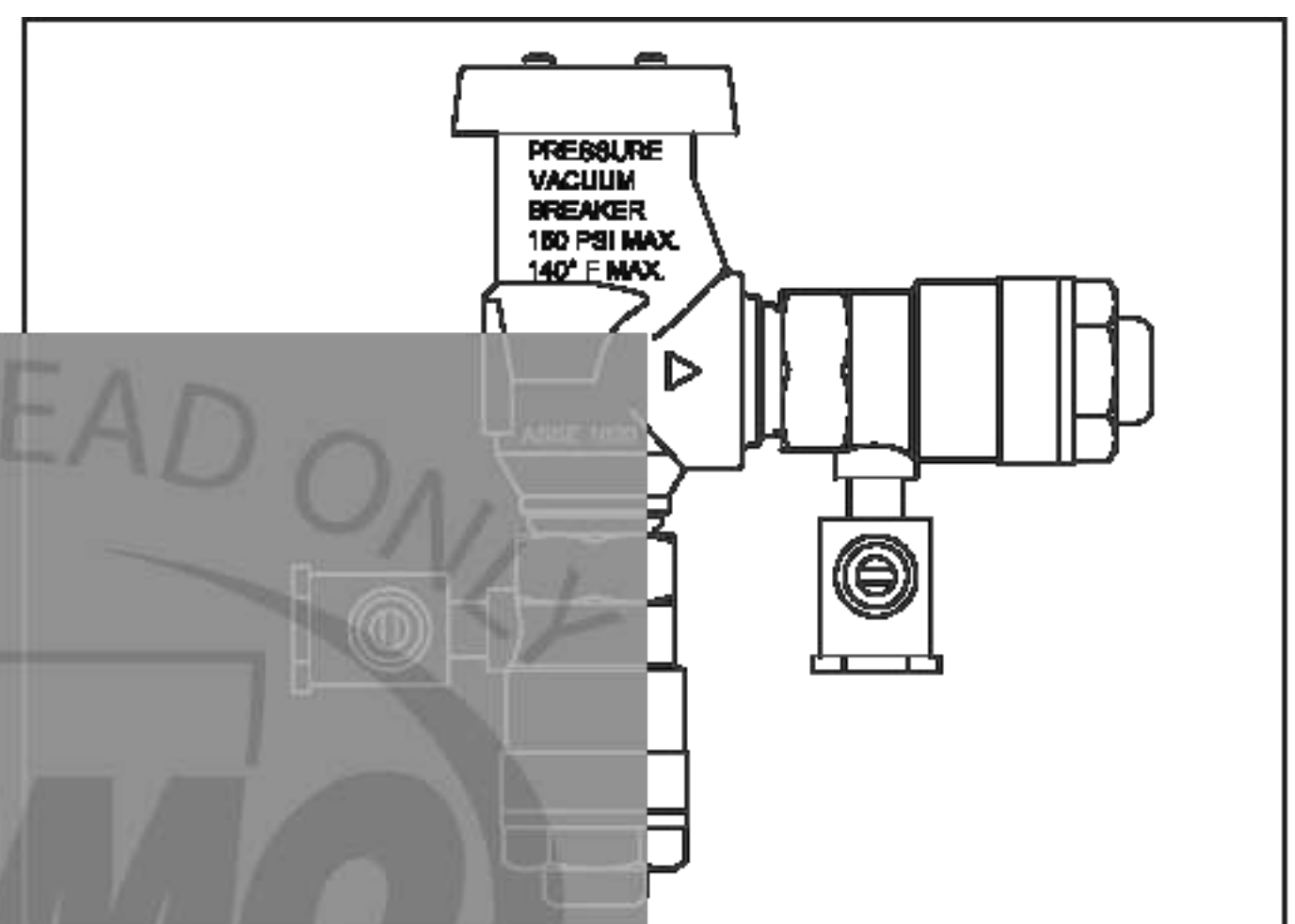


Figure 1.2.67
A PRESSURE VACUUM BREAKER

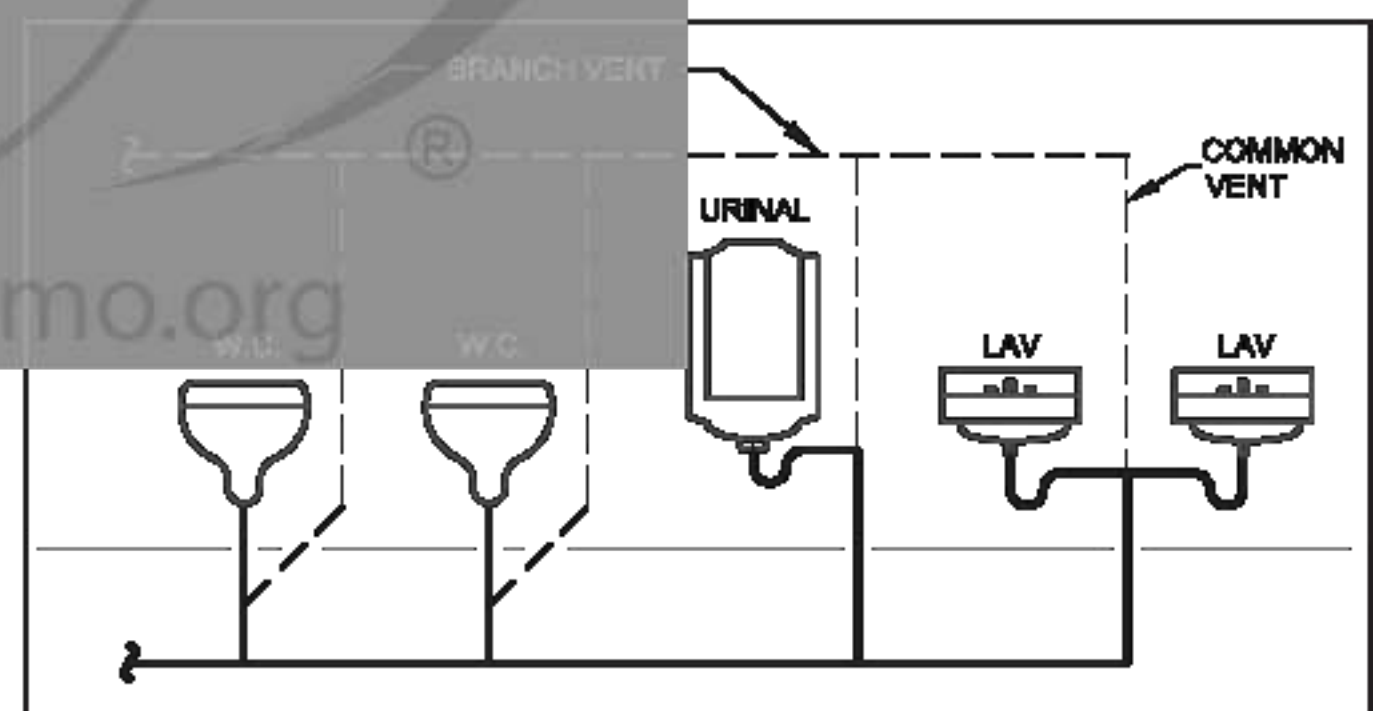


Figure 1.2.70
A BRANCH VENT

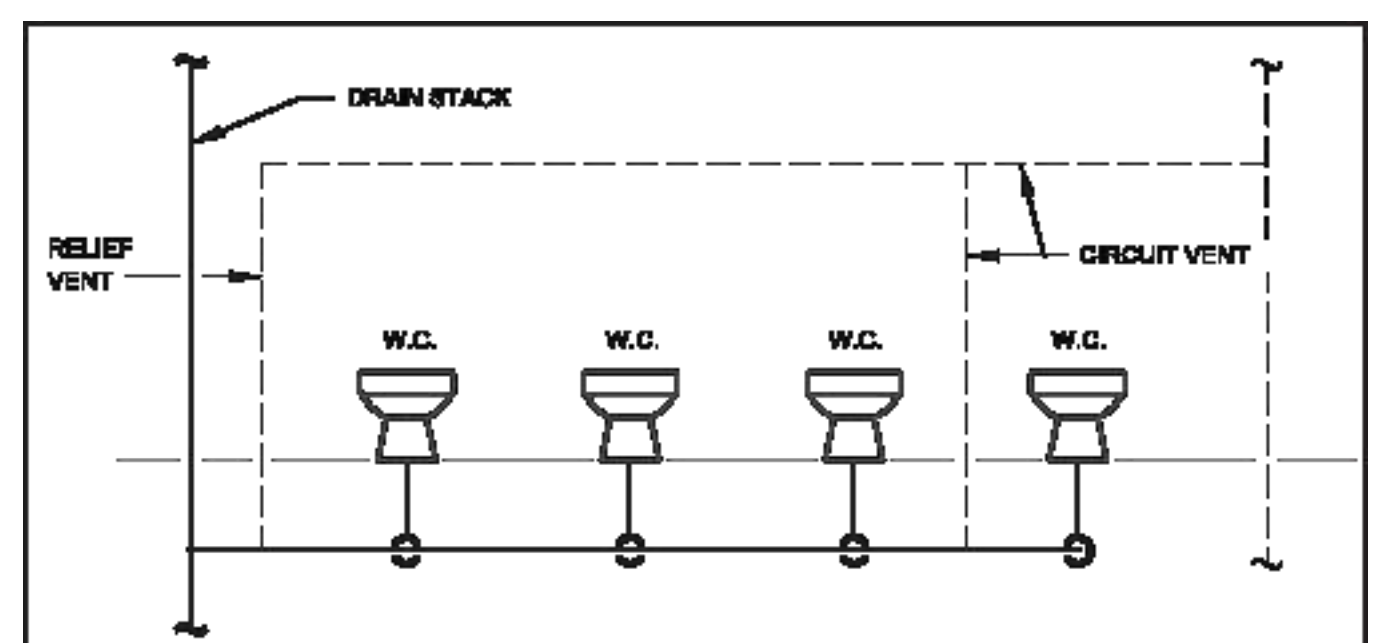


Figure 1.2.71
A CIRCUIT VENT

DEFINITIONS

Vent, Sterilizer: A separate pipe or stack, indirectly drained to the building drainage system that receives the vapors from non-pressure sterilizers, or the exhaust vapors from pressure sterilizers, and conducts the vapors directly to the outside air. Sometimes called vapor, steam, atmosphere, or exhaust vent. *See Section 14.11*

Vent, Vapor: See “Vent, Sterilizer”.

Vent, Wet: A vent pipe that is sized and arranged in accordance with this Code to receive the discharge of waste from a fixture. *See Figure 1.2.77. Refer to Section 12.10 for other arrangements of wet venting.*

Vent, Yoke: A vertical vent pipe that connects up to ten branch intervals of a drain stack to its vent stack to relieve the pressure in the drain stack. *See Figure 1.2.78 and Section 12.3.2*

Comment: A yoke vent is vertical. No portion of a yoke vent can be horizontal.

Vertical Pipe: Any pipe or fitting that makes an angle of 45° or more with the horizontal. *See Section 12.3.2*

Wash Fountain: A large circular lavatory equivalent to a lavatory except it serves more than one person.

Wash Sink: A long rectangular lavatory except it serves more than one person.

Waste: Liquid discharge into a drain from a fixture, appliance, or other device that contains urine or fecal matter.

Waste Stack, Pipe, or Pipe: A vertical pipe that carries the discharge from fixtures (other than water closets) and appliances that does not contain urine or fecal matter.

Water Bottle Filling Station: A fixture that is connected to the building drainage system and provides for the filling of water bottles. Stations can be designed to include filtration units, self-cleaning nozzles, and drinking fountains.

Water Closet, Pressure Assisted: A low consumption water closet with an air accumulator vessel in the tank that stores water and air under pressure, using the water supply pressure. When flushed, the air produces a high velocity jet of water and air that forces the contents out of the bowl.

Water Closet, Pump Assisted: A low consumption water closet with a fractional horsepower pump in the tank that produces a high velocity jet in the trapway that assists the flushing action.

Water Closet, Vacuum Assisted: A low consumption water closet that uses the falling water level in the tank to induce a vacuum near the outlet of the trapway that assists the flushing action.

Water Closet, Wall Hung: A water closet designed and installed in such a way that no part of it touches the floor. *See Figure 1.2.80*

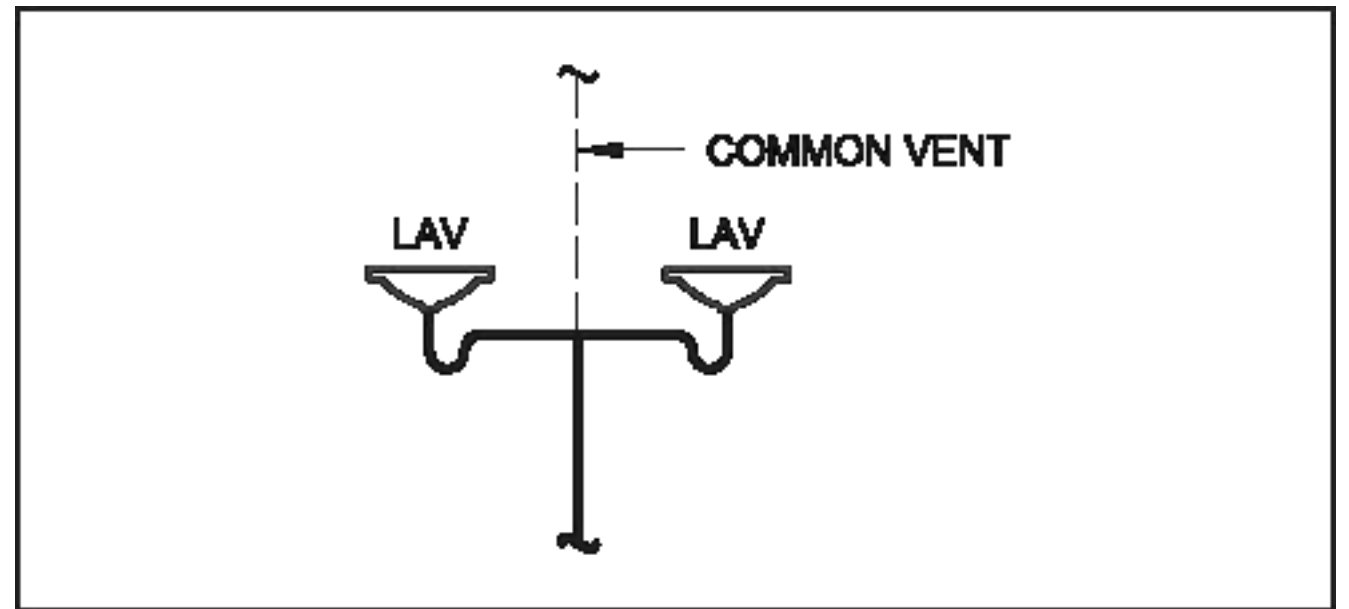


Figure 1.2.72
A COMMON VENT

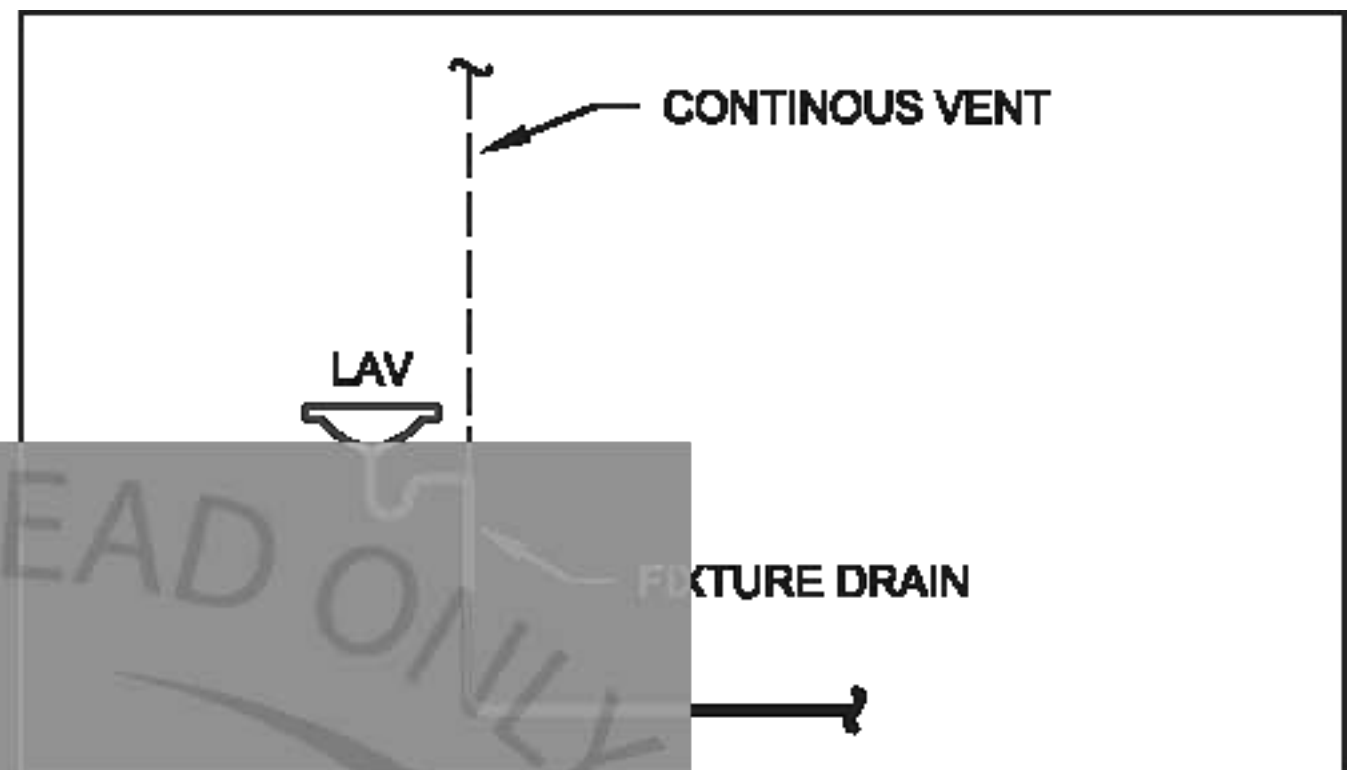


Figure 1.2.73
A CONTINUOUS VENT

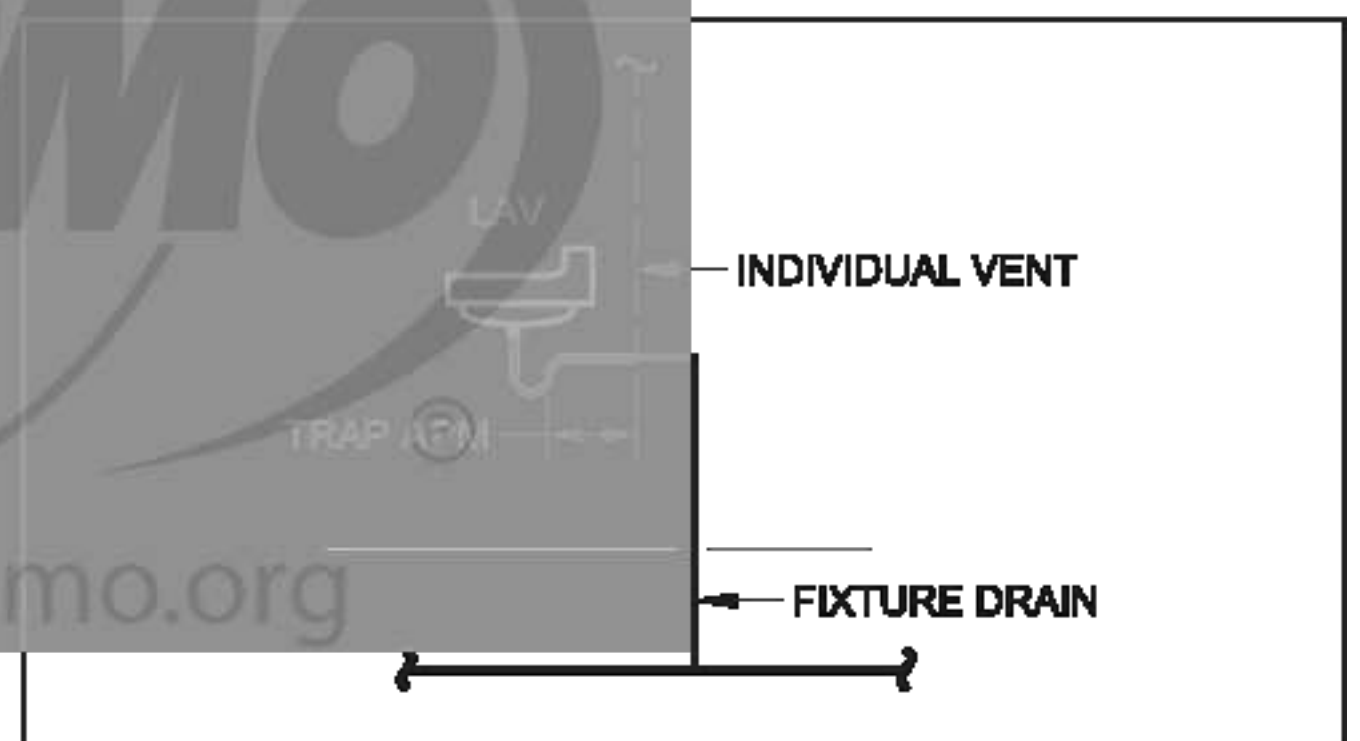


Figure 1.2.74
A INDIVIDUAL VENT

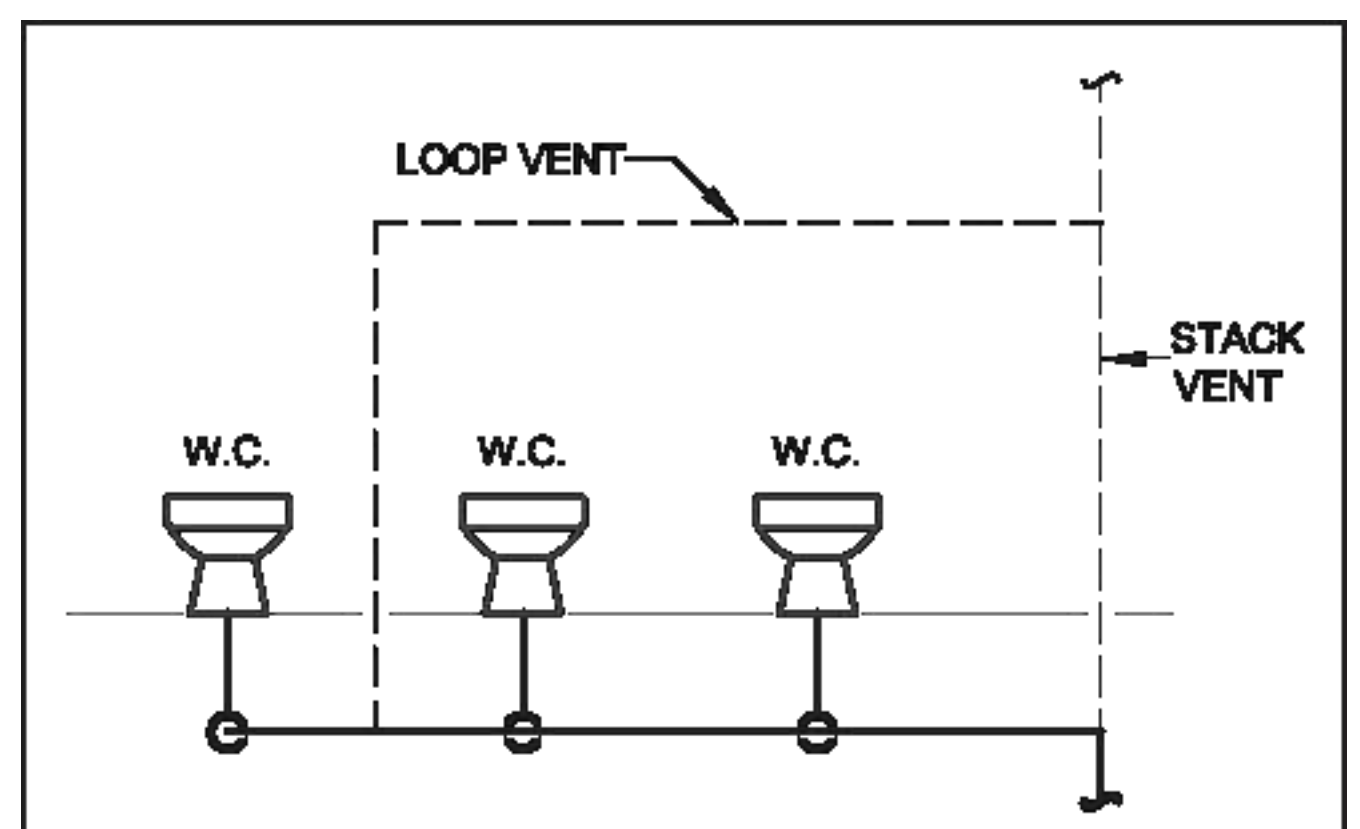


Figure 1.2.75
A LOOP VENT

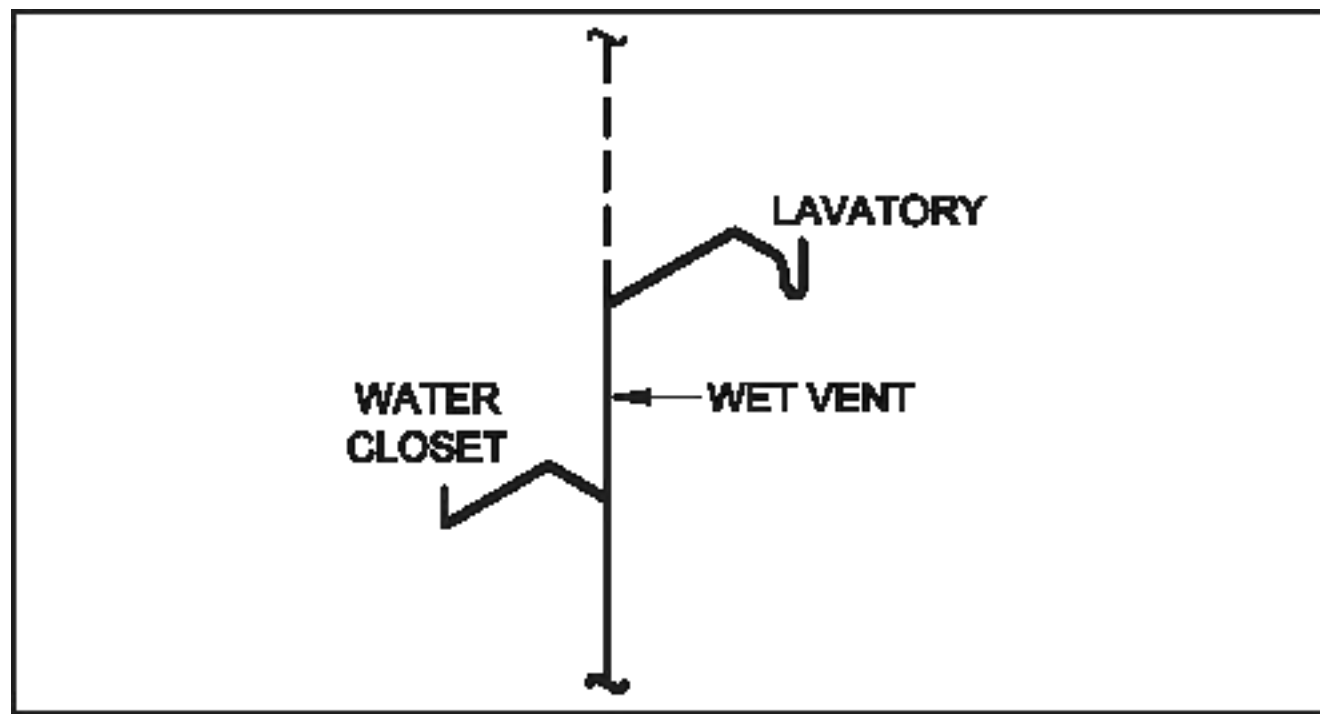


Figure 1.2.77
A WET VENT

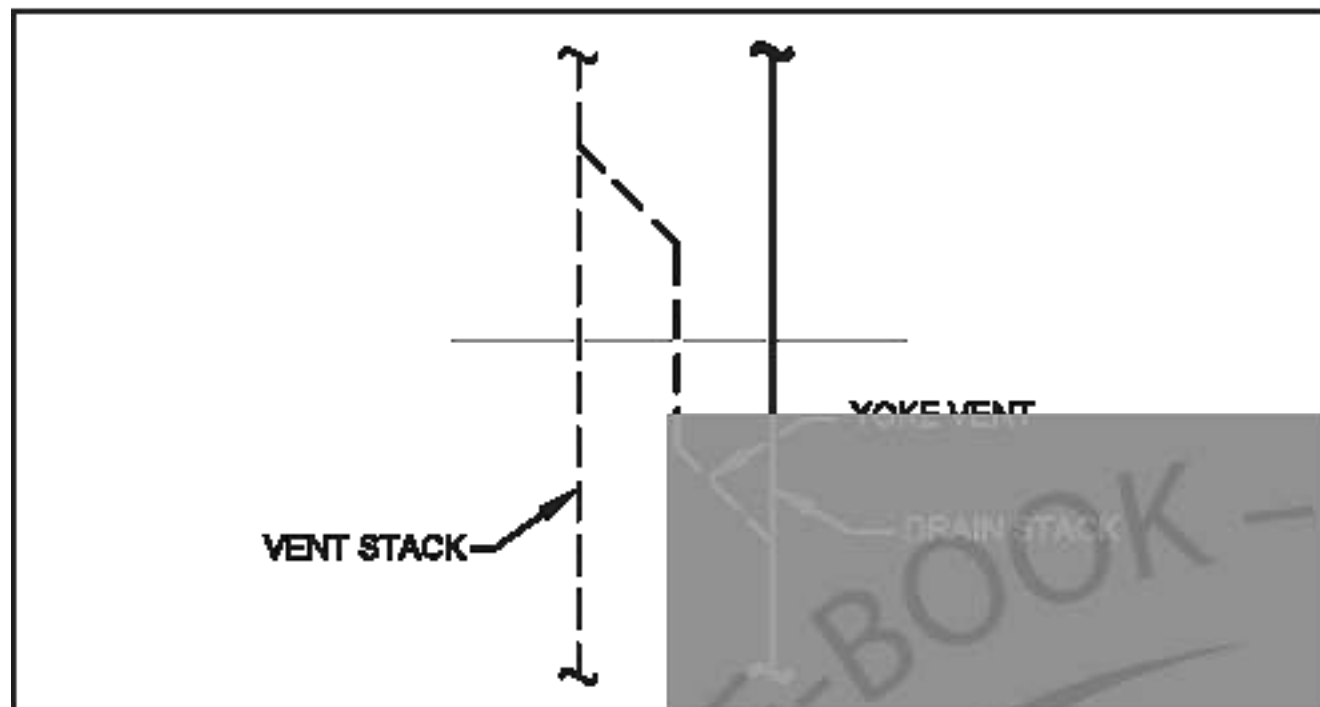


Figure 1.2.78
A YOKED VENT

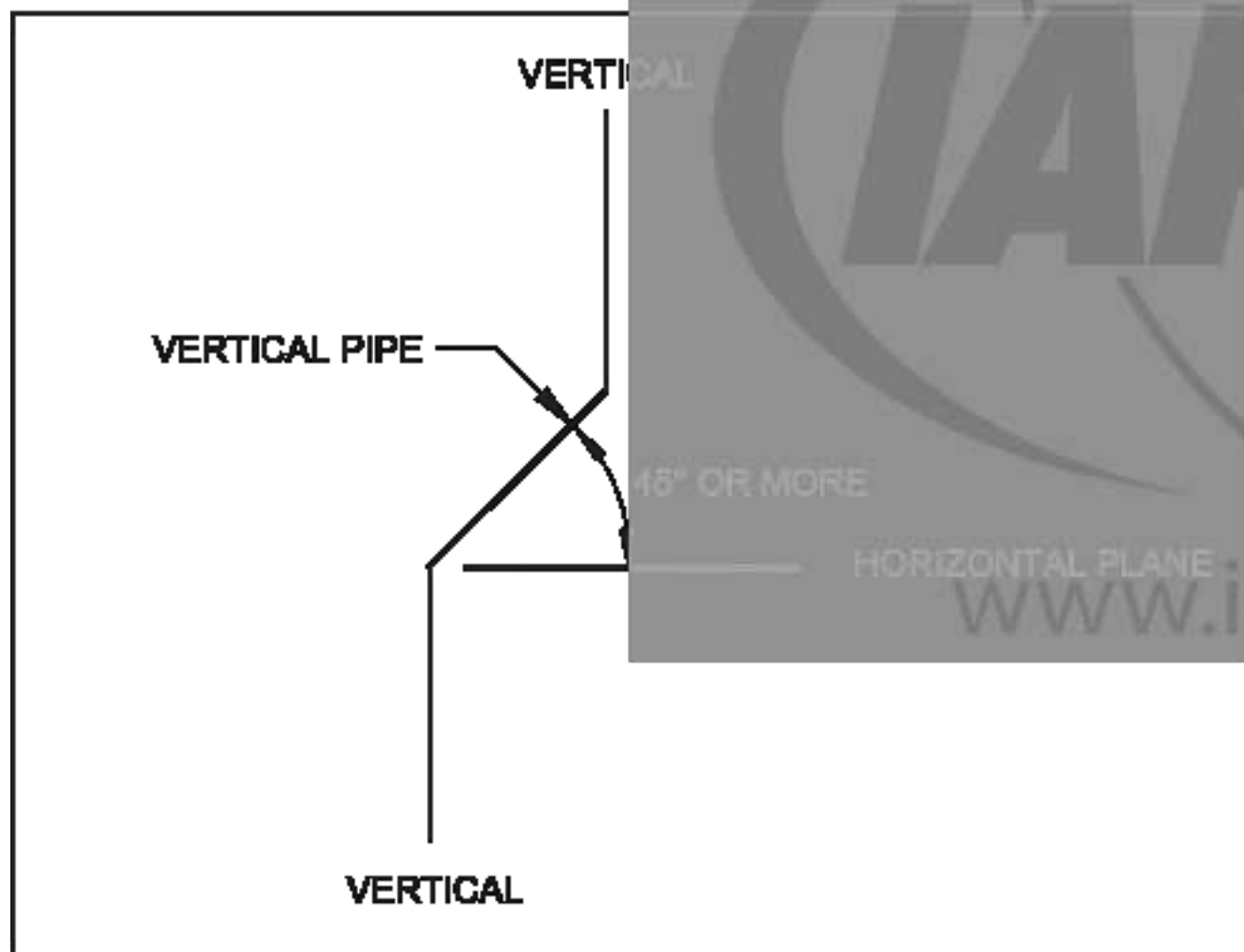


Figure 1.2.79
THE DEFINITION OF "VERTICAL PIPE"

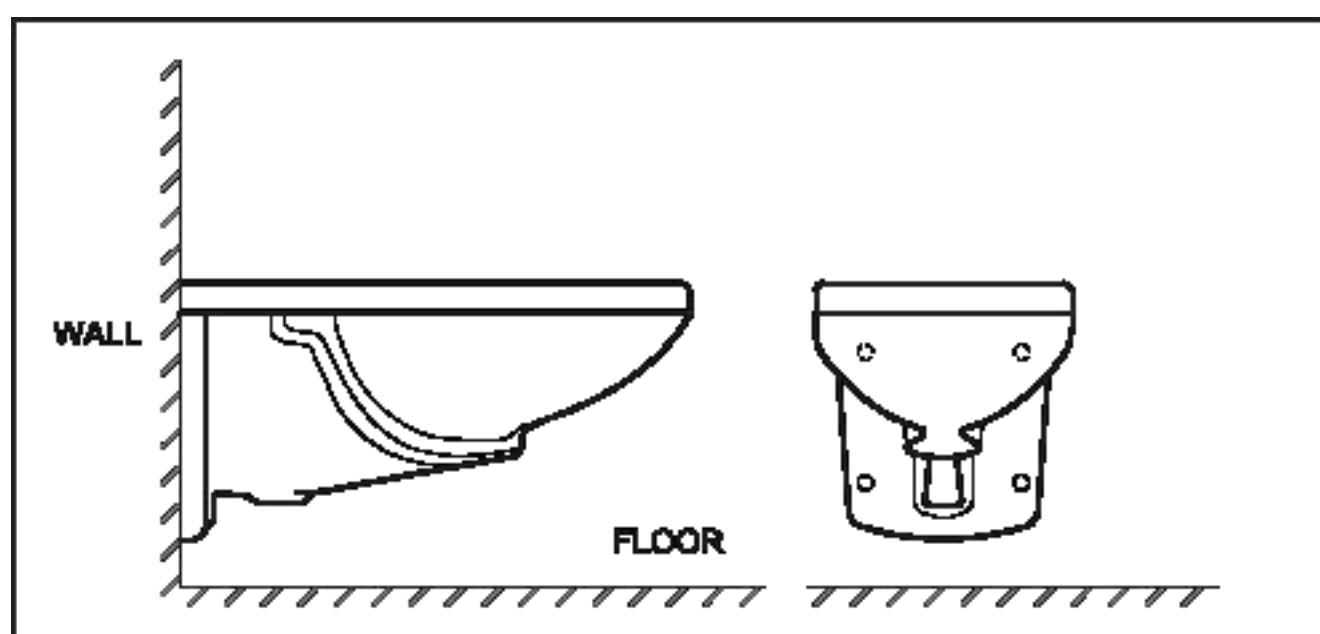
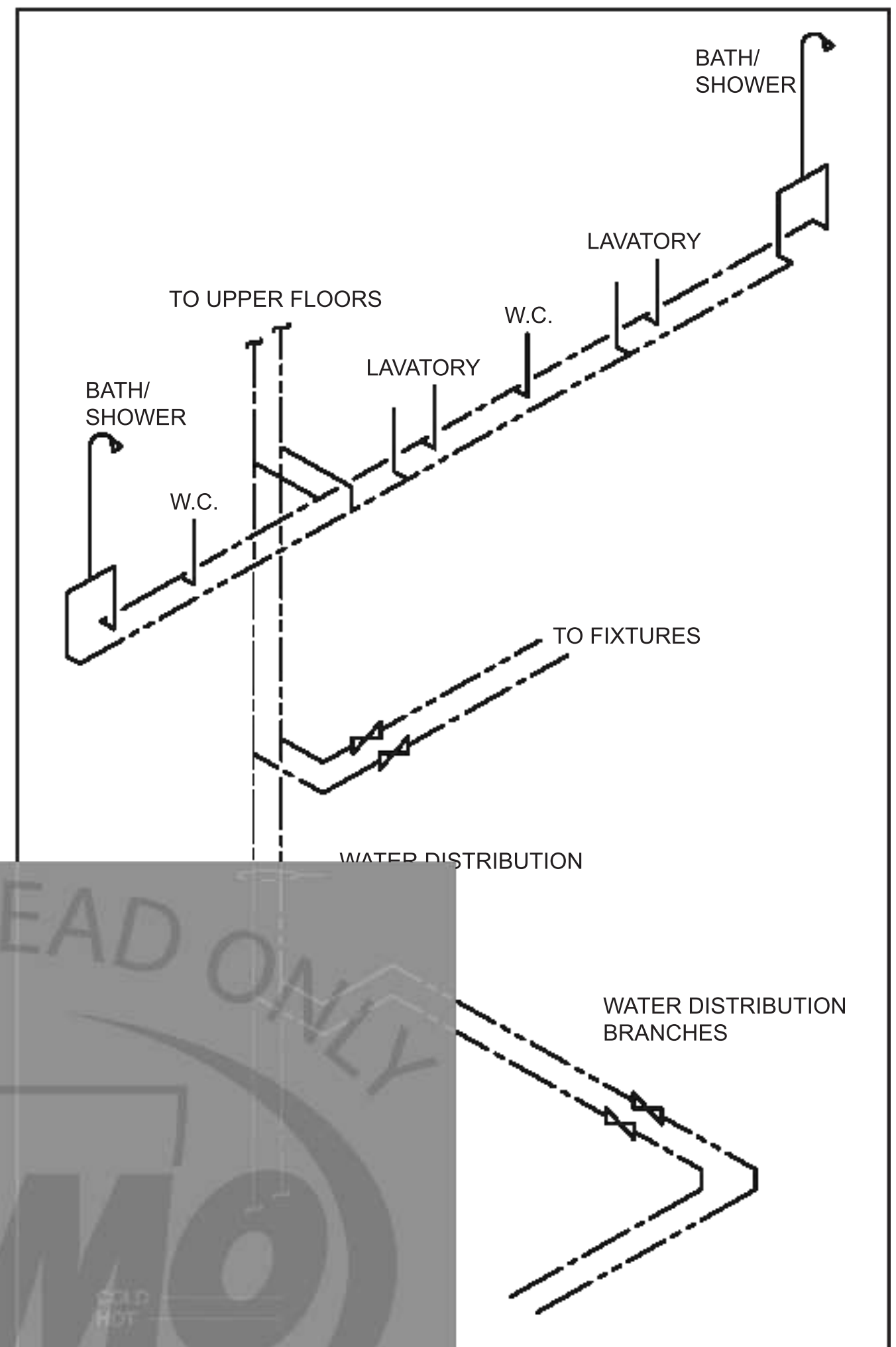


Figure 1.2.80
A WALL HUNG WATER CLOSET



1.2.81
DISTRIBUTION PIPING

Piping within the building or water from the water service piping to its points of use. It includes hot and cold water supply piping. *See Figure 1.2.81*

Water Hammer Arrestor: A manufactured pre-charged device operating through the compressibility of air. *See Figure 1.2.3*

Comment: Water hammer arrestors are either the bellows or piston type and are pre-charged with compressed air or gas. The Code no longer mentions air chambers, which are subject to losing their initial captive air charge through absorption into the system water.

Water Main: A water supply line that serves the public or a community and is under the jurisdiction of a municipality or water purveyor.

Water Service Piping: Piping from a water main or other source of potable water supply to the water distribution system within the building served. *See Figure 1.2.82 and Section 10.6*

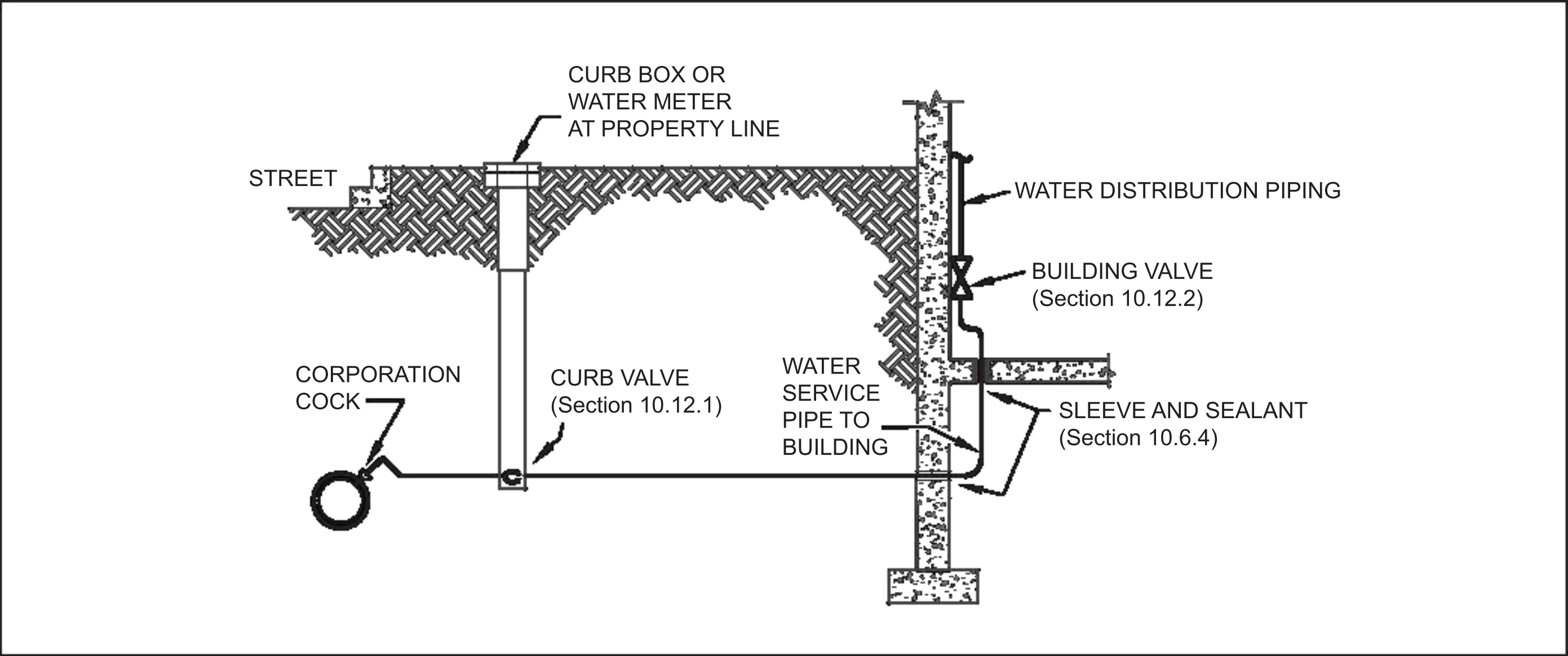


Figure 1.2.82
THE WATER SERVICE PIPE IN A PUBLIC WATER SUPPLY

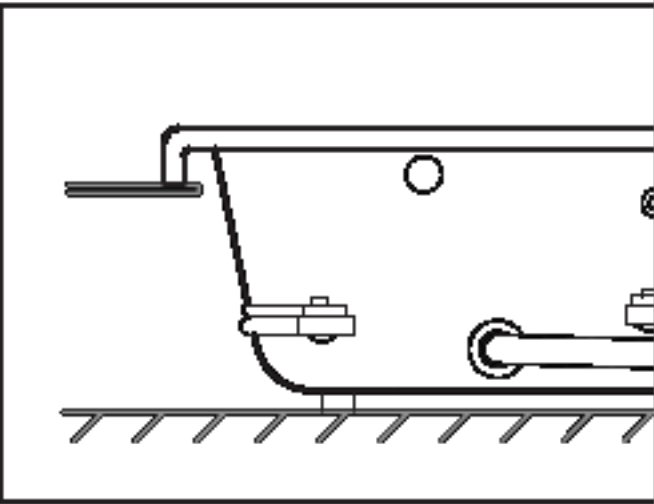


Figure
A WHIRLP

plumbing appliance consist-
is equipped and fitted with a
p, and other appurtenances and
te, and discharge bathtub water
83
ter Supply – WSFU)”

GENERAL REGULATIONS

2.1 RESERVED

2.2 CAST IRON SOIL PIPE MARKING

All cast iron soil pipe and fittings shall be listed and tested to comply with standards referenced in Table 3.1.3 and marked with country of origin and identification of the original manufacturer in addition to any markings required by those referenced standards.

2.3 CHANGES IN DIRECTION OF DRAINAGE PIPING

2.3.1 Uses for Drainage Fittings

a. Changes in direction of drainage piping shall be made with long radius drainage fittings except where short radius fittings are required or permitted.

1. Short radius fittings are fixture trap arms to vertical
2. Short radius fittings may an individual fixture.
3. Short radius fittings sh serving two or more fixtur
4. Short radius fittings sh drain stacks.
5. Short radius fittings may

b. Short radius drainage fittings are those having radius or centerline dimensions that are approximately equal to or less than their nominal pipe size. The radius or centerline dimensions of long radius drainage fittings are greater than their nominal pipe size.

c. Long radius drainage fittings shall not be used to connect fixture trap arms to vertical drain and vent piping. Connections to fixture vents shall be above the weir of the fixture trap.
EXCEPTION: Double wyes with 1/8 bends or 45-degree elbows that drain two lavatories into a common drain with a common vent shall be permitted.

See Figures 2.3.1-A, 2.3.1-B, 2.3.1-C, 2.3.1-D, 2.3.2, and 12.8.1-A

gs

Image fittings shall be the same
Table 2.3.1.

tees and crosses shall not be used, back-outlet water closets, water closets, and fixtures or charge. *See Figure 2.3.2*

Outlet Fixtures

be either the wye pattern,

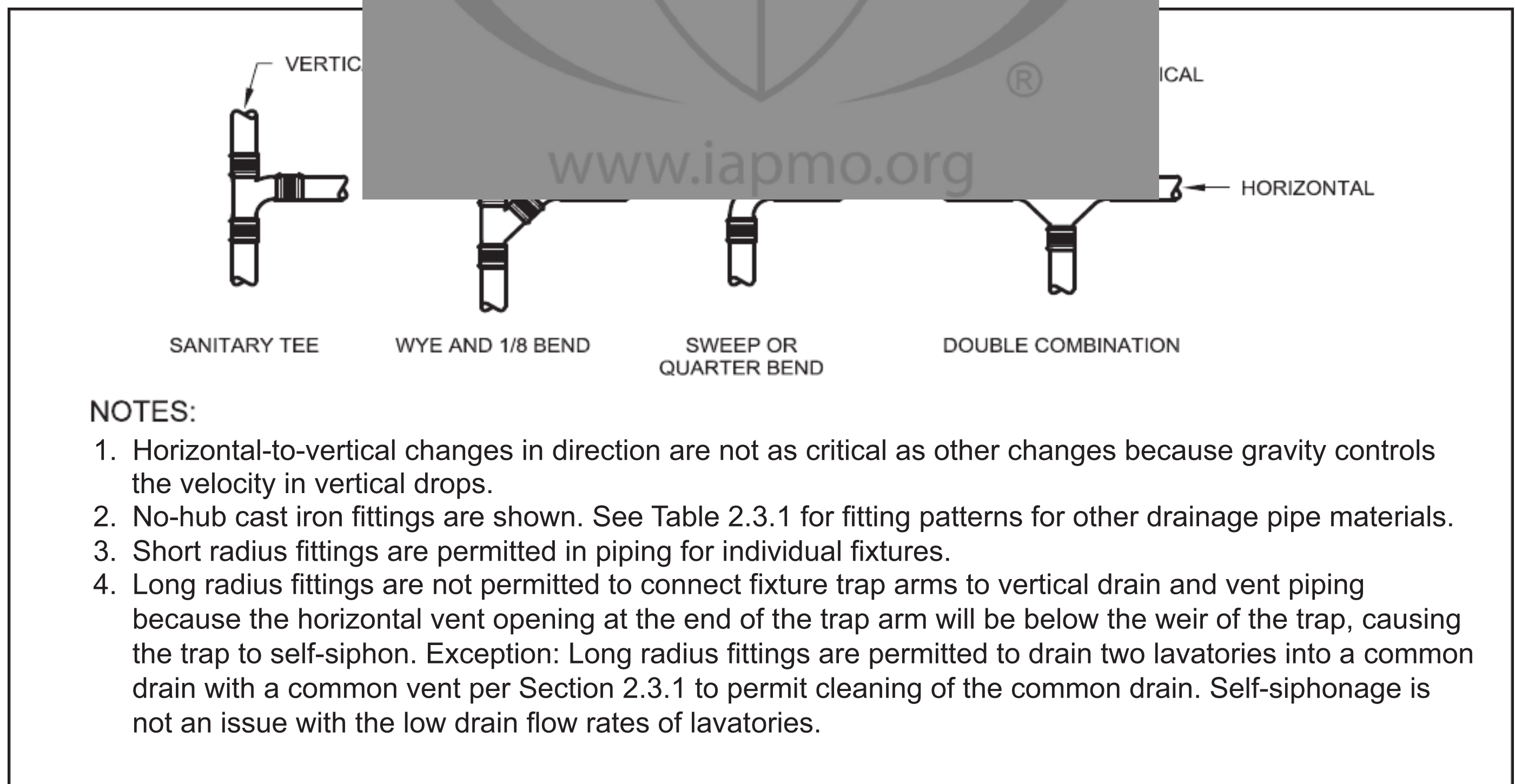


Figure 2.3.1 - A
DRAINAGE FITTINGS FOR HORIZONTAL-TO-VERTICAL CHANGES IN DIRECTION

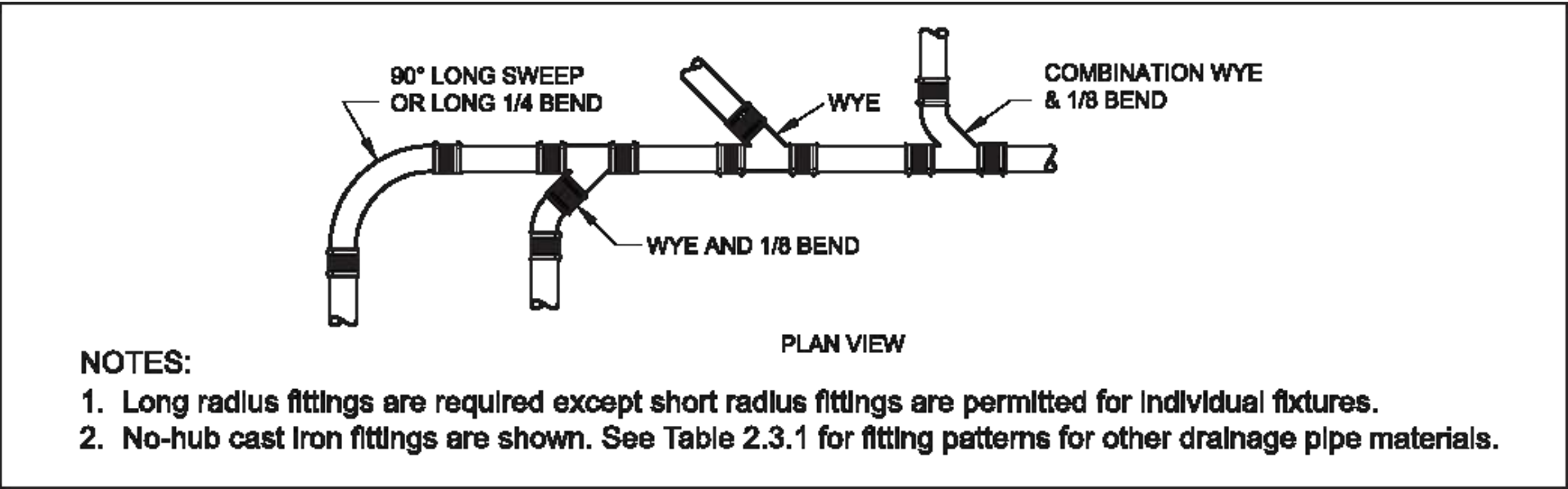
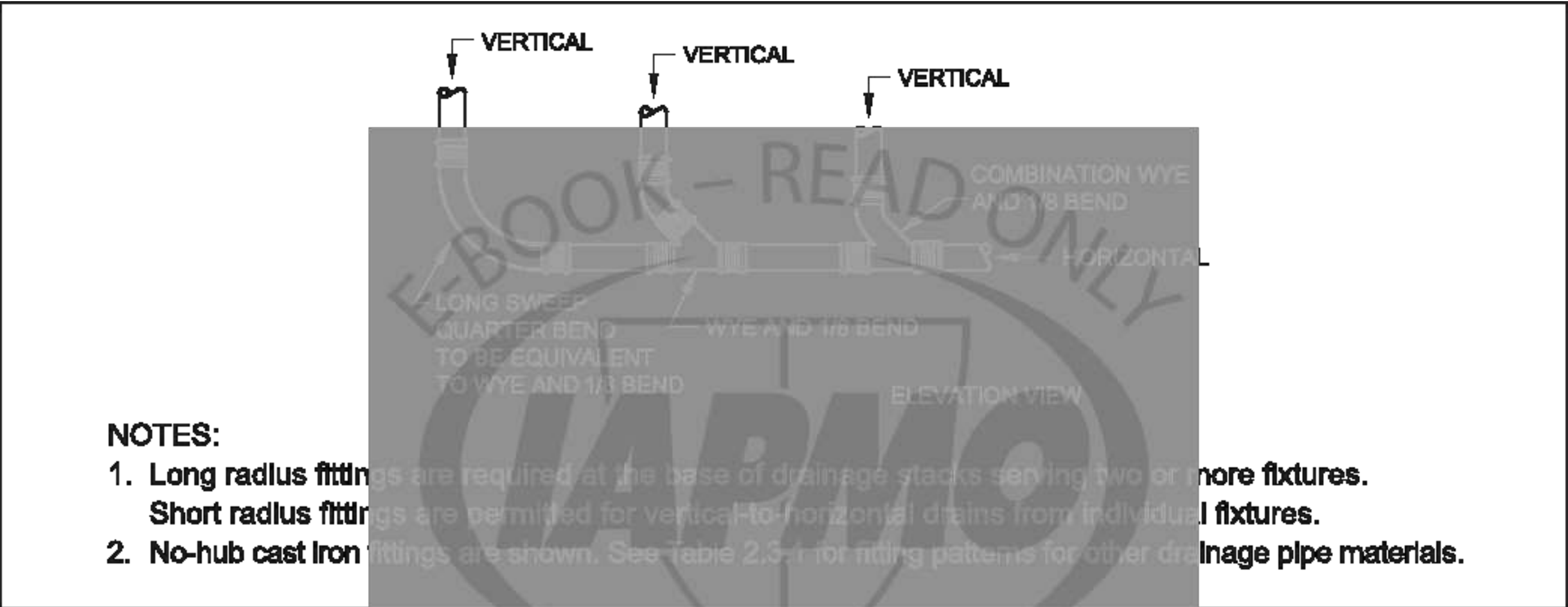


Figure 2.3.1 - B
DRAINAGE FITTINGS FOR HORIZONTAL-TO-HORIZONTAL CHANGES IN DIRECTION



DRAINAGE FITTINGS FOR HORIZONTAL-TO-HORIZONTAL CHANGES IN DIRECTION

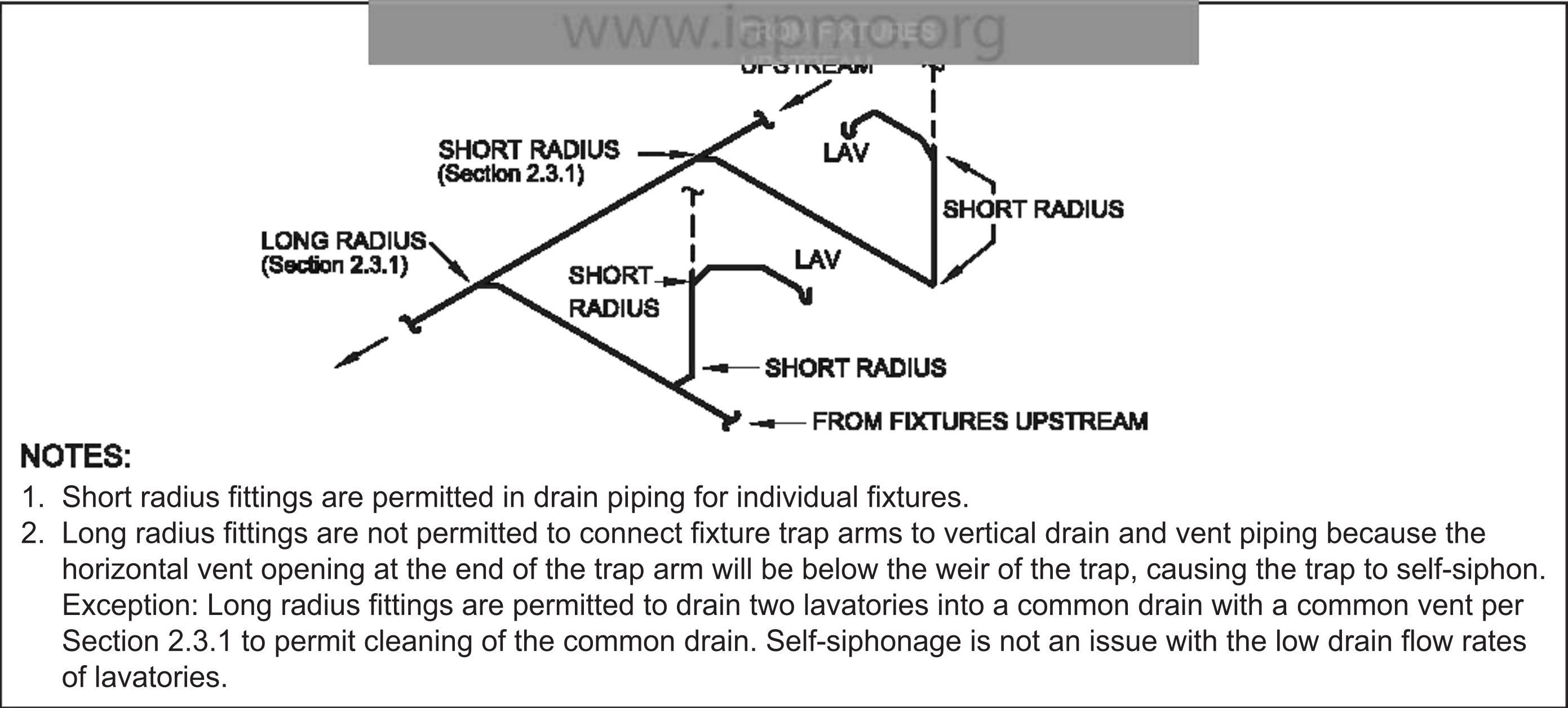
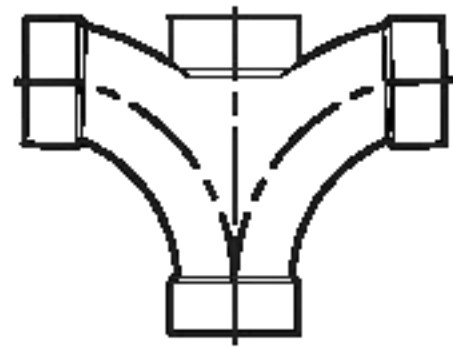
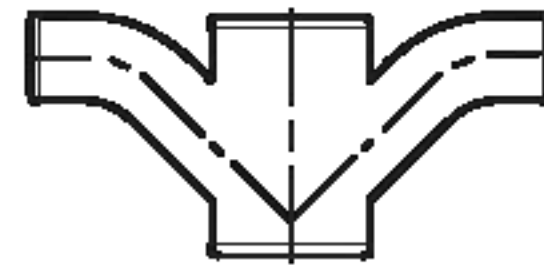


Figure 2.3.1 - D
USE OF SHORT AND LONG RADIUS DRAINAGE FITTINGS



DOUBLE FIXTURE FITTING - ENLARGED CHAMBER TO PREVENT CROSS-FLOW FROM ONE FIXTURE TO ANOTHER



DOUBLE COMBINATION WYE & 1/8 BEND HORIZONTAL DRAINAGE TO VERTICAL DRAINAGE

NOTES:

1. Double fixture fittings are used to connect two horizontal fixture trap arms to a vertical drain and common vent.
2. Long radius fittings are not permitted to connect fixture trap arms to vertical drain and vent piping because the vent opening at the end of the trap arm will be below the weir of the trap, causing the trap to self-siphon.

**Figure 2.3.2
DOUBLE PATTERN DRAINAGE FITTINGS**

incorporate baffles within the drainage fitting, or otherwise be designed to prevent crossflow or mixing of the discharges from the two fixtures prior to the change in direction. *See Figure 2.3.3*

2.4 FITTINGS AND CONNECTIONS IN DRAINAGE SYSTEMS

2.4.1 Prohibited Fittings

No running threads or saddles shall be used in the drainage or vent system. No drainage or vent piping shall be drilled, tapped, burned or welded.

2.4.2 Heel or Side-Inlet Quarter Bends

- a. A heel or side-inlet quarter bend shall not be used for a dry vent connection when the heel inlet or side inlet is placed in a horizontal position. *See Figure 2.4.2-A*
- b. Dry vents may be connected to a quarter bend when the heel inlet or side inlet is in a vertical position. *See Figure 2.4.2-B*

2.4.3 Obstruction to Flow

- a. No fitting, connection, device, or method of installation that obstructs or retards the flow of water, wastes, sewage, or air in the drainage or venting systems in an amount greater than the normal frictional resistance to flow, shall be used unless it is indicated as acceptable in this Code.
- b. 4x3 closet bends and 4x3 closet flanges shall not be considered as obstructions to flow.

Comment: Failure to ream or deburr drainage piping constitutes an obstruction to flow.

2.4.4 Prohibited Joints

Cement mortar joints are prohibited.

EXCEPTION: When used for repairs and/or when used for connections to existing lines constructed with such joints.

2.5 HEALTH AND SAFETY

Where a health or safety hazard is found to exist on a premise, the owner or his agent shall be required to make such corrections as may be necessary to abate such nuisance, and bring the plumbing installation within the provisions of this Code.

2.6 TRENCHING, BEDDING, TUNNELING AND BACKFILLING

2.6.1 Trenching and Bedding

a. Trenching and excavation for the installation of underground piping shall be performed in compliance with occupational safety and health requirements. Trenches shall be of sufficient width to permit proper installation of the pipe. Where shoring is required, additional allowance shall be made in the width of the trench to provide adequate clearance.

b. A firm, stable, uniform bedding shall be provided under the pipe for continuous support. Bell holes shall be provided for joints in bell and spigot pipe and for other joints requiring such clearance. Blocking shall not be used to support the pipe.

c. The trench bottom may provide the required bedding when adequate soil conditions exist and when excavated to the proper depth and grade. Where trenches are excavated to depths below the bottom of the pipe, bedding shall be added beneath the pipe as required. Such bedding shall be of clean sand, gravel, or similar select material that is compacted sufficiently to provide the support required under 2.6.1.b.

d. Where rock is encountered in trenching, it shall be removed to a depth of not less than 6 inches below the bottom of the pipe and bedding shall be added as required under 2.6.1.c. The pipe shall not rest on rock at any point, including joints.

See Figures 2.6.1-A and 2.6.1-B. Also Section 2.6.2, 2.6.3, and 2.6.4

Table 2.3.1 PERMISSIBLE DRAINAGE FITTINGS FOR CHANGES IN DIRECTION			
PIPE MATERIAL	CHANGES IN DIRECTION		
	HORIZONTAL TO HORIZONTAL	HORIZONTAL TO VERTICAL	VERTICAL TO HORIZONTAL
CAST IRON HUB & SPIGOT	long sweep	sanitary tee	eighth bend & wye
	short sweep	eighth bend & wye (2)	combination wye & eighth bend
	wye	combination wye & eighth bend	long sweep
	combination wye & eighth bend	long sweep	short sweep 3” or larger
	fifth bend (72-deg)	short sweep	quarter bend (1)
	sixth bend (60-deg)	quarter bend	short sweep (1)
CAST IRON NO-HUB	eighth bend (45-deg)		
	sixteenth bend (22-1/2 deg)		
	quarter bend		
CAST IRON DRAINAGE (threaded)	extra long turn 90-deg elbow	drainage tee	long turn 90-deg TY
	long turn 90-deg elbow	short turn 90-deg TY	extra long turn 90-deg elbow
	long turn 45-deg elbow	long turn 90-deg TY (2)	long turn 90-deg elbow
	short turn 22-1/2 deg elbow	45-deg elbow or 45-deg Y branch (2)	short turn 90-deg elbow (1)
	short turn 11-1/4 deg elbow	extra long turn 90-deg elbow	45-deg elbow & 45-deg Y branch (1)
	long turn 90-deg TY	long turn 90-deg elbow	
	short turn 45-deg Y branch	short turn 90-deg elbow	
	short turn 90-deg elbow		
	short turn 60-deg elbow		
	short turn 45-deg elbow		
COPPER DWV	DWV 90-deg long radius elbow	DWV tee	DWV long turn T-Y
	90-deg elbow - long radius	DWV 90-deg sanitary tee	45-deg elbow & DWV 45-deg Y
	DWV long turn T-Y	DWV long turn T-Y (2)	DWV 90-deg long radius elbow
	DWV 45-deg Y	45-deg elbow & DWV 45-deg Y (2)	90-deg elbow - long radius
	DWV 90-deg elbow	DWV 90-deg long radius elbow	DWV 90-deg elbow (1)
	DWV 45-deg elbow	90-deg elbow - long radius	
		DWV 90-deg elbow	
PLASTIC DWV	90-deg long turn elbow	sanitary tee	long radius TY
	long sweep 1/4 bend	fixture tee	45-deg elbow and 45-deg wye
	60-deg elbow or 1/6 bend	long radius TY (2)	90-deg long turn elbow
	45-deg elbow or 1/8 bend	45-deg elbow & DWV 45-deg Y (2)	90-deg elbow or 1/4 bend (1)
	22-1/2 deg elbow or 1/16 bend	90-deg long turn elbow	
	long radius TY	90-deg elbow or 1/4 bend	
	45-deg wye		
	90-deg elbow or quarter bend		
STAINLESS STEEL PUSH-FIT DWV	long sweep	tee	eighth bend & wye (2)
	wye	sanitary tee	combination wye & eighth bend
	combination wye & eighth bend	eighth bend & wye (2)	long sweep
	15-degree 1/24 bend	combination wye & eighth bend	90-degree 1/4 bend (1)
	22-1/2 degree 1/16 bend	long sweep	
	30-degree 1/12 bend	90-deg 1/4 bend	
	45-degree 1/8 bend		
	90-deg 1/4 bend		

NOTES FOR TABLE 2.3.1

- (1) Short radius fittings shall not be permitted in horizontal offsets in drainage stacks and at the base of stacks.
- (2) Long radius fittings shall not be used to connect fixture trap arms to vertical drain and vent piping. Exception: Long radius fittings are permitted to drain two lavatories into a common drain with a common vent per Section 2.3.1.

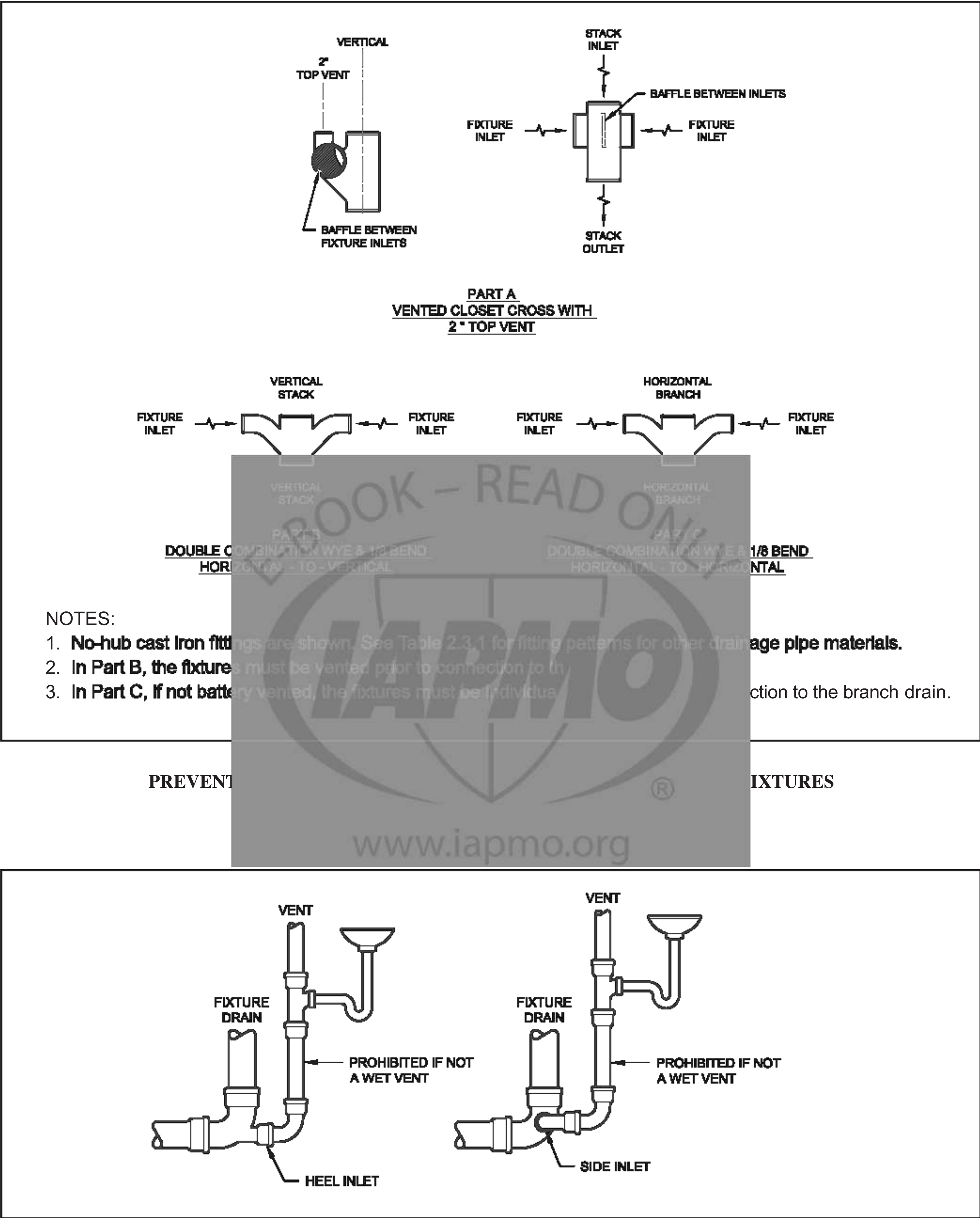


Figure 2.4.2 - A
HORIZONTAL HEEL OR SIDE INLET VENT CONNECTION

GENERAL REGULATIONS

2.6.2 Side-fill

The haunch areas adjacent to the pipe between the bottom of the pipe and its horizontal centerline shall be filled with a clean coarse-grain material such as sand, gravel, or soil. Such side-fill shall be placed by hand, extending to the sides of the trench, and be compacted to provide lateral support for the pipe. *See Figures 2.6.1-A and 2.6.1-B*

2.6.3 Initial Backfill

- Backfill material shall be sand, gravel, or loose soil that is free of rocks and debris. Maximum particle size shall be 1-1/2 inches.
- The side fill adjacent to the pipe shall be backfilled, tamped, and compacted to the top of the pipe.
- After the side-fill is backfilled, the trench shall be backfilled in not more than 6-inch layers, each tamped and compacted, to a level not less than 2 feet above the top of the pipe.
- Heavy equipment shall not be used for the initial backfill.

See Figure 2.6.3

2.6.4 Final Backfill

The trench shall be backfilled from the top of the compacted initial backfill to finish grade using suitable material. Heavy compacting equipment may be used for the final backfill. *See Figure 2.6.3*

2.6.5 Tunneling

When pipe is installed in a dug or bored earth tunnel, the space around the pipe between the pipe and the wall of the tunnel shall be completely filled with packed concrete or grout. When pipe is installed in a jacked-in-place conduit or sleeve, the space around the pipe between the pipe and the inside of the conduit or sleeve shall be sealed in an approved manner in accordance with Section 2.12.d.

2.6.6 Underground Plastic Pipe

- Underground plastic pipe shall be installed in accordance with the requirements of Section 2.6.

EXCEPTIONS:

- The maximum particle size in the side-fill and initial backfill shall be not more than 1/2-inch for pipe 6" size and smaller, and 3/4-inch for pipe 8" and larger.
 - For water service piping, refer to ASTM D2774, Standard Practice for Underground Installation of Thermoplastic Pressure Piping.
 - For gravity-flow drainage pipe, refer to ASTM D2321, Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-flow Applications.
- An insulated copper tracer wire or other approved conductor shall be installed adjacent to underground non-metallic water service piping and non-metallic force mains, to facilitate locating the piping. One end shall be brought above ground inside or outside the building wall. The tracer wire for the water service shall originate at the curb valve required in Section 10.12.1. The tracer wire for the force main shall

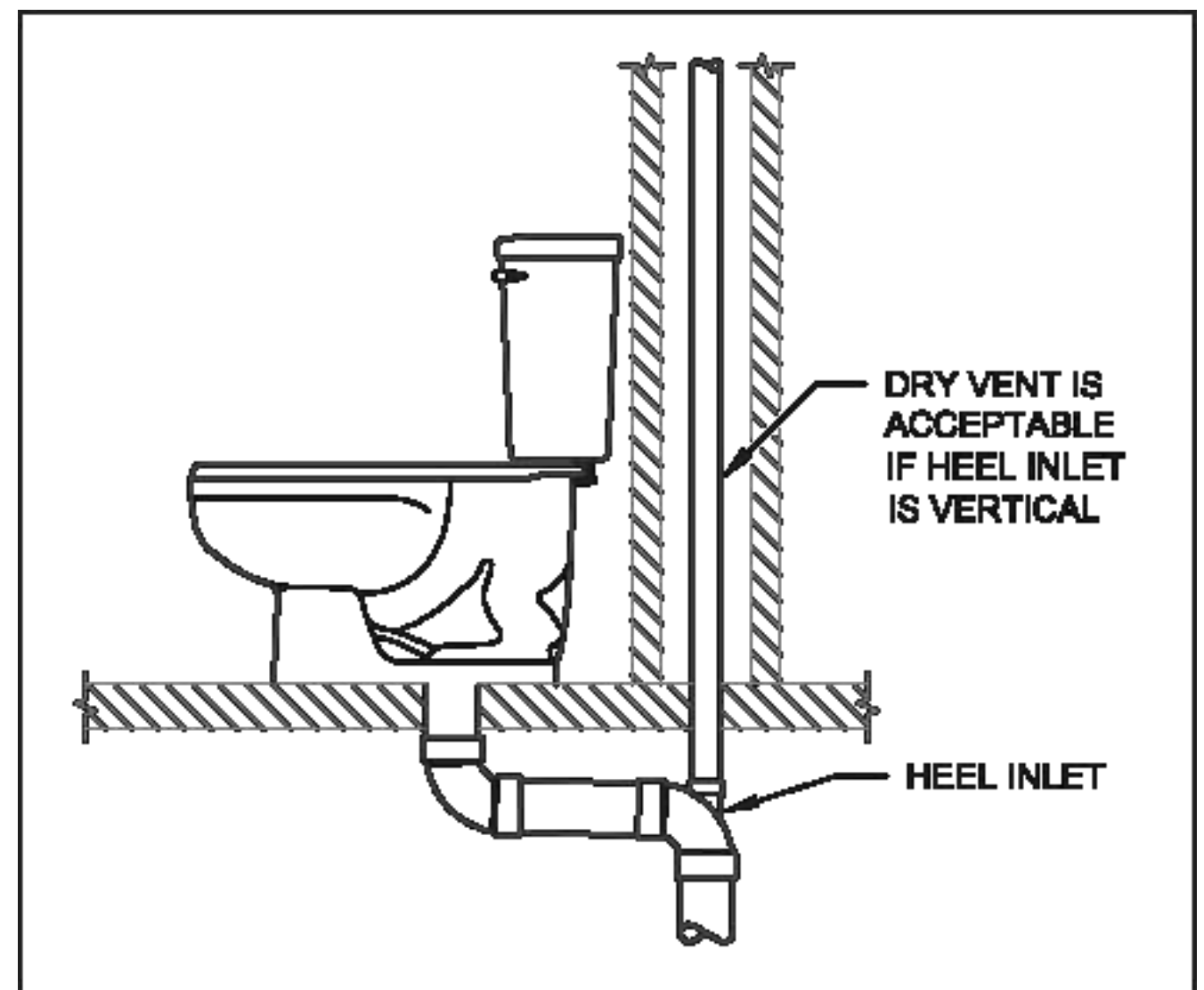


Figure 2.4.2 - B
VERTICAL HEEL INLET VENT CONNECTION

originate at the final point of disposal. The tracer wire shall not be less than 18 AWG insulated. The insulation shall not be yellow in color.

2.6.7 Underground Copper Piping Under-ground copper piping shall be installed in accordance with the requirements of Section 2.6. EXCEPTION: The maximum particle size in the side-fill and initial backfill shall be not more than 1/2-inch for pipe 6" size and smaller, and 3/4-inch for pipe 8" and larger.

2.6.8 Safety Precautions

Rules and regulations pertaining to safety and protection of workers, other persons in the vicinity, and neighboring property shall be adhered to where trenching or similar operations are being conducted.

2.6.9 Supervision

Where excavation, bedding or backfilling are performed by persons other than the installer of the underground piping, the pipe installer shall supervise the bedding, side-fill, and initial backfill, and shall be responsible for its conformance to this Code.

2.6.10 Trenchless Pipe Replacement Systems

Trenchless replacement of water and sewer piping shall be performed using equipment and procedures recommended by the equipment manufacturer. Where underground piping beneath paved surfaces or concrete floor slabs is replaced by this method, the manufacturer's recommendations for the specific conditions shall be used. Approved mechanical couplings shall be used to make the connections between new and existing piping.

Comment: When piping beneath paving or concrete floors is replaced by the trenchless method, there must be sufficient distance above the pipe to prevent cracking the paving or floor slab when the pipe being replaced bursts.

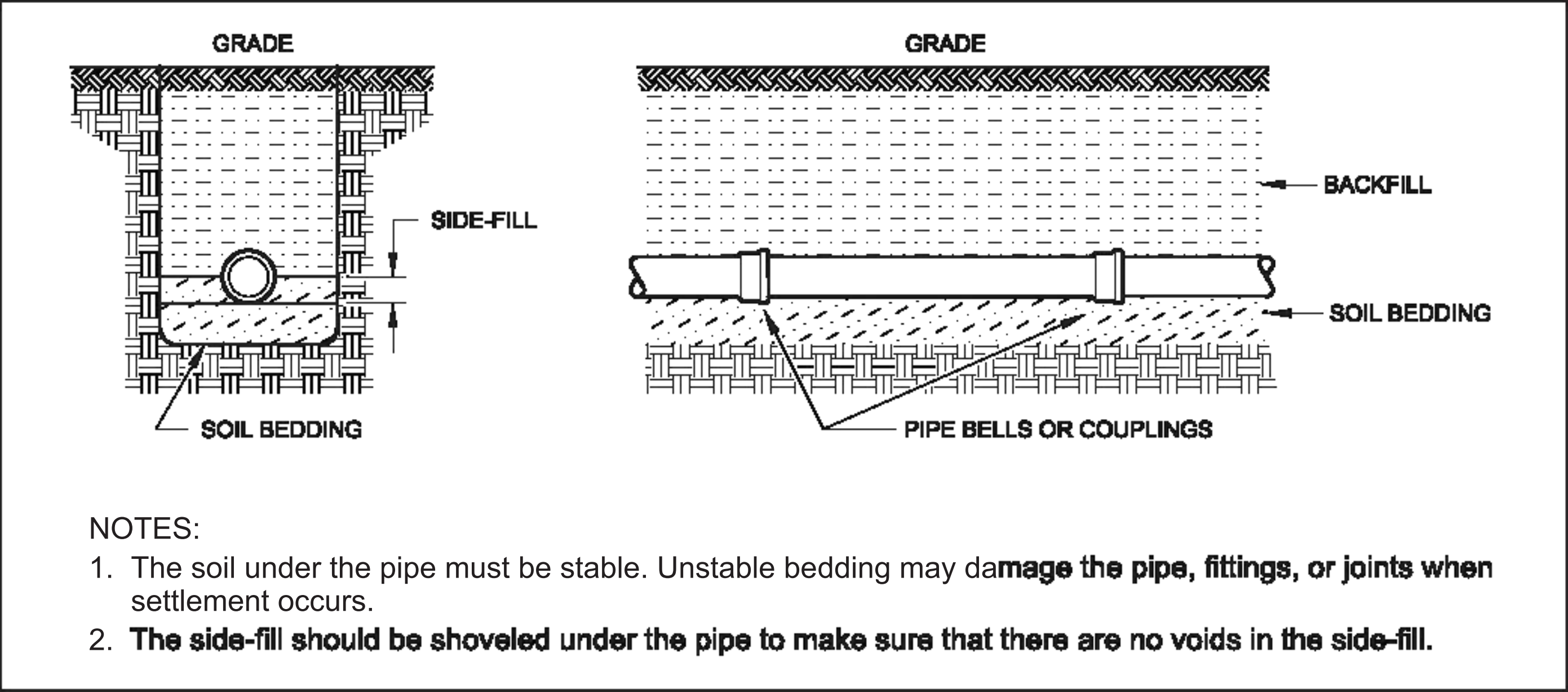


Figure 2.6.1 - A

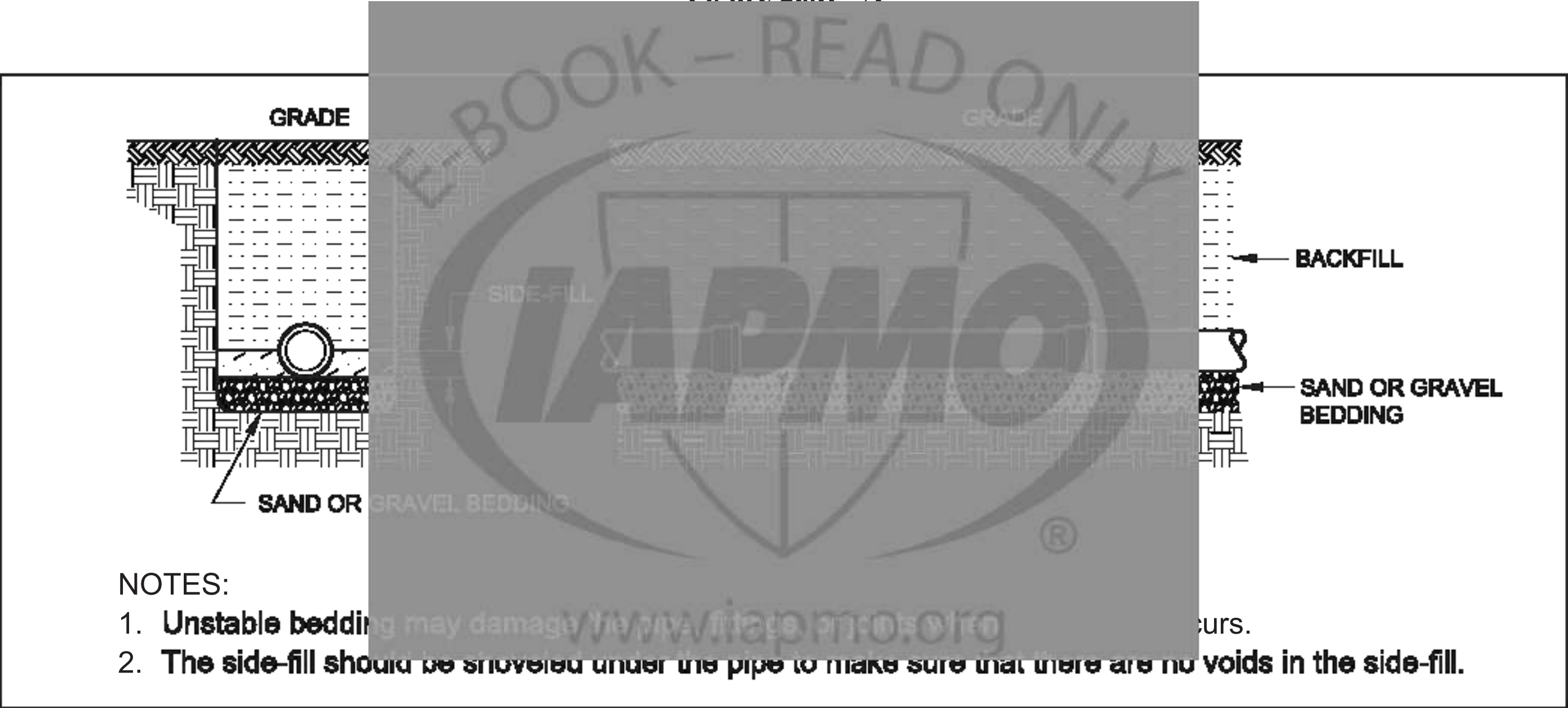


Figure 2.6.1 - B
UNDERGROUND PIPING BEDDED ON SAND OR GRAVEL

2.7 SAFETY

Any part of a building or premise that is changed, altered, or required to be replaced as a result of the installation, alteration, renovation, or replacement of a plumbing system, or any part thereof, shall be left in a safe, non-hazardous condition.

2.8 INSTALLATION PRACTICES

Plumbing systems shall be installed in a manner conforming to this Code and industry installation standards.

2.9 PROTECTION OF PIPES

2.9.1 From Breakage

Pipes passing under or through foundation walls shall be protected from breakage.

2.9.2 From Corrosion

Pipe subject to corrosion by passing through or under corrosive fill, such as, but not limited to, cinders, concrete, or other corrosive material, shall be protected against external corrosion by protective coating, wrapping, or other means that will resist such corrosion.

Comment 1: Soil samples should be taken to assure that the soil will not corrode the pipe. Wrappings and coatings reduce contact corrosion, but cathodic protection may be required where stray electric currents exist.

Comment 2: Job site debris should not be allowed in the backfill for piping trenches. Material such as metal cans, metal studs, and gypsum board may chemically react with some types of pipe.