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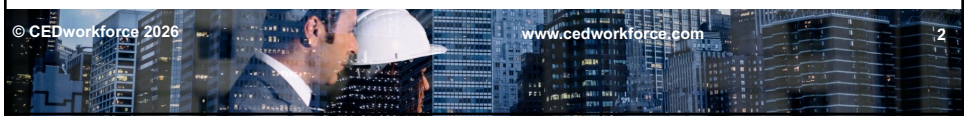

Vermont Plumbing Rules
and 2024 IPC with Changes
from 2021 including VT
Amendments to the Code
P08C-05I
8 Hours

Vermont Plumbing Rules and 2024 IPC with Changes from 2021 including VT Amendments to the Code

Course No: P08C-05I - Course Credit: 8 Hours

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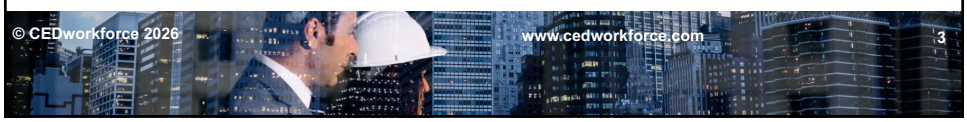


OVERVIEW

PART I: Vermont Plumbing Rule

- This part This part of the course introduces the 2025 Vermont Plumbing Rules and explains their purpose, scope, and overall structure. It covers key topics such as licensing requirements, inspections, work notices, and enforcement procedures. The goal is to provide a clear understanding of how plumbing work is regulated and administered in the State of Vermont.

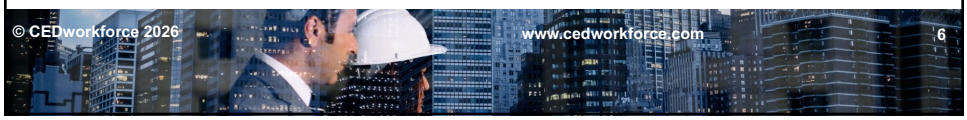
PART II: International Plumbing Code 2024 & Changes from 2021

- This part of the course focuses on the 2024 International Plumbing Code and highlights the key changes from the 2021 edition. It examines updated requirements, revised technical provisions, and newly introduced standards that impact plumbing design and installation. The objective is to help learners clearly understand what has changed and how those changes affect code compliance.

PART I: Vermont Plumbing Rule

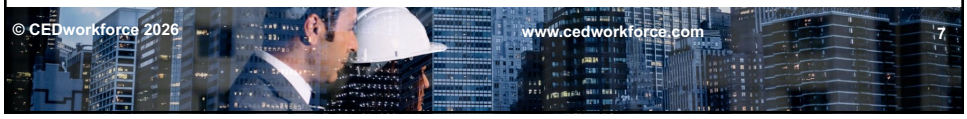
LEARNING OBJECTIVES

1. Understand the purpose and scope of the 2025 Vermont Plumbing Rules and how they apply to different building types and plumbing work.
2. Identify licensing requirements for master plumbers, journeyman plumbers, apprentices, and specialists under Vermont law.
3. Explain the work notice process, including when it is required, validation procedures, and inspection obligations.
4. Recognize Vermont-specific amendments to the 2024 International Plumbing Code and how they differ from the base IPC provisions.
5. Apply Vermont regulatory requirements related to inspections, enforcement, and disciplinary procedures.
6. Distinguish between priority and non-priority plumbing work and understand how inspection priorities are determined.



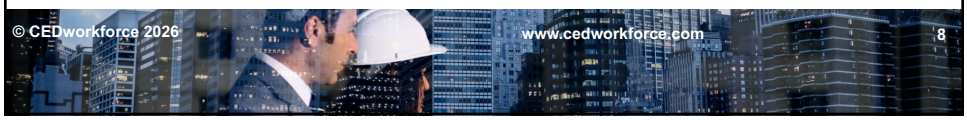
Introduction

- The 2025 Vermont Plumbing Rules establish the regulatory framework governing plumbing work within the State of Vermont.
- These rules are adopted by the Plumbers' Examining Board under Title 26 V.S.A. Chapter 39 and are enforced by the Department of Public Safety.
- The rules incorporate the 2024 International Plumbing Code (IPC) with Vermont-specific amendments to address state requirements and regulatory authority.
- Compliance with these rules is mandatory for licensed plumbers, building owners, and all plumbing work subject to Vermont jurisdiction.



INTRODUCTION (CONT'D)

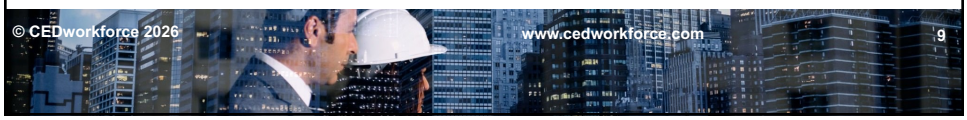
- The purpose of the Vermont Plumbing Rules is to protect public health, safety, and welfare through proper plumbing system design, installation, and maintenance.
- The rules regulate potable water supply, wastewater conveyance, sanitation systems, hydronic heating systems, and water treatment installations.
- The Plumbers' Examining Board has authority to adopt rules, issue licenses, conduct examinations, and discipline license holders.
- The Commissioner of Public Safety oversees enforcement, inspections, and administrative actions.



INTRODUCTION (CONT'D)

In this part of the course, we will review the following key sections of the Vermont Plumbing Rules:

- Section 1 – Purpose of the Rules
- Section 2 – Scope of the Rules
- Section 3 – Definitions
- Section 6 – Duties of the Owner
- Section 7 – Duties of a License Holder
- Section 8 – License Examinations
- Section 9 – Renewal of License



- Section 10 – Plumbing License Fees
- Section 13 – Disciplinary Proceedings
- Section 16 – Inspection of Plumbing Installations
- Section 20 – Request for Reconsideration
- The objective is to provide a clear understanding of regulatory responsibilities, licensing requirements, and enforcement procedures under Vermont law.

SECTION 1 PURPOSE OF THE RULES

The purpose of these rules is to protect and improve the general health and welfare of the people of the State of Vermont in the fields of environmental sanitation, water treatment, domestic hot and cold water supply/distribution piping and hydronically related heating systems, by authorizing and enforcing rules and regulations for properly designed, acceptably installed and adequately maintained plumbing, water treatment and hydronically related heating systems and by licensing qualified plumbers and qualified heating and water treatment specialists.

These rules are enacted in conformance with the Vermont statutes covering plumbers and plumbing.

SECTION 2 SCOPE OF THE RULES

- These rules shall apply to all public buildings, whether or not they are connected to a public water system or a public sewerage system, and to all other buildings or facilities connected to a public water or sewerage system. This includes owner-occupied single-family residences. Owner-occupied single-family residences which are not connected to a public water system or a public sewerage system do not require a work notice.
- Existing public buildings, and all other existing buildings or facilities which are connected to a public water system or public sewerage system must comply with these rules whenever the plumbing in those buildings or premises is changed, replaced, or altered. These rules shall not apply to existing private dwellings or public buildings except as the plumbing systems in them may be altered in the future.

A. These rules shall apply to all public buildings, whether or not they are connected to a public water system or a public sewerage system, and to all other buildings or facilities connected to a public water or sewerage system. This includes owner-occupied single-family residences. Owner-occupied single-family residences which are not connected to a public water system or a public sewerage system do not require a work notice.
   - Existing public buildings, and all other existing buildings or facilities which are connected to a public water system or public sewerage system must comply with these rules whenever the plumbing in those buildings or premises is changed, replaced, or altered.
   - These rules shall not apply to existing private dwellings or public buildings except as the plumbing systems in them may be altered in the future.

All new plumbing work must comply with the current Vermont State Plumbing Code.

B. Section 403.4.2 shall apply to all new and existing single user toilet facility/room.

SECTION 3 DEFINTIONS

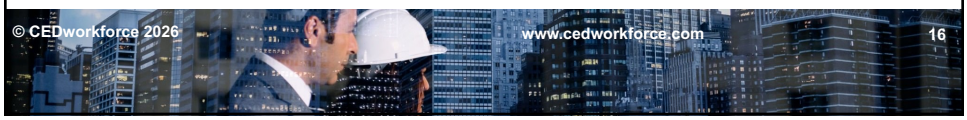
A. The definitions set out at 26 V.S.A. Section 2172 shall be applicable for these rules:

1) A "public water system" or "public sewerage disposal system" shall mean any system supplying or serving 15 or more customers, each family, tenement, store, or other establishment being considered a single customer.

2) A "master plumber" shall mean any person, licensed under this chapter, as a business, designs and/or installs plumbing systems, hires or employs a person or persons to perform plumbing work, or supervises journeyman plumbers, or apprentice plumbers in completion of their work. Licensed master plumbers may perform all aspects of the trade under a specialist license without being required to obtain a specialist license.

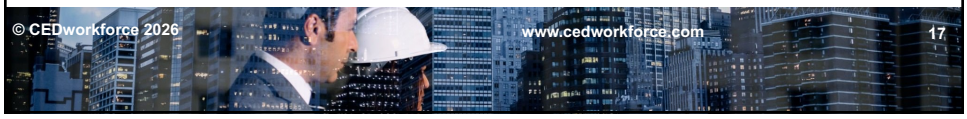
SECTION 3 DEFINITIONS (CONT'D)

3) A "journeyman plumber" shall mean any person licensed under this chapter who installs plumbing and water treatment or heating specialties under the direction of a master plumber. A journeyman plumber may supervise an apprentice employed by a master plumber and under the master plumber's direction. A journeyman plumber may perform all plumbing covered by a specialist license without being required to obtain a specialist license. A journeyman plumber shall not act as a master plumber.
4) An "apprentice plumber" shall mean any person, employed by a master plumber or under the direction of a master plumber or a journeyman plumber, who is engaged in learning and assisting in the installation of plumbing and water treatment or heating specialties under an apprenticeship program properly registered with the Vermont Apprenticeship Council. An apprentice plumber shall be supervised on the job by either a master or a journeyman plumber as per Vermont Department of Labor apprenticeship guidelines.



SECTION 3 DEFINITIONS (CONT'D)

5) A "journeyman plumber" shall mean any person licensed under this chapter who installs plumbing and water treatment or heating specialties under the direction of a master plumber. A journeyman plumber may supervise an apprentice employed by a master plumber and under the master plumber's direction. A journeyman plumber may perform all plumbing covered by a specialist license without being required to obtain a specialist license. A journeyman plumber shall not act as a master plumber.
6) An "apprentice plumber" shall mean any person, employed by a master plumber or under the direction of a master plumber or a journeyman plumber, who is engaged in learning and assisting in the installation of plumbing and water treatment or heating specialties under an apprenticeship program properly registered with the Vermont Apprenticeship Council. An apprentice plumber shall be supervised on the job by either a master or a journeyman plumber as per Vermont Department of Labor apprenticeship guidelines.

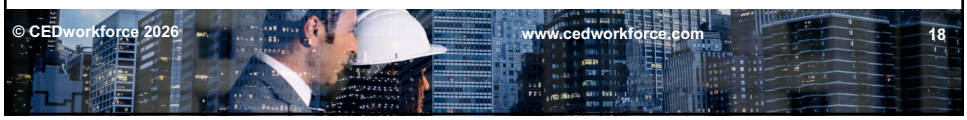


SECTION 3 DEFINITIONS (CONT'D)

7) "Municipal inspector" means a plumbing inspector authorized to conduct municipal inspections pursuant to this chapter.

8) "Specialist" means any person licensed under this chapter who performs work in connection with water treatment and heating, or both, or performs that work as a principal business or an auxiliary to a principal business for the person's own account as designated on the person's license.

9) "Commissioner" means the commissioner of the Department of Public Safety.

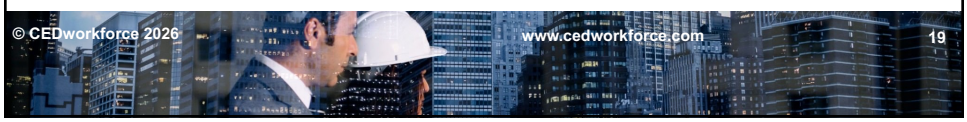


SECTION 3 DEFINITIONS (CONT'D)

10) "Legislative body" means the select board, the alder board, city council or board of trustees of a municipality or an incorporated village.

11) "Work notice" means the notice required to be filed and validated under Section 14 of these rules by a licensee prior to commencement of plumbing work.

12) "Maintenance" To maintain existing plumbing fixtures and associated piping in good working order. This does not include relocation of fixtures or piping. Plumbing work that requires a plumbing work notice is not considered maintenance.



B. In addition, for the purposes of these rules:

1) "Person" shall include any person or entity who performs plumbing work or is responsible for the performance of plumbing work under the jurisdiction of the Plumbers' Examining Board or the Department of Public Safety.

2) "Board" shall mean the Plumbers' Examining Board created by 26 V.S.A. 2181;

3) "Department" shall mean the Department of Public Safety.

4) "Public building" shall be as defined in 20 V.S.A. Section 2730. (Refer to appendix B for link to statute)

5) “Regular Employee” shall mean a person who is on the payroll of a building owner and has a defined work schedule as a maintenance employee.

6) "Investigator" shall mean the person designated by the Department to work at the direction of the Assistant Attorney General on the investigating panel as detailed in Appendix C Section 1) (a) (3).

SECTION 4 PLUMBERS' EXAMINING BOARD

A. The Plumbers' Examining Board is comprised of 5 members: the Commissioner of Public Safety or designee; the Commissioner of Health or designee; a master plumber; a journeyman plumber; a public member not associated with the plumbing or heating trades.

B. By statute the Board is responsible for: adopting plumbing rules; licensing and disciplining plumbers.

1) The plumbing rules the Board adopts must be minimum performance standards reasonably necessary for the protection of the public against recognized health hazards (26 V.S.A. Section 2173). The Board may adopt a nationally recognized plumbing code and amend it to suit Vermont in fulfilling its rule-making duties.

2) The Board controls the issuance, suspension and revocation of plumbers' licenses. In order to exercise its powers and carry out its responsibilities the board may:

   i. Conduct or otherwise provide examinations, and review and approve applications for licensure.
   ii. Investigate all matters within its jurisdiction.
   iii. Conduct hearings regarding the administration of its affairs, including disciplinary hearings regarding licensed persons; and,
   iv. Adopt rules consistent with its statutory authority.

SECTION 5 THE COMMISSIONER OF PUBLIC SAFETY

The Commissioner of Public Safety or a designated representative may:

A. Enter any public building or premises in which an installation subject to these rules is being or has been installed, replaced, or altered for the purpose of performing inspections necessary to carry out inspection responsibilities under these rules.

B. In accordance with 20 V.S.A. Section 2733, order a building or premises or any part of it closed until any unsafe condition or violation of these rules is corrected. Where appropriate, the Commissioner may order the demolition, removal, or disconnection of any plumbing systems or equipment deemed to constitute a hazard to persons or property.

C. Cause a written notice to be delivered to the owner of any property directing them to correct any condition where, in the opinion of the Commissioner or a plumbing inspector, that condition constitutes a violation of these rules.

D. Order the owner to stop work on the building or premises if the work on the plumbing systems in them are proceeding in contravention of these rules or are considered unsafe.

E. Direct tests of materials, devices, or assemblies made, or sufficient evidence or proof be submitted, at the expense of the owner, where the evidence or proof is necessary to determine whether the material, device or installation method meets the requirements of these rules.

A. Revoke, amend, or refuse to issue a plumbing work notice where, in the opinion of the Commissioner or a plumbing inspector, the results of tests referred to in Subsection (e) of this section are not satisfactory.

B. Order the removal of any plumbing systems or equipment installed in violation of these rules.

C. Prioritize inspections of plumbing systems based on the relative risks to persons or property arising from potential plumbing code violations.

D. Pursuant to 26 V.S.A. 2175(d), assess an administrative penalty for each violation of this code.

E. Order any company supplying fuel service to the premises to disconnect the fuel supply until the cited violation has been removed or corrected.

SECTION 6 DUTIES OF THE OWNER

The owner of the building or structure, or a designated representative shall:

A. Not install or maintain, or cause to be installed or maintained, any plumbing system or equipment which is unsafe or is likely to be unsafe to persons or property.

B. Observe these rules in all public buildings, or private residences on public water or sewer, which are under their control.

C. Allow the Commissioner or a plumbing inspector to enter any public building, or private residence on public water or sewer, at any reasonable time for the purposes of administering or enforcing these rules.

D. File a work notice and obtain a validated work notice required under Section 14 of these rules before any plumbing work begins in a single-family home connected to a public water or sewerage system.

E. Engage the services of a properly licensed plumber to file a work notice and obtain a validated work notice as required under Section 14 of these rules before any plumbing work begins in a public building.

SECTION 7 DUTIES OF A LICENSE HOLDER

A. Any person who has obtained a plumbing license under these rules shall:

1) Observe these rules regarding the installation of all plumbing work and the supervision of unlicensed employees.
2) Not begin plumbing work until a work notice for the work has been validated by the department.
3) Notify the department of a change of address.
4) Provide all information requested by the department

A. Any licensed plumber who has filed a work notice shall:

1) Keep records which outline who has accomplished the work covered under a work notice.
2) Provide at least 5 working days' notice to the plumbing inspector for any required inspection.
3) Provide access for the plumbing inspector to all plumbing work and records subject to inspection.

SECTION 8 LICENSE EXAMINATIONS

To become licensed to perform plumbing work in the State of Vermont an applicant must meet the requirements established in the following sections:

(A) Master Plumbers

- Any person who completes an application for a master plumber's license, presents documentation of having held a valid journeyman plumber's license under this chapter for a least 12 months, or documents equivalent training and experience in or outside of this state acceptable to the board, and pays an examination fee in an amount determined by the board based on the costs associated with administering the examination, shall be entitled to an examination.
- Upon successful completion of the examination and payment of a licensing fee, the applicant shall receive a master plumber's license in the form of a wallet-sized card. The license shall be carried by the master plumber at all times while performing the licensee's trade and shall be displayed upon request. Upon request of a license holder, a license certificate, suitable for framing, shall be available for a fee.

(B) Journeyman Plumbers

- Any person who completes an application for a journeyman plumber's license and documents apprenticeship in plumbing which includes both instruction and practice in work processes as verified by the Vermont apprenticeship council, or equivalent training and experience in or out of this state acceptable to the board, and pays an examination fee to be determined by the board based on the costs associated with administering the examination, shall be entitled to examination.
- Upon successful completion of the examination and payment of a licensing fee, the applicant shall receive a journeyman plumber's license in the form of a wallet-sized card. The license shall be carried by the journeyman at all times while performing the licensee's trade and shall be displayed upon request. Upon request of a license holder, a license certificate, suitable for framing, shall be available for a fee.

(C) Limited Licensure; Specialists

- Any person who completes an application for a specialist's license and documents apprenticeship in plumbing which includes both instruction and practice in work processes as verified by the Vermont Apprenticeship Council, or successful completion of instruction, training and experience in or out of the state acceptable to the board and pays an examination fee to be determined by the board based on the costs associated with administering the examination, shall be entitled to an examination.
- Upon successful completion of the examination and payment of a license fee, the applicant shall receive a specialist license in the form of a wallet-sized card. The license shall be carried by the licensee at all times while performing the licensee's specialty and shall be displayed upon request. Upon request by the license holder, a specialist license suitable for framing shall be available for a fee. A specialist license shall indicate each specialty for which the licensee has been approved. A specialist license does not take the place of any other license required by law.

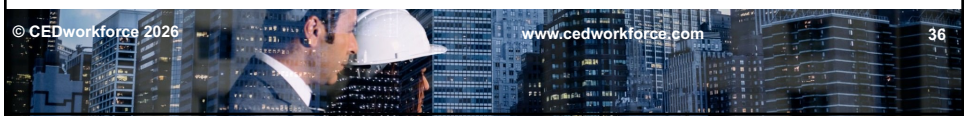
Specialty fields for limited licenses include the following:

- P1 Water Heater Specialist: Installation, replacement and repair of residential, industrial or commercial domestic water heaters or hot water supply tanks.
- P2 Heating System Specialist: Installation, replacement and repair of residential, industrial, or commercial hydronic space heating systems, including radiant, solar and other types of hydronic system design. Any work on steam systems shall be limited to steam systems with operating pressure not to exceed 15 PSI.
- P1/P2 Water Heater/Heating System Specialist:

SECTION 8 LICENSE EXAMINATIONS (CONT'D)

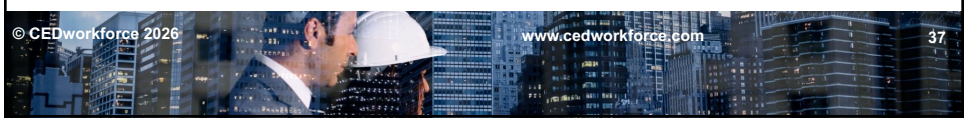
- P3 Water Treatment Specialist: Installation, replacement, and repair of residential, industrial or commercial potable water treatment and filtration equipment. Well pressure tanks, pumps and municipal water meter installations are also covered under this licensing field.

- Note: A P1/P2 Water Heater/Heating System Specialist license covers two specialty fields, therefore the license fee will reflect two specialty field license fees.



SECTION 8 LICENSE EXAMINATIONS (CONT'D)

- A person duly licensed as a specialist under this section may perform specialty limited use work, either as an employee or as an independent contractor only in connection with the specialty field designated on the person's license. A specialist may perform a supply connection to an existing water supply for test and related system operation, but at no time shall any specialist perform any plumbing or heating work that is not specified or permitted under the specialist's license.
- The intent of these rules as they apply to the installation of fixtures and plumbing related to specialist licenses is to ensure the safety of the potable water supply. It is not the intent of these rules to regulate the operation, efficiency or consumer satisfaction of water heaters, hydronic heating systems, or water treatment equipment. The Vermont Fire and Building Safety Code and the Vermont Electrical Safety Rules regulate the safe operation of water heaters, hydronic heating systems, water treatment equipment and the related fuel or power source.



(D) Process for Examinations

1) Each applicant for a license shall present to the executive office of the board on blanks furnished by the board, a written application for examination and license containing such information as the board may require, accompanied by the fee required. Examinations shall be in whole or in part in writing and shall include the theoretical and practical nature of plumbing or specialties, or both, and knowledge of state laws and department of health and environmental conservation regulations and such other regulations as the board may determine necessary to satisfactorily determine the qualifications of the applicant. Examinations shall be relevant to the instructional material taught in classes, the codes used and new developments and procedures within the trade.

2) In order to carry out its responsibilities under this section the board may contract with a national testing organization to develop and administer a written plumbing exam. Any test fees charged by the testing organization are separate from the examination fee charged by the board and shall be paid directly to the testing organization.

3) Any individual who fails to achieve a passing grade on a plumbing licensing examination, after having taken the examination three times, shall appear before the board for the purpose of the board recommending further education, training and/or tutoring, prior to the applicant taking the test a fourth time.

4) See License procedure in Appendix F. License testing is facilitated by a third-party vendor.

(E) Examination not Required

- Appropriate licenses without examination may be issued to the following applicants upon payment of the required fee:
- 1) Reciprocal licenses - To a person to whom a master plumber's license, a journeyman plumber's license, or a specialist plumber's license has been previously issued by another state or municipality therein, provided that state or municipality therein maintains a standard of requirements equivalent to those of this state and who presents satisfactory proof to the board that he or she is a bona fide master, journeyman, or specialist plumber. An applicant under this subsection shall be exempt from examination only if he or she holds a license from a foreign state or municipality and if under the laws or regulations of the foreign state or municipality issuing the license a like exemption is granted to plumbers duly licensed under the laws of this state.

2) Service Members and Veteran's - Except as otherwise provided by law, a journeyman's license shall be issued without examination and upon payment of requested fee to an applicant who is a service member or veteran who:

a) submits a complete application and any documentation required by the Board;
b) has received designation by the U. S. Armed Forces as a 12K Plumber or equivalent; and
c) has completed a minimum of 8000 hours and four years of active duty field work as a 12K plumber or equivalent

3) Universal Licensing:

- Appropriate licenses without examination may be issued to a person to whom a master plumber's license or a journeyman plumber's license or a specialty license or equivalent has been previously issued by another state or municipality upon the payment of the required fee if:

  a) That state or municipality maintained a standard of requirements equivalent to those of this State; and
  b) The applicant presents satisfactory proof to the Board that he or she is a bona fide licensee. This will include a state issued certificate of licensure and letter of good standing, a printed copy of license alone is not accepted.
  c) The applicant completes a VT Energy Goals Education Module & includes the certificate with the application. The website to access the module is: VT Energy Goals · Custom Portal (powerappsportals.us)

SECTION 9 RENEWAL OF LICENSE

A. A license shall be valid for two years. A notice of renewal and application for renewal of license shall be provided to each licensee prior to the expiration of the license. The application for renewal of license and the appropriate fee must be received by the department prior to the date the license expires. It is the responsibility of the licensee to contact the licensing office for a renewal application in advance of expiration date if no renewal form is received prior to expiration date.

B. If a license has lapsed it may be renewed within 90 days of its expiration date along with a $15.00 reinstatement fee in addition to the renewal fee.

C. If a license is not renewed within 90 days of expiration date the inactive licensee shall make application for reinstatement and shall appear before the board to request reinstatement.

D. Applicants for license renewal shall provide to the Board evidence of completion of 8 hours of continuing education or training, approved by the Board, within the previous 24-month period, at least 2 hours of which must include code review. A course or training program is valid for only one license renewal. A copy of the certificate is acceptable evidence of meeting the requirements for continuing education.

E. Approval of continuing education or training;

(1) Sponsors of training courses shall submit for approval the following information:

a) Sponsoring organization or individuals;
b) Course content;
c) Number of hours of eligible training;
d) Instructors should be certified as a master plumber, engineer, plumbing inspector, vocational teacher with related experience, or otherwise acceptable by the Board;
e) Date and place of instruction;
f) Instructional materials to be used by attendees.

(2) Subject matter shall deal with the adopted current plumbing codes, license renewal protocol or related information. This may include general or specific review of the code, code changes from preceding versions, common violations of the code, or other related areas that relate to the specialty plumbing installation.

(3) Tests at training programs are optional.

(4) Upon completion of a course, certificates shall be issued to attendees and shall include: Sponsor's name

a) Course title
b) Date, place
c) Hours completed
d) Instructor's Signature
e) Attendees' full name, license number.

(F) Representatives of the Licensing Board and the Department of Public Safety reserve the right to monitor all courses.

SECTION 10 PLUMBING LICENSE FEES

- Plumbing license and 2-year renewal fees* shall be as established under 26 V.S.A. Section 2193(c) as follows:
  A. Master plumber license…$120
  B. Journeyman plumber license…$90
  C. Specialist license - per specialty field…$50
  D. Master renewal fee…$120
  E. Journeyman renewal fee…$90
  F. Specialist renewal fee - per specialty field…$50
  G. License certificate…$10

*Subject to fee change by Legislative Process

SECTION 11 LICENSE NOT REQUIRED

- All plumbing and specialty work performed in Vermont shall be performed by persons licensed under this chapter except that a license shall not be required for the following types of work:

  A. Any plumbing and specialty work performed by an owner or the owner's regular employees in the owner-occupied freestanding single-family dwelling or in outbuildings accessory to the owner-occupied, single family dwelling.
  B. Installations of plumbing systems in laboratories for experimental purposes only.
  C. A person who regularly employs a maintenance person whose duties include the maintenance of plumbing on the property of that person.

D. Plumbing or specialty installations performed as part of a training project of a vocational school or other educational institution. However, the installation shall be inspected if the building is to be sold as a private dwelling or public building.

E. A person who performs miscellaneous jobs of manual labor on the person's own property in the course of which plumbing repairs or alterations are made.

F. For the construction, repair or maintenance of buildings used exclusively for agricultural purposes and animal housing located on owner-occupied farms.

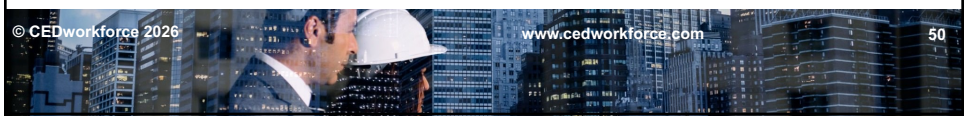
G. Work performed by employees of any public or private water company, who in the main course of their employment install, maintain or repair water supply pipes, meters or control valves.

SECTION 12 COMPLAINTS

- A person may file a complaint with the board by doing so in writing, setting forth a full statement of the facts concerning the alleged infraction of the plumber's licensing statute or rules. In the event a complaint is filed with the Board, the Board's investigation shall not be limited to the matter set forth in the request for investigation but may extend to any act coming to the attention of the board which appears to violate the statute or these rules.

SECTION 13 DISCIPLINARY PROCEEDINGS

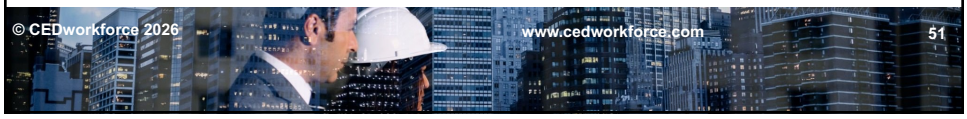
A. In accordance with 26 V.S.A. Section 2181, the board may revoke or suspend a license, or refuse to renew a license. This shall not preclude the board from taking lesser steps, including, but not limited to formal reprimand, or required further education and training. The board may act for any of the following reasons:
   1) Fraud or deceit in obtaining a license.
   2) Gross negligence, incompetency, misrepresentation, or misconduct by a licensee.
   3) Violation by a licensee of the rules of the Department of Health, the Department of Public Safety Board
   4) Failure to comply with a written notice issued under sections 2173, 2174 or 2175 of this title.



SECTION 13 DISCIPLINARY PROCEEDINGS (CONT'D)

B. The board may take these actions only after notice and provision to the licensee of an opportunity to appear before the board for a hearing, in accordance with 3 V.S.A. Chapter 25, the Vermont Administrative Procedure Act, and these rules issued thereunder.

C. The board and department will proceed with initiating a complaint against a licensee, investigation of the complaint, action and hearings as described in Appendix C.



SECTION 14 WORK NOTICES

A. A work notice shall be filed with the department for all plumbing work covered by these rules and be validated by the department, prior to the start of such work, in order to facilitate the inspection process authorized by 26 V.S.A. 2199. The term "Permit" as used in the 2024 International Plumbing Code (IPC) shall have the same meaning as "Work Notice validated by the department".

B. The department may refuse to validate a work notice if the license holder has other ongoing plumbing work for which a work notice has not been filed, if the department is owed fees or penalties, or if requested by the Plumbers' Examining Board pursuant to 26 V.S.A. 2181(c).

C. A work notice is not required for plumbing work described as follows:

(1) Replacement of a plumbing fixture/appliance by a similar fixture/appliance utilizing existing water supply, waste lines, source of fuel and venting termination if the existing fixture/appliance meets currently adopted codes and is not being moved to a new location.

(2) Maintenance or repair within an existing plumbing fixture.

(3) Replacement of water supply and waste lines without relocation or installation of new plumbing fixtures.

D. The department may accept an annual plumbing work notice where plumbing installation work is ongoing in an existing building. A plumbing work notice filed under this section shall include the name and location of the building, the licensed plumber responsible for the work and the payment of the minimum fee. The acceptance of an annual plumbing work notice does not modify the requirements for licensure or supervision as established under these rules.

E. A validated work notice shall expire if the plumber of record ceases work authorized under the work notice. If work has not commenced, is suspended or abandoned for a time period of 180 days, the work notice will become invalid. A new work notice is required to be filed if a different plumber of record takes over an existing project.

SECTION 15 SCHEDULE OF WORK NOTICE AND INSPECTION FEES

A. Fees established by the legislature under 26 V.S.A. Section 2175(a) shall be paid to the Commissioner or a designated representative prior to the validation of a work notice.

(1) For all plumbing work, identified as a priority for inspection and review under Section 18 of these rules, the fee shall be:

i. $10 for every plumbing fixture/appliance/device described as a washing machine, dishwasher, (grease, oil, sand, or neutralizing) interceptor, sewage ejector pump, water closet, urinal, bidet, disposal, drinking fountain or bottle filler, water cooler, lavatory, bathtub, shower, sink, disposal, hose bibb, eye wash or emergency shower, floor drain, roof drain, floor sink, water meter, backflow prevention device, pressure reducing valve or similar device. The total shall not be less than $50.

(2) For all plumbing work, not identified as a priority for inspection and review under Section 18 of these rules, the fee shall be $50.

B. At the discretion of the Commissioner, whenever an owner or licensed plumber requests for the owner's or licensed plumber's benefit that an inspection be made outside of the normal working hours, all fees payable by the owner under this section shall be paid in an amount twice that indicated under this section.

SECTION 16 INSPECTION OF PLUMBING INSTALLATIONS

The process for inspection and review of plumbing work, identified as a priority for inspection and review under Section 18 of these rules, shall be as follows:

(A) PLANS

- Plumbing plans are not required for the plumbing work covered under these rules unless, in the opinion of the Commissioner or a designated representative, the job is of sufficient size or complexity to warrant such plans.

(B) ROUGH INSPECTIONS

- A plumbing system installed under these rules shall not be covered unless it is first inspected by a plumbing inspector. The provisions of this section may be specifically waived by a designated representative.

(C) FINAL INSPECTIONS

(1) Upon completion of a new plumbing installation, the applicant shall request a final inspection by a plumbing inspector. Within 5 working days of the receipt of the inspection request, the Commissioner, or designated representative, shall conduct an inspection, establish a reasonable date for inspection, or issue a waiver of inspection.

(2) The plumbing inspector may waive the presence of the licensee who filed the work notice for rough and final inspections.

SECTION 17 CONNECTING INSTALLATIONS

- New plumbing installations shall not commence unless a work notice has been validated by the department.

SECTION 18 PRIORITIES FOR INSPECTION, REVIEW AND INVESTIGATION

- Priorities for inspection, review and investigation are established, consistent with 26 V.S.A. 2173 (b), based on the type and size of the building, the complexity of the plumbing work and consideration of health risks to persons or property resulting from potential plumbing code violations, as follows:

(A) Priority inspection and review work based on use:

(1) Plumbing work involving commercial food preparation and food process areas.

(2) Plumbing work involving special hazards in commercial operations such as Automotive repair garages, car wash, laundry, dry cleaning, funeral home, laboratory, Cannabis Processing or industrial hazardous waste discharge.

(3) Plumbing work performed in facilities where the occupants may be most vulnerable to risk such as a hospital, nursing home, health center, doctor or dentist's office, beauty/nail salon parlor, day care or elementary or secondary school.

(4) Plumbing work involving public swimming pools, public spas and hot tubs.

(5) Plumbing work performed in buildings containing multiple dwelling units, including apartments, hotels, motels and inns.

(6) Plumbing work performed in buildings or having an occupant load of 300 or more persons or where multi-user style bathrooms are installed in commercial buildings.

B. Priority for investigations in descending order of priority:

(1) Complaints alleging serious plumbing violations.

(2) Plumbing work being performed by non-licensed persons.

(3) Plumbing work being performed where no work notice has been filed with the Department.

(4) Complaints alleging non-serious plumbing violations.

C. Plumbing work not listed as a priority in subsection (A) or (B) above is required to be installed and completed in accordance with these rules and is subject to random inspection and enforcement actions by the State Plumbing Inspector.

D. All plumbing work in a building shall be classified as priority plumbing work where both priority and non-priority plumbing work occur on the same water and/or wastewater systems.

SECTION 19 APPROVAL, ALTERNATIVES, AND VARIANCES

- The approval of materials, equipment and devices and alternatives and variances to this code, shall be in accordance with Section 105 of the 2024 International Plumbing Code.

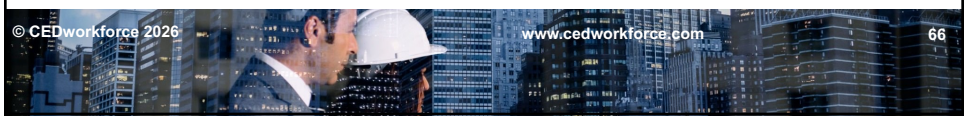
SECTION 20 REQUEST FOR RECONSIDERATION

- A person aggrieved by an interpretation of these rules, or the result of any inspection or an order to correct code violations may request that the Commissioner or designated representative reconsider such refusal or order.
- A request for reconsideration shall be made within 15 days after receipt of written notice of such refusal or order.
- The Commissioner or designated representative shall review the refusal or order within 30 days of the date the request for reconsideration is received.
- The Commissioner or designated shall issue an order amending, modifying or affirming the prior refusal or order as circumstances require within 30 days of the date of the review. A person aggrieved by the decision under this section may appeal to the superior court.

REFERENCES

This part of the interactive presentation was adapted from the Plumbers Examining Board, Division of Fire Safety, Vermont Plumbing Rules 2025.

PART 2: 2024 International Plumbing Code and The Changes From 2021



LEARNING OBJECTIVES

1. To understand what is the International Plumbing Code (IPC) and its adoption within the Vermont Plumbing Rules
2. To familiarize with the IPC's design and format, including Vermont 2025 administrative structure and amendments
3. To summarize the changes and updates to the IPC 2024 and Vermont-specific modifications from IPC 2021
4. To review the newly added sections and tables to the IPC 2024, including Vermont amendments, deletions, and replacements
5. To provide international guidelines for installation, maintenance, and inspection, as adapted and enforced under Vermont regulations
6. To address general plumbing regulations, fixture requirements, water heater installations, and systems for water distribution, including Vermont-specific requirements and standards
7. To learn sanitary drainage, special wastes, venting, storm drainage, and medical gases, including Vermont regulatory coordination with state agencies
8. To provide clear codes, terms, and regulations for builders, inspectors, and plumbers to follow in accordance with Vermont Plumbing Rules and IPC 2024

INTRODUCTION

- The International Plumbing Code (IPC) is a model code that regulates the design and installation of plumbing systems including the plumbing fixtures in all types of buildings except for detached one- and two-family dwellings and townhouses that are not more than three stories above grade in height.
- The IPC addresses general plumbing regulations, fixture requirements, water heater installations and systems for water distribution, sanitary drainage, special wastes, venting, storm drainage and medical gases.
- The IPC does not address fuel gas piping systems as those systems are covered by the International Fuel Gas Code (IFGC).
- The IPC also does not regulate swimming pool piping systems, process piping systems, or utility-owned piping and systems.

- The purpose of the IPC is to establish the minimum acceptable level of safety to protect life and property from the potential dangers associated with supplying potable water to plumbing fixtures and outlets and the conveyance of bacteria-laden wastewater from fixtures.
- The IPC is primarily a specification-oriented (prescriptive) code with some performance-oriented text.
- Where a building contains plumbing fixtures, those fixtures requiring water must be provided with an adequate supply of water for proper operation.
- The number of required plumbing fixtures for a building is specified by this code and is based on the anticipated maximum number of occupants for the building and the type of building occupancy.

- This code provides prescriptive criteria for sizing piping systems connected to those fixtures. Through the use of code-approved materials and the installation requirements specified in this code, plumbing systems will perform their intended function over the life of the building.
- In summary, the IPC sets forth the minimum requirements for providing safe water to a building as well as a safe manner in which liquid-borne wastes are carried away from a building.

Arrangement And Format Of The 2021 IPC

- The format of the IPC allows each chapter to be devoted to a particular subject with the exception of Chapter 3, which contains general subject matters that are not extensive enough to warrant their own independent chapter.

- Chapter 1 (Scope and Administration) contains provisions for the application, enforcement and administration of subsequent requirements of the code. In addition to establishing the scope of the code, Chapter 1 identifies which buildings and structures come under its purview. Chapter 1 is largely concerned with maintaining "due process of law" in enforcing the requirements contained in the body of this code.
- Chapter 2 (Definitions) is the repository of the definitions of terms used in the body of the code. Codes are technical documents and every word, term and punctuation mark can impact the meaning of the code text and the intended results. The code often uses terms that have a unique meaning in the code and the code meaning can differ substantially from the ordinarily understood meaning of the term as used outside of the code.

INTRODUCTION (CONT'D)

- Chapter 3 (General Regulations) contains safety requirements for the installation of all types of plumbing and non plumbing fixtures. The content of Chapter 3 is often referred to as "miscellaneous," rather than general regulations.

- Chapter 4 (Fixtures, Faucets and Fixture Fittings) regulates the minimum number of plumbing fixtures that must be provided for every type of building. This chapter also regulates the quality of fixtures and faucets by requiring those items to comply with nationally recognized standards.

INTRODUCTION (CONT'D)

- Chapter 5 (Water Heaters) regulates the design, approval and installation of water heaters and related safety devices. The intent is to minimize the hazards associated with the installation and operation of water heaters.

- Chapter 6 (Water Supply and Distribution) regulates the supply of potable water from both public and individual sources to every fixture and outlet so that it remains potable. Chapter 6 also regulates the design of the water distribution system, which will allow fixtures to function properly and help prevent backflow conditions.

INTRODUCTION (CONT'D)

- Chapter 7 (Sanitary Drainage) regulates the materials, design and installation of sanitary drainage piping systems and connections made to the system. The intent is to design and install sanitary drainage systems that will function reliably, that are neither undersized nor oversized and that are constructed from materials, fittings and connections as prescribed herein.

- Chapter 8 (Indirect/Special Waste) regulates drainage installations that require an indirect connection to the sanitary drainage system. Fixtures and plumbing appliances, such as those associated with food preparation or handling, health care facilities and potable liquids, must be protected from contamination that can result from connection to the drainage system.

INTRODUCTION (CONT'D)

- Chapter 9 (Vents) covers the requirements for vents and venting. Venting protects every trap against the loss of its seal.

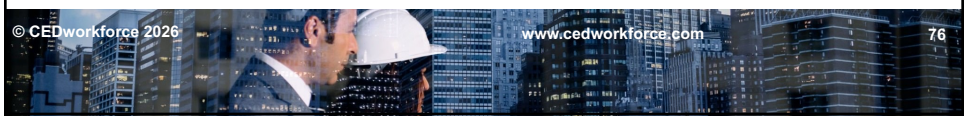
- Chapter 10 (Traps, Interceptors and Separators) contains design requirements and installation limitations for traps. Requirements for the design and location of various types of interceptors and separators are provided.

- Chapter 11 (Storm Drainage) regulates the removal of storm water. The proper installation of a storm drainage system reduces the possibility of structural collapse of a flat roof and prevents damage to the footings and foundation of the building.

INTRODUCTION (CONT'D)

- Chapter 12 (Special Piping and Storage Systems) contains the requirements for the design, installation, storage, handling and use of nonflammable medical gas systems, including inhalation anesthetic and vacuum piping systems, bulk oxygen storage systems and oxygen-fuel gas systems used for welding and cutting operations.

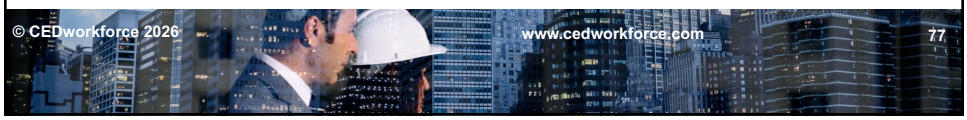
- Chapter 13 (Non-potable Water Systems) regulates the design and installation of non-potable water systems, including rainwater harvesting systems. The need for a reduction of potable water use in buildings has led building designers to utilize non-potable water in building applications.



INTRODUCTION (CONT'D)

- Chapter 14 (Subsurface Graywater Soil Absorption Systems) regulates the design and installation of subsurface graywater soil absorption systems for the disposal of on-site non-potable water such as graywater. The reduction of potable water use in buildings has led building designers in some jurisdictions to use on-site non-potable water in building applications such as landscape irrigation.

- Chapter 15 (Referenced Standards) lists all of the product and installation standards and codes that are referenced throughout Chapters 1 through 14 and includes identification of the promulgators and the section numbers in which the standards and codes are referenced. As stated in Section 102.8, these standards and codes become an enforceable part of the code as if printed in the body of the code.



- Appendix A provides a format for a fee schedule.
- Appendix B provides specific rainfall rates for major cities in the United States.
- Appendix C is provided to direct the user to a registered design professional for the cutting, notching and boring of structural steel members.
- Appendix D provides valuable temperature information for designers and installers of plumbing systems in areas where freezing temperatures might exist.
- Appendix E provides two recognized methods for sizing the water service and water distribution piping for any structure.
- Appendix F contains the provisions for appeal and the establishment of a board of appeals. The provisions include the application for an appeal, the makeup of the board of appeals and the conduct of the appeal process.

CHAPTER 1 SCOPE AND ADMINISTRATION

Chapter 1 establishes the limits of applicability of this code and describes how the code is to be applied and enforced.

This code is intended to be adopted as a legally enforceable document and it cannot be effective without adequate provisions for its administration and enforcement.

The provisions of Chapter 1 establish the authority and duties of the code official appointed by the authority having jurisdiction and also establish the rights and privileges of the design professional, contractor and property owner.

Newly Added Sections to the 2024 IPC Version:

101.2.1 Appendices.

- All appendices are adopted except for Appendix F.

104 Duties and Powers of the Code Official

- The Commissioner of the department of Public Safety or designee shall be designated as the code official for the purpose of this code. The code official shall have the authority to render interpretations of this code and to adopt policies and procedures to clarify the application of its provisions. Such interpretations, policies and procedures shall be in compliance with the intent and purpose of this code.

(2021)

Section 105.1 Modifications:

- Where there are practical difficulties involved in carrying out the provisions of this code, the code official shall have the authority to grant modifications for individual cases, upon application of the owner or owner's authorized agent, provided that the code official shall first find that special individual reason makes the strict letter of this code impractical.

(2024)

Section 105.1 ~~Modifications~~ Where Required:

- Any owner, owner's authorized agent or contractor who desires to construct, enlarge, alter, repair, move, demolish or change the occupancy of a building or structure, or to erect, install, enlarge, alter, repair, remove, convert or replace any plumbing system, the installation of which is regulated by this code.

(2021)

Section 115.1 Unlawful Acts:

- Where the code official finds any work regulated by this code being performed in a manner contrary to the provisions of this code or in a dangerous or unsafe manner, the code official is authorized to issue a stop work order […]

(2024)

Section 115.1 ~~Unlawful Acts~~ Authority:

- It shall be unlawful for any person, firm or corporation to erect, construct, alter, repair, remove, demolish or utilize any plumbing system, or cause same to be done, in conflict with or in violation of any of the provisions of this code.

Newly Added Sections to the 2024 IPC Version:

105.1.1 Annual Permit

- Instead of an individual construction permit for each alteration to an already approved system or equipment or appliance installation, the code official is authorized to issue an annual permit upon application therefor to any person, firm or corporation regularly employing one or more qualified tradespersons in the building, structure or on the premises owned or operated by the applicant for the permit.

105.1.2 Annual Permit Records

- The person to whom an annual permit is issued shall keep a detailed record of alterations made under such annual permit. The code official shall have access to such records at all times or such records shall be filed with the code official as designated.

Newly Added Sections to the 2024 IPC Version:

108.3 Permit Valuations

- The applicant for a permit shall provide an estimated value of the work for which the permit is being issued at time of application. Such estimated valuations shall include the total value of work, including materials and labor, for which the permit is being issued, such as electrical, gas, mechanical, plumbing equipment and permanent systems. Where, in the opinion of the building official, the valuation is underestimated, the permit shall be denied, unless the applicant can show detailed estimates acceptable to the building official. The building official shall have the authority to adjust the final valuation for permit fees.

108.5 Permit Fees

- The payment of the fee for the construction, alteration, removal or demolition for work done in connection to or concurrently with the work authorized by a permit shall not relieve the applicant or holder of the permit from the payment of other fees that are prescribed by law

Newly Added Sections to the 2024 IPC Version:

111.2 Required Inspections and Testing

- The code official, upon notification from the permit holder or the permit holder's agent, shall make the following inspections and such other inspections as necessary, and shall either release that portion of the construction or shall notify the permit holder or an agent of any violations that must be corrected. The holder of the permit shall be responsible for the scheduling of such inspections.
  1. Underground inspection shall be made after trenches or ditches are excavated and bedded, piping installed, and before any backfill is put in place.
  2. Rough-in inspection shall be made after the roof, framing, fireblocking, firestopping, draftstopping and bracing is in place and all sanitary, storm and water distribution piping is roughed-in, and prior to the installation of wall or ceiling membranes.
  3. Final inspection shall be made after the building is complete, all plumbing fixtures are in place and properly connected, and the structure is ready for occupancy.

101.2 Scope

- The design and installation of plumbing systems including sanitary and storm drainage, sanitary facilities and water supplies, storm water and sewage disposal, located within the building and the connecting pipes within 10 feet of the building, shall comply with the requirements of this code.

- The design and installation of gas piping and the design and installation of fire sprinkler and standpipe systems shall be in accordance with the Vermont Fire and Building Safety Code.

Figure 1: Plumbing Works

102.2 Existing Installations

- Existing public buildings, & all other existing buildings or facilities must comply with these rules whenever the plumbing in those buildings or premises is changed, replaced, or altered as required by section 102.4.

103 Code Compliance Agency

- Refer to Section 1: Purpose of the Rules - in the 2025 Vermont Plumbing Rules

(2021)

Section 106.5.7 Posting of Permit:

- The permit or a copy shall be kept on the site of the work until the completion of the project.

(2024)

~~Section 106.5.7~~ Section 105.5.7 Posting of Permit:

- The permit or a copy shall be kept on the site of the work until the completion of the project.

(2021)

Section 110.1 Connection of Service Utilities:

- A person shall not make connections from a utility, source of energy, fuel, power, water system or sewer system to any building or system that is regulated by this code for which a permit is required until authorized by the code official.

(2024)

Section 110.1 : ~~Connection of Service Utilities~~ General

- The code official is authorized to issue a permit for temporary uses, equipment and systems. Such permits shall be limited as to time of service, but shall not be permitted for more than 180 days. The code official is authorized to grant extensions for demonstrated cause

115.2 Notice of violation.

- The code official shall serve a notice of violation or order to the person responsible for the erection, installation, alteration, extension, repair, removal or demolition of plumbing work in violation of the provisions of this code, or in violation of a detail statement or the approved construction documents thereunder, or in violation of a permit or certificate issued under the provisions of this code.
- Such order shall direct the discontinuance of the illegal action or condition and the abatement of the violation.

Figure 2: Notice of Violations

CHAPTER 2 DEFINITIONS

- Codes, by their very nature, are technical documents.
- Every word, term and punctuation mark can add to or change the meaning of a technical requirement.
- It is necessary to maintain a consensus on the specific meaning of each term contained in the code.
- Chapter 2 performs this function by stating clearly what specific terms mean for the purpose of the code.

Newly Added Definitions.

- **AMBULATORY CARE FACILITY.** Buildings or portions thereof used to provide medical, surgical, psychiatric, nursing or similar care on a less than 24-hour basis to persons who are rendered incapable of self-preservation by the services provided or staff has accepted responsibility for care recipients already incapable.

- **FAMILY OR ASSISTED-USE BATHING ROOM.** A room separate from other bathing rooms that: is intended to be used by all persons regardless of sex, families and those needing assisted care; has an independent entrance, not more than one shower or bathtub, not more than one adult-height water closet and one adult-height lavatory; and is permitted to have one urinal, one child-height water closet and one child-height lavatory.

Newly Added Definitions.

- **FAMILY OR ASSISTED-USE TOILET FACILITY.** A room separate from other toilet facilities that: is intended to be used by all persons regardless of sex, families and those needing assisted care; has an independent entrance, not more than one adult-height water closet and not more than one adult-height lavatory; and is permitted to have one urinal, one child-height water closet and one child-height lavatory.

- **PEER REVIEW.** An independent and objective technical review conducted by an approved third party.

- **SERVICE SINK.** A sink exclusively intended to be used for facilitating the cleaning of a building or tenant space.

Newly Added Definitions.

- **Multiple-user toilet facility.** A toilet facility intended to be used by multiple occupants. Such facilities have more than one water closet and one lavatory. Each water closet is located in its own compartment that is created by vertical partitions.

- **Single-user toilet facility.** A toilet facility intended to be used by a single occupant and that contains not less than one water closet and one lavatory.

(2021)

APPROVED AGENCY.

- An established and recognized agency that is regularly engaged in conducting tests or furnishing inspection services, or furnishing product certification where such agency has been approved by the code official.

(2024)

APPROVED AGENCY.

- An established and recognized organization ~~agency~~ that is regularly engaged in conducting tests or furnishing inspection services, or furnishing product evaluation or certification where such organization ~~agency~~ has been approved by the code official.

(2021)

COPPER ALLOY.

- A metal alloy where the principle component is copper.

(2024)

COPPER ALLOY.

- A homogenous mixture of two or more metals in which copper is the primary component, such as brass and bronze.

Section 201 general

201.1 Scope.

- Unless otherwise expressly stated, the following words and terms shall, for the purposes of this code, have the meanings shown in this chapter.

201.2 Interchangeability.

- Words stated in the present tense include the future; words stated in the masculine gender include the feminine and neuter; the singular number includes the plural and the plural the singular.

201.3 Terms defined in other codes.

- Where terms are not defined in this code and are defined in the International Building Code, International Fire Code, International Fuel Gas Code or the International Mechanical Code, such terms shall have the meanings ascribed to them as in those codes.

201.4 Terms not defined.

- Where terms are not defined through the methods authorized by this section, such terms shall have ordinarily accepted meanings such as the context implies.

Section 202 General Definitions

- **ACCEPTED ENGINEERING PRACTICE.** That which conforms to accepted principles, tests or standards of nationally recognized technical or scientific authorities.

- **ACCESS (TO).** That which enables a fixture, appliance or equipment to be reached by ready access or by a means that first requires the removal or movement of a panel or similar obstruction (see "Ready access").

- **ACCESS COVER.** A removable plate, usually secured by bolts or screws, to permit access to a pipe or pipe fitting for the purposes of inspection, repair or cleaning.

- **AIR ADMITTANCE VALVE.** One-way valve designed to allow air to enter the plumbing drainage system when negative pressures develop in the piping system. The device shall close by gravity and seal the vent terminal at zero differential pressure (no-flow conditions) and under positive internal pressures. The purpose of an air admittance valve is to provide a method of allowing air to enter the plumbing drainage system without the use of a vent extended to open air and to prevent sewer gases from escaping into a building.

- **AIR BREAK (Drainage System).** A piping arrangement in which a drain from a fixture, appliance or device discharges indirectly into another fixture, receptacle or interceptor at a point below the flood level rim and above the trap seal.

- **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 receptacle.

- **ALTERNATE ON-SITE NONPOTABLE WATER.** Nonpotable water from other than public utilities, on-site surface sources and subsurface natural freshwater sources. Examples of such water are graywater, on-site reclaimed water, collected rainwater, captured condensate and rejected water from reverse osmosis systems.

- **FAUCET.** A valve end of a water pipe through which water is drawn from or held within the pipe.

Figure 3: Installation of a Kitchen Sink Faucet

- **FILL VALVE.** A water supply valve, opened or closed by means of a float or similar device, utilized to supply water to a tank. An antisiphon fill valve contains an antisiphon device in the form of an approved air gap or vacuum breaker that is an integral part of the fill valve unit and that is positioned on the discharge side of the water supply control valve.

- **FIXTURE BRANCH.** A drain serving two or more fixtures that discharges to another drain or to a stack.

- **FIXTURE SUPPLY.** The water supply pipe connecting a fixture to a branch water supply pipe or directly to a main water supply pipe.

- **FLOOD HAZARD AREA.** The greater of the following two areas

1. The area within a flood plain subject to a 1-percent or greater chance of flooding in any given year.
2. The area designated as a flood hazard area on a community's flood hazard map or as otherwise legally designated.

Figure 4: Flood Hazard Area

- **MAINTENANCE.** To maintain existing plumbing fixtures and associated piping in good working order. This does not include relocation of fixtures or piping. Plumbing work that requires a Plumbing Work Notice is not considered maintenance.

- **PLUMBING.** The art of installing pipes, fixtures and other apparatus for bringing in the water supply and removing liquid / water carried waste through drainage and venting systems within or on any building or structure.

- **MEDICAL GAS SYSTEM.** The complete system to convey medical gases for direct patient application from central supply systems (bulk tanks, manifolds and medical air compressors), with pressure and operating controls, alarm warning systems, related components and piping networks extending to station outlet valves at patient use points.

Figure 5: Medical Gas System

- **MEDICAL VACUUM SYSTEM.** A system consisting of central-vacuum-producing equipment with pressure and operating controls, shutoff valves, alarm-warning systems, gauges and a network of piping extending to and terminating with suitable station inlets at locations where patient suction may be required.

- **PLUMBING SYSTEM.** A system that includes the water distribution pipes; plumbing fixtures and traps; water-treating or water-using equipment; soil, waste and vent pipes; and building drains; in addition to their respective connections, devices and appurtenances within a structure or premises; and the water service, building sewer and building storm sewer serving such structure or premises.
- **POLLUTION.** An impairment of the quality of the potable water to a degree that does not create a hazard to public health but that does adversely and unreasonably affect the aesthetic qualities of such potable water for domestic use.
- **POTABLE WATER.** Water free from impurities present in amounts sufficient to cause disease or harmful physiological effects and conforming to the bacteriological and chemical quality requirements of the Public Health Service Drinking Water Standards or the regulations of the public health authority having jurisdiction.

- **RECLAIMED WATER.** Nonpotable water that has been derived from the treatment of wastewater by a facility or system licensed or permitted to produce water meeting the jurisdiction's water requirements for its intended uses. Also known as "recycled water."
- **REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTION ASSEMBLY.** A backflow prevention device consisting of two independently acting check valves, internally force-loaded to a normally closed position and separated by an intermediate chamber (or zone) in which there is an automatic relief means of venting to the atmosphere, internally loaded to a normally open position between two tightly closing shutoff valves and with a means for testing for tightness of the checks and opening of the relief means.

- **SOIL PIPE.** A pipe that conveys sewage containing fecal matter to the building drain or building sewer.

- **SPILLPROOF VACUUM BREAKER.** An assembly 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, and located between and including two tightly closing shutoff valves and a test cock.

- **TEMPERED WATER.** Water having a temperature range between 85°F (29°C) and 110°F (43°C).

- **THIRD-PARTY CERTIFICATION AGENCY.** An approved agency operating a product or material certification system that incorporates initial product testing, assessment and surveillance of a manufacturer's quality control system.

- **THIRD-PARTY CERTIFIED.** Certification obtained by the manufacturer indicating that the function and performance characteristics of a product or material have been determined by testing and ongoing surveillance by an approved third-party certification agency. Assertion of certification is in the form of identification in accordance with the requirements of the third-party certification agency.

- **WATER MAIN.** A water supply pipe or system of pipes, installed and maintained by a city, township, county, public utility company or other public entity, on public property, in the street or in an approved dedicated easement of public or community use.

- **WATER OUTLET.** A discharge opening through which water is supplied to a fixture, into the atmosphere (except into an open tank that is part of the water supply system), to a boiler or heating system, or to any devices or equipment that require water to operate but are not part of the plumbing system.

- **Riser.** A water supply pipe that extends one full story or more to convey water to branches or to a group of fixtures.

- **Water distribution pipe.** A pipe within the structure or on the premises that conveys water from the water service pipe, or from the meter when the meter is at the structure, to the points of utilization.

- **Water service pipe.** The pipe from the water main or other source of potable water supply, or from the meter when the meter is at the public right of way, to the water distribution system of the building served.

- **WATER SUPPLY SYSTEM.** The water service pipe, water distribution pipes, and the necessary connecting pipes, fittings, control valves and all appurtenances in or adjacent to the structure or premises.

- **Bored.** A well constructed by boring a hole in the ground with an auger and installing a casing.

- **Drilled.** A well constructed by making a hole in the ground with a drilling machine of any type and installing a casing and screen.

CHAPTER 2 DEFINITIONS (CONT'D)

- **Driven.** A well constructed by driving a pipe in the ground. The drive pipe is usually fitted with a well point and screen.

- **Dug.** A well constructed by excavating a large-diameter shaft and installing a casing.

CHAPTER 2 DEFINITIONS (CONT'D)

- **WHIRLPOOL BATHTUB.** A plumbing appliance consisting of a bathtub fixture that is equipped and fitted with a circulating piping system designed to accept, circulate and discharge bathtub water upon each use.

- **YOKE VENT.** A pipe connecting upward from a soil or waste stack to a vent stack for the purpose of preventing pressure changes in the stacks.

- **QUICK-CLOSING VALVE.** A valve or faucet that closes automatically when released manually or that is controlled by a mechanical means for fast-action closing.

- **RECLAIMED WATER.** Nonpotable water that has been derived from the treatment of wastewater by a facility or system licensed or permitted to produce water meeting the jurisdiction's water requirements for its intended uses. Also known as "recycled water."

- **RELIEF VALVE.**
  - **Pressure relief valve.** A pressure-actuated valve held closed by a spring or other means and designed to relieve pressure automatically at the pressure at which such valve is set.
  - **Temperature and pressure relief (T&P) valve.** A combination relief valve designed to function as both a temperature relief and a pressure relief valve.
  - **Temperature relief valve.** A temperature-actuated valve designed to discharge automatically at the temperature at which such valve is set.

- **ROOF DRAIN.** A drain installed to receive water collecting on the surface of a roof and to discharge such water into a leader or a conductor.

- **SEWAGE EJECTOR.** A device for lifting sewage by entraining the sewage in a high-velocity jet of steam, air or water.

- **SEWER.**
  - **Public sewer.** That part of the drainage system of pipes, installed and maintained by a city, township, county, public utility company or other public entity, and located on public property, in the street or in an approved dedicated easement of public or community use.
  - **Sanitary sewer.** A sewer that carries sewage and excludes storm, surface and ground water.
  - **Storm sewer.** A sewer that conveys rainwater, surface water, subsurface water and similar liquid wastes.

- **SPILLPROOF VACUUM BREAKER.** An assembly 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, and located between and including two tightly closing shutoff valves and a test cock.

- **SUMP PUMP.** An automatic water pump powered by an electric motor for the removal of drainage, except raw sewage, from a sump, pit or low point.

- **SUMP VENT.** A vent from pneumatic sewage ejectors, or similar equipment, that terminates separately to the open air.

- **WATER PIPE.**
  - **Riser.** A water supply pipe that extends one full story or more to convey water to branches or to a group of fixtures.
  - **Water distribution pipe.** A pipe within the structure or on the premises that conveys water from the water service pipe, or from the meter when the meter is at the structure, to the points of utilization.
  - **Water service pipe.** The pipe from the water main or other source of potable water supply, or from the meter when the meter is at the public right of way, to the water distribution system of the building served.

- **YOKE VENT.** A pipe connecting upward from a soil or waste stack to a vent stack for the purpose of preventing pressure changes in the stacks.

CHAPTER 3 GENERAL REGULATIONS

Chapter 3 covers general regulations for plumbing installations.

As many of these requirements would need to be repeated in Chapters 3 through 14, placing such requirements in only one location eliminates code development coordination issues associated with the same requirement in multiple locations.

These general requirements can be superseded by more specific requirements for certain applications in Chapters 3 through 14.

Figure 1: Plumbing System Installation

Newly Added Sections to the 2024 IPC Version:

305.6.1 Shield plates.

- Shield plates shall be of steel material having a thickness of not less than 0.0575 inch (1.463 mm) (No. 16 gage).

305.8 Expansive soil.

- Where expansive soil is identified under buildings in accordance with Section 1803.5.3 of the International Building Code, but not removed in accordance with Section 1808.6.3 of the International Building Code, plumbing shall be protected in accordance with Section 305.8.1 or 305.8.2.

Newly Added Sections to the 2024 IPC Version:

305.8.1 Nonisolated foundations.

- Under foundations with slabs that are structurally supported by a subgrade, buried plumbing shall be permitted.

305.8.2 Isolated foundations.

- Under foundations with a slab or framing that structurally spans over an under-floor space that isolates the slab or framing from the effects of expansive soil swelling and shrinking in accordance with Section 1808.6.1 of the International Building Code, the plumbing shall be suspended so that plumbing, hangers and supports are isolated, by a voidspace, from the effects of expansive soil swelling and shrinking.

Newly Added Sections to the 2024 IPC Version:

305.8.2 Isolated foundations *(Cont'd)*.

- Exception: Plumbing shall be permitted to be buried where it provides drainage of an under-floor space.
- To protect the voidspace, soil shall be sloped, benched or retained in accordance with an approved design methodology.
- Plumbing, hangers and supports below the slab or framing shall not be permitted to be in contact with the soil or any assemblage of materials that is in contact with soil in the active zone.
- A slab and plumbing shall not be permitted to be lifted as an assembly to create the voidspace unless the under-floor space is a crawl space with access to allow inspection of plumbing after lifting.

Newly Added Sections to the 2024 IPC Version:

305.8.2 Isolated foundations *(Cont'd)*.

- Exception: Plumbing shall be permitted to be buried where it provides provides drainage of an under-floor space.
- Organic materials subject to decay shall not be used for hangers, supports and soil retention systems.
- Materials subject to corrosion shall not be used for hangers, supports and soil retention systems unless protected in an approved manner.
- Where plumbing transitions to a buried condition beyond the perimeter of the foundation, an adequately flexible expansion joint shall be provided in the plumbing system to accommodate the effects of expansive soil swelling and shrinking.

Newly Added Sections to the 2024 IPC Version:

306.2.4 Tracer wire.

- For plastic sewer piping, an insulated copper tracer wire or other approved conductor shall be installed adjacent to and over the full length of the piping.
- Access shall be provided to the tracer wire or the tracer wire shall terminate at the cleanout between the building drain and building sewer.
- The tracer wire size shall be not less than 14 American Wire Gauge (2.5 mm^2) and the insulation type shall be listed for direct burial.

Newly Added Sections to the 2024 IPC Version:

307.3 Cutting and notching in cold-formed steel framing.

- The cutting and notching of holes in cold-formed steel framing members shall be in accordance with AISI S240 for structural members and AISI S220 for nonstructural members.

Newly Added Sections to the 2024 IPC Version:

312.4 Drainage and vent vacuum test.

- The portion of the drainage and vent system under test shall be evacuated of air by a vacuum-type pump to achieve a uniform gauge pressure of negative 5 pounds per square inch or a negative 10 inches of mercury column (-34 kPa).
- This pressure shall be held without the removal of additional air for a period of 15 minutes.
- Any adjustments to the test pressure required because of changes in ambient temperatures or the seating of gaskets shall be made prior to the beginning of the test period.

(2021)

307.2 Cutting, notching or bored holes.

- A framing member shall not be cut, notched or bored in excess of limitations specified in the International Building Code.

(2024)

307.2 Cutting, notching ~~or bored holes~~ and boring in wood framing.

- The cutting, notching and boring of structural wood framing members shall comply with Section 2308.6 of the International Building Code.

Section 301 general

301.3 Connections to drainage system.

- Plumbing fixtures, drains, appurtenances and appliances used to receive or discharge liquid waste or sewage shall be directly connected to the sanitary drainage system of the building or premises, in accordance with the requirements of this code.
- This section shall not be construed to prevent indirect waste systems required by Chapter 8.

301.4 Connections to water supply.

- Every plumbing fixture, device or appliance requiring or using water for its proper operation shall be directly or indirectly connected to the water supply system in accordance with the provisions of this code.

301.5 Pipe, tube and fitting sizes.

- Unless otherwise indicated, the pipe, tube and fitting sizes specified in this code are expressed in nominal or standard sizes as designated in the referenced material standards.

301.6 Prohibited locations.

- Plumbing systems shall not be located in an elevator shaft or in an elevator equipment room.
  - Exception: Floor drains, sumps and sump pumps shall be permitted at the base of the shaft, provided that they are indirectly connected to the plumbing system and comply with Section 1003.4.

Section 302 exclusion of materials detrimental to the sewer system

302.1 Detrimental or dangerous materials.

- Ashes, cinders or rags; flammable, poisonous or explosive liquids or gases; oil, grease or any other insoluble material capable of obstructing, damaging or overloading the building drainage or sewer system, or capable of interfering with the normal operation of the sewage treatment processes, shall not be deposited, by any means, into such systems.

302.2 Industrial wastes.

- Waste products from manufacturing or industrial operation introduced into the public sewerage system are regulated by the Vermont Agency of Natural Resources.

Section 303 materials

303.1 Identification.

- Each length of pipe and each pipe fitting, trap, fixture, material and device utilized in a plumbing system shall bear the identification of the manufacturer and any markings required by the applicable referenced standards.

303.2 Installation of materials.

- Materials used shall be installed in strict accordance with the standards under which the materials are accepted and approved. In the absence of such installation procedures, the manufacturer's instructions shall be followed. Where the requirements of referenced standards or manufacturer's installation instructions do not conform to minimum provisions of this code, the provisions of this code shall apply.

303.3 Plastic pipe, fittings and components.

- Plastic pipe, fittings and components shall be third-party certified as conforming to NSF 14.

303.4 Third-party certification.

- Plumbing products and materials required by the code to be in compliance with a referenced standard shall be listed by a third-party certification agency as complying with the referenced standards.
- Products and materials shall be identified in accordance with Section 303.1.

303.5 Cast-iron soil pipe, fittings and components.

- Cast-iron soil pipes and fittings, and the couplings used to join these products together, shall be third-party listed and labeled.
- Third-party certifiers or inspectors shall comply with the minimum inspection requirements of Annex A or Annex A1 of the ASTM and CISPI product standards indicated in the code for such products.

Figure 2: Cast-Iron Soil Pipes and Their Fittings Shall be Third-party Listed and Labeled

Section 304 Rodentproofing

304.1 General.

- Plumbing systems shall be designed and installed in accordance with Sections 304.2 through 304.4 to prevent rodents from entering structures.

304.2 Strainer plates.

- Strainer plates on drain inlets shall be designed and installed so that all openings are not greater than $^1/_2$ inch (12.7 mm) in least dimension.

304.3 Meter boxes.

- Meter boxes shall be constructed in such a manner that rodents are prevented from entering a structure by way of the water service pipes connecting the meter box and the structure.

304.4 Openings for pipes.

- In or on structures where openings have been made in walls, floors or ceilings for the passage of pipes, the annular space between the pipe and the sides of the opening shall be sealed with caulking materials or closed with gasketing systems compatible with the piping materials and locations.

Section 305 protection of pipes and plumbing system components

305.1 Protection against contact.

- Metallic piping, except for cast iron, ductile iron and galvanized steel, shall not be placed in direct contact with steel framing members, concrete or cinder walls and floors or other masonry.
- Metallic piping shall not be placed in direct contact with corrosive soil.
- Where sheathing is used to prevent direct contact, the sheathing shall have a thickness of not less than 0.008 inch (8 mil) (0.203 mm) and the sheathing shall be made of plastic.
- Where sheathing protects piping that penetrates concrete or masonry walls or floors, the sheathing shall be installed in a manner that allows movement of the piping within the sheathing.

305.4 Freezing.

- Water, soil and waste pipes shall not be installed outside of a building, in attics or crawl spaces, concealed in outside walls, or in any other place subjected to freezing temperatures unless adequate provision is made to protect such pipes from freezing by insulation or heat or both. Exterior water supply system piping shall be installed not less than 6 inches (152 mm) below the frost line and not less than 12 inches (305 mm) below grade.

305.6 Protection against physical damage.

- In concealed locations where piping, other than cast iron or galvanized steel, is installed through holes or notches in studs, joists, rafters or similar members less than $1^1/_4$ inches (32 mm) from the nearest edge of the member, the pipe shall be protected by steel shield plates. Such shield plates shall have a thickness of not less than 0.0575 inch (1.463 mm) (No. 16 gage).
- Such plates shall cover the area of the pipe where the member is notched or bored, and shall extend not less than 2 inches (51 mm) above sole plates and below top plates.

305.7 Protection of components of plumbing system.

- Components of a plumbing system installed along alleyways, driveways, parking garages or other locations exposed to damage shall be recessed into the wall or otherwise protected in an approved manner.

Section 306 trenching, excavation and backfill

306.1 Support of piping.

- Buried piping shall be supported throughout its entire length.

306.2 Trenching and bedding.

- Where trenches are excavated such that the bottom of the trench forms the bed for the pipe, solid and continuous load-bearing support shall be provided between joints.
- Bell holes, hub holes and coupling holes shall be provided at points where the pipe is joined.
- Such pipe shall not be supported on blocks to grade.
- In instances where the material manufacturer's installation instructions are more restrictive than those prescribed by the code, the material shall be installed in accordance with the more restrictive requirement.

306.2.1 Overexcavation.

- Where trenches are excavated below the installation level of the pipe such that the bottom of the trench does not form the bed for the pipe, the trench shall be backfilled to the installation level of the bottom of the pipe with sand or fine gravel placed in layers not greater than 6 inches (152 mm) in depth and such backfill shall be compacted after each placement.

306.2.2 Rock removal.

- Where rock is encountered in trenching, the rock shall be removed to not less than 3 inches (76 mm) below the installation level of the bottom of the pipe, and the trench shall be backfilled to the installation level of the bottom of the pipe with sand tamped in place so as to provide uniform load-bearing support for the pipe between joints. The pipe, including the joints, shall not rest on rock at any point.

306.2.3 Soft load-bearing materials.

- If soft materials of poor load-bearing quality are found at the bottom of the trench, stabilization shall be achieved by overexcavating not less than two pipe diameters and backfilling to the installation level of the bottom of the pipe with fine gravel, crushed stone or a concrete foundation.
- The concrete foundation shall be bedded with sand tamped into place so as to provide uniform load-bearing support for the pipe between joints.

308.10 Alternate support

Alternate support techniques can be utilized, subject to the plumbing inspector's approval.

Section 309 Flood Hazard Resistance

309.1 General.

- Plumbing systems and equipment in structures erected in flood hazard areas shall be constructed in accordance with the requirements of this section and the International Building Code.

Figure 3: Plumbing systems installed in flood hazard areas shall be in accordance with IBC

309.2 Flood hazard.

- For structures located in flood hazard areas, the following systems and equipment shall be located and installed as required by Section 1612 of the International Building Code.
  1. Water service pipes.
  2. Pump seals in individual water supply systems where the pump is located below the design flood elevation.
  3. Covers on potable water wells shall be sealed, except where the top of the casing well or pipe sleeve is elevated to not less than 1 foot (305 mm) above the design flood elevation.
  4. Sanitary drainage piping.
  5. Storm drainage piping.
  6. Manhole covers shall be sealed, except where elevated to or above the design flood elevation.
  7. Other plumbing fixtures, faucets, fixture fittings, piping systems and equipment.
  8. Water heaters.
  9. Vents and vent systems.

Section 314 Condensate Disposal

314.1 Fuel-burning appliances

- Liquid combustion byproducts of condensing appliances shall be collected and discharged to an approved plumbing fixture or disposal area in accordance with the manufacturer's instructions. Condensate piping shall be of approved corrosion-resistant material and shall not be smaller than the drain connection on the appliance. Such piping shall maintain a horizontal slope in the direction of discharge of not less than one-eighth unit vertical in 12 units horizontal (one percent slope).

Section 314 Condensate Disposal

314.2.1.2 Condensate Disposal Regulations

- All condensate disposal shall conform to ANR regulations (802-828-1535)

Section 315 penetrations

315.1 Sealing of annular spaces.

- The annular space between the outside of a pipe and the inside of a pipe sleeve or between the outside of a pipe and an opening in a building envelope wall, floor, or ceiling assembly penetrated by a pipe shall be sealed in an approved manner with caulking material, foam sealant or closed with a gasketing system.
- The caulking material, foam sealant or gasketing system shall be designed for the conditions at the penetration location and shall be compatible with the pipe, sleeve and building materials in contact with the sealing materials.
- Annular spaces created by pipes penetrating fire-resistance-rated assemblies or membranes of such assemblies shall be sealed or closed in accordance with Section 714 of the International Building Code.

Section 316 Alternative Engineered Design

316.1 Alternative engineered design.

- The design, documentation, inspection, testing and approval of an alternative engineered design plumbing system shall comply with Sections 316.1.1 through 316.1.6.

316.1.1 Design criteria.

- An alternative engineered design shall conform to the intent of the provisions of this code and shall provide an equivalent level of quality, strength, effectiveness, fire resistance, durability and safety. Material, equipment or components shall be designed and installed in accordance with the manufacturer's instructions.

316.1.2 Submittal.

- The registered design professional shall indicate on the permit application that the plumbing system is an alternative engineered design. The permit and permanent permit records shall indicate that an alternative engineered design was part of the approved installation.

316.1.3 Technical data.

- The registered design professional shall submit sufficient technical data to substantiate the proposed alternative engineered design and to prove that the performance meets the intent of this code.

316.1.4 Construction documents.

- The registered design professional shall submit to the code official two complete sets of signed and sealed construction documents for the alternative engineered design. The construction documents shall include floor plans and a riser diagram of the work. Where appropriate, the construction documents shall indicate the direction of flow, all pipe sizes, grade of horizontal piping, loading and location of fixtures and appliances.

316.1.5 Design approval.

- Where the code official determines that the alternative engineered design conforms to the intent of this code, the plumbing system shall be approved. If the alternative engineered design is not approved, the code official shall notify the registered design professional in writing, stating the reasons thereof.

CHAPTER 4 FIXTURES, FAUCETS AND FIXTURE FITTINGS

Plumbing fixtures are required to be installed for nearly every building as toilet facilities (water closets and lavatories) are needed by the occupants of a building.

Additional fixtures for washing, bathing and culinary purposes are also necessary where occupants dwell in buildings.

Chapter 4 specifies the minimum number and type of plumbing fixtures for buildings based on the description of use of the building.

Because fixture design and quality are paramount to ensure that plumbing fixtures operate properly, this chapter also specifies numerous product and material standards for plumbing fixtures.

Newly Added Sections to the 2024 IPC Version

412.12 Electrically heated or cooled water dispensers.

- Electrically heated or cooled water dispensers shall comply with ASSE 1023.

419.6 Soap dispenser.

- Soap dispensers shall be provided for public lavatories.

(2021)

403.1.2 Single-user toilet and bathing room fixtures.

- The plumbing fixtures located in single-user toilet and bathing rooms, including family or assisted-use toilet and bathing rooms that are required by Section 1110.2.1 of the International Building Code, shall contribute toward the total number of required plumbing fixtures for a building or tenant space. […]

(2024)

403.1.2 Fixtures in single-user toilet facilities and bathing rooms.

- […] The number of fixtures in single-user toilet facilities, single-user bathing rooms and family or assisted-use toilet facilities shall be deducted proportionately from the required gender ratios of Table 403.1. Single-user toilet facilities and bathing rooms, and family or assisted-use toilet facilities and bathing rooms shall be identified […]

(2021)

403.1.3 Lavatory distribution.

- Where two or more toilet rooms are provided for each sex, the required number of lavatories shall be distributed proportionately to the required number of water closets.

(2024)

403.1.3 Lavatory distribution.

- Where two or more toilet facilities are provided for each sex, the required number of lavatories shall be distributed proportionately to the required number of male and female designated water closets.

(2021)

403.4 Signage.

- Required public facilities shall be provided with signs that designate the sex, as required by Section 403.2. Signs shall be readily visible and located near the entrance to each toilet facility. Signs for accessible toilet facilities shall comply with Section 1111 of the International Building Code.

(2024)

403.4 Signage.

- Required public toilet facilities shall be provided with signs that indicate whether the facility is to be used by males, by females, or by all persons regardless of sex. Signs shall be readily visible and located near the entrance to each toilet facility. Signs for accessible toilet facilities shall comply with Section 1111 of the International Building Code.

(2021)

407.2 Bathtub waste outlets and overflows.

- Bathtubs shall be equipped with a waste outlet that is not less than $1^1/_2$ inches (38 mm) in diameter. The waste outlet shall be equipped with a watertight stopper. Where an overflow is installed, the overflow shall be not less than $1^1/_2$ inches (38 mm) in diameter.

(2024)

407.2 Bathtub waste outlets and overflows.

- Bathtubs shall be equipped with a waste outlet that is not less than $1^1/_2$ inches (38 mm) in diameter. The waste outlet shall be equipped with a watertight stopper. Where an overflow is installed in a bathtub, the piping from the overflow outlet shall be connected upstream of the fixture trap. The overflow outlet shall discharge to the trap whether the waste outlet is closed or open.

Section 401 general

401.1 Scope.

- This chapter shall govern the materials, design and installation of plumbing fixtures, faucets and fixture fittings in accordance with the type of occupancy, and shall provide for the minimum number of fixtures for various types of occupancies.

401.2 Prohibited fixtures and connections.

- Water closets having a concealed trap seal or an unventilated space or having walls that are not thoroughly washed at each discharge in accordance with ASME A112.19.2/CSA B45.1 shall be prohibited. Any water closet that permits siphonage of the contents of the bowl back into the tank shall be prohibited. Trough urinals shall be prohibited.

Section 402 fixture materials

402.1 Quality of fixtures.

- Plumbing fixtures shall be constructed of approved materials, with smooth, impervious surfaces, free from defects and concealed fouling surfaces, and shall conform to standards cited in this code. Porcelain enameled surfaces on plumbing fixtures shall be acid resistant.

402.2 Materials for specialty fixtures.

- Materials for specialty fixtures not otherwise covered in this code shall be of stainless steel, soapstone, chemical stoneware or plastic, or shall be lined with lead, copper-base alloy, nickel-copper alloy, corrosion-resistant steel or other material especially suited to the application for which the fixture is intended.

Section 403 Minimum Plumbing Facilities

403.1 Minimum number of fixtures.

- Plumbing fixtures shall be provided in the minimum number as shown in Table 403.1, based on the actual use of the building or space.
- Uses not shown in Table 403.1 shall be considered individually by the code official.
- The number of occupants shall be determined by the International Building Code.

Figure 12: Plumbing Fixtures

NO.	CLASSIFICATION	DESCRIPTION	WATER CLOSETS (URINALS: SEE SECTION 424.2)		LAVATORIES		BATHTUBS/ SHOWERS	DRINKING FOUNTAIN (SEE SECTION 410)	OTHER
			MALE	FEMALE	MALE	FEMALE			
1	Assembly	Theaters and other buildings for the performing arts and motion pictures[d]	1 per 125	1 per 65	1 per 200		—	1 per 500	1 service sink
		Nightclubs, bars, taverns, dance halls and buildings for similar purposes[d]	1 per 40	1 per 40	1 per 75		—	1 per 500	1 service sink
		Restaurants, banquet halls and food courts[d]	1 per 75	1 per 75	1 per 200		—	1 per 500	1 service sink
		Casino gaming areas	1 per 100 for the first 400 and 1 per 250 for the remainder exceeding 400	1 per 50 for the first 400 and 1 per 150 for the remainder exceeding 400	1 per 250 for the first 750 and 1 per 500 for the remainder exceeding 750		—	1 per 1,000	1 service sink
		Auditoriums without permanent seating, art galleries, exhibition halls, museums, lecture halls, libraries, arcades and gymnasiums[e]	1 per 125	1 per 65	1 per 200		—	1 per 500	1 service sink
		Passenger terminals and transportation facilities[d]	1 per 500	1 per 500	1 per 750		—	1 per 1,000	1 service sink
		Places of worship and other religious services[d]	1 per 150	1 per 75	1 per 200		—	1 per 1,000	1 service sink
		Coliseums, arenas, skating rinks, pools and tennis courts for indoor sporting events and activities	1 per 75 for the first 1,500 and 1 per 120 for the remainder exceeding 1,500	1 per 40 for the first 1,520 and 1 per 60 for the remainder exceeding 1,520	1 per 200	1 per 150	—	1 per 1,000	1 service sink
		Stadiums, amusement parks, bleachers and grandstands for outdoor sporting events and activities[r]	1 per 75 for the first 1,500 and 1 per 120 for the remainder exceeding 1,500	1 per 40 for the first 1,520 and 1 per 60 for the remainder exceeding 1,520	1 per 200	1 per 150	—	1 per 1,000	1 service sink
2	Business	Buildings for the transaction of business, professional services, other services involving merchandise, office buildings, banks, ambulatory care, light industrial and similar uses	1 per 25 for the first 50 and 1 per 50 for the remainder exceeding 50		1 per 40 for the first 80 and 1 per 80 for the remainder exceeding 80		—	1 per 100	1 service sink[e]
3	Educational	Educational facilities	1 per 50		1 per 50		—	1 per 100	1 service sink

Table 2 (1): Minimum number of required plumbing fixtures (see sections 403.1.1 and 403.2)
(*Source: INTERNATIONAL CODE COUNCIL, 2021 International Plumbing Code – Table 403.1)*

4	Factory and industrial	Structures in which occupants are engaged in work fabricating, assembly or processing of products or materials	1 per 100	1 per 100	—	1 per 400	1 service sink
5	Institutional	Custodial care facilities	1 per 10	1 per 10	1 per 8	1 per 100	1 service sink
		Medical care recipients in hospitals and nursing homes	1 per room[c]	1 per room[c]	1 per 15	1 per 100	1 service sink per floor
		Employees in hospitals and nursing homes[b]	1 per 25	1 per 35	—	1 per 100	—
		Visitors in hospitals and nursing homes	1 per 75	1 per 100	—	1 per 500	—
		Prisons[b]	1 per cell	1 per cell	1 per 15	1 per 100	1 service sink
		Reformitories, detention centers, and correctional cen	1 per 15	1 per 15	1 per 15	1 per 100	1 service sink
		Employees in reformatories, detention centers and co	1 per 25	1 per 35	—	1 per 100	—
		Adult day care and child day care	1 per 15	1 per 15	1	1 per 100	1 service sink
6	Mercantile	Retail stores, service stations, shops, salesrooms, markets and shopping centers	1 per 500	1 per 750	—	1 per 1,000	1 service sink[e]
7	Residential	Hotels, motels, boarding houses (transient)	1 per sleeping unit	1 per sleeping unit	1 per sleeping unit	—	1 service sink
		Dormitories, fraternities, sororities and boarding houses (not transient)	1 per 10	1 per 10	1 per 8	1 per 100	1 service sink
		Apartment house	1 per dwelling unit	1 per dwelling unit	1 per dwelling unit	—	1 kitchen sink per dwelling unit; 1 automatic clothes washer connection per 20 dwelling units
		Congregate living facilities with 16 or fewer persons	1 per 10	1 per 10	1 per 8	1 per 100	1 service sink
		One- and two-family dwellings and lodging houses with five or fewer guestrooms	1 per dwelling unit	1 per dwelling unit	1 per dwelling unit	—	1 kitchen sink per dwelling unit; 1 automatic clothes washer connection per dwelling unit
		Congregate living facilities with 16 or fewer persons	1 per 10	1 per 10	1 per 8	1 per 100	1 service sink
8	Storage	Structures for the storage of goods, warehouses, storehouse and freight depots. Low and Moderate Hazard.	1 per 100	1 per 100	—	1 per 1,000	1 service sink

Table 2 (2): Minimum number of required plumbing fixtures (see sections 403.1.1 and 403.2)
(*Source: INTERNATIONAL CODE COUNCIL, 2021 International Plumbing Code – Table 403.1)*

403.4 Signage.

- Required public facilities shall be provided with signs that designate the sex, as required by Section 403.2. Signs shall be readily visible and located near the entrance to each toilet facility. Signs for accessible toilet facilities shall comply with Section 1111 of the International Building Code.

403.4.1 Directional signage.

- Directional signage indicating the route to the required public toilet facilities shall be posted in a lobby, corridor, aisle or similar space, such that the sign can be readily seen from the main entrance to the building or tenant space.

403.4.2 Single-user restroom signage

- Single-user toilet facility/room shall be provided with a sign "RESTROOM". Signage for Accessible toilet facility/room shall comply with the Vermont Access Rules.

Section 404 accessible plumbing facilities

404.2 Accessible Fixture Requirements

- Accessible plumbing fixtures shall be installed in accordance with the 2010 ADA Standards for Accessible Design and the currently adopted version of the Division of Fire Safety's Vermont Access Rules.

404.3 Exposed pipes and surfaces.

- Water supply and drain pipes under accessible lavatories and sinks shall be covered or otherwise configured to protect against contact. Pipe coverings shall comply with ASME A112.18.9 or ASTM C1822.

Section 405 Installation Of Fixtures

405.1 Water supply protection.

- The supply lines and fittings for every plumbing fixture shall be installed so as to prevent backflow.

405.3.1 Water closets, urinals, lavatories and bidets.

- A water closet, urinal, lavatory or bidet shall not be set closer than 15 inches (381 mm) from its center to any side wall, partition, vanity or other obstruction.
- Where partitions or other obstructions do not separate adjacent water closets, urinals, or bidets, the fixtures shall not be set closer than 30 inches (762 mm) center to center between adjacent fixtures or adjacent water closets, urinals, or bidets.
- There shall be not less than a 21-inch (533 mm) clearance in front of a water closet, urinal, lavatory or bidet to any wall, fixture or door.
- Water closet compartments shall be not less than 30 inches (762 mm) in width and not less than 60 inches (1524 mm) in depth for floor-mounted water closets and not less than 30 inches (762 mm) in width and 56 inches (1422 mm) in depth for wall-hung water closets.

405.3.3 Location of fixtures and piping.

- Piping, fixtures or equipment shall not be located in such a manner as to interfere with the normal operation of windows, doors or other means of egress openings.

Figure 13: Piping Should Not Interfere with Normal Operation of Windows, Doors or Other Means of Egress

Section 405.3.4 Water Closet Compartment

- Each Water Closet utilized by the public or employees shall occupy a separate compartment with walls or partitions and a door enclosing the fixtures to ensure privacy.

Exceptions:

- Water closet compartments shall not be required in a single-occupant toilet room with a lockable door.
- Toilet facilities located in child day care facilities and containing two or more water closets shall be permitted to have one water closet without an enclosing compartment.
- This provision is not applicable to toilet areas located within Group I-3 housing areas.
- Gender Neutral Multi-user bathrooms shall have the Water Closet within a Room with walls from floor to ceiling and a Locking door for privacy. Ventilation shall be provided for this Water Closet room.

405.3.5 Urinal partitions

- Each urinal utilized by the public or employees shall occupy a separate area with walls or partitions to provide privacy. The horizontal dimension between walls or partitions at each urinal shall be not less than 30 inches. The walls or partitions shall begin at a height not greater than 12 inches from and extend not less than 60 inches above the finished floor surface. The walls or partitions shall extend from the wall surface at each side of the urinal not less than 18 inches or to a point not less than 6 inches beyond the outermost front lip of the urinal measured from the finished backwall surface, whichever is greater.

Exceptions:

- Urinal Partitions shall not be required in a single occupant or family/assisted-use toilet room with a lockable door.
- Toilet facilities located in child day care facilities and containing two or more urinals shall be permitted to have one urinal without partitions.
- Gender Neutral Multi-user bathrooms shall have the Urinal within a Room with walls from floor to ceiling and a Locking door for privacy. Ventilation shall be provided for this Urinal room.

405.4 Floor and wall drainage connections.

- Connections between the drain and floor outlet plumbing fixtures shall be made with a floor flange or a waste connector and sealing gasket.
- The waste connector and sealing gasket joint shall comply with the joint tightness test of ASME A112.4.3 and shall be installed in accordance with the manufacturer's instructions.
- The flange shall be attached to the drain and anchored to the structure.
- Connections between the drain and wall-hung water closets shall be made with an approved extension nipple or horn adaptor.
- The water closet shall be bolted to the hanger with corrosion-resistant bolts or screws. Joints shall be sealed with an approved elastomeric gasket, flange-to-fixture connection complying with ASME A112.4.3 or an approved setting compound.

405.5 Plumbing fixtures with a pumped waste.

- Plumbing fixtures with a pumped waste shall comply with ASME A112.3.4/CSA B45.9. The plumbing fixture with a pumped waste shall be installed in accordance with the manufacturer's instructions.

405.7 Plumbing in mental health centers.

- In mental health centers, pipes or traps shall not be exposed, and fixtures shall be bolted through walls

405.10 Design and installation of plumbing fixtures.

- Integral fixture fitting mounting surfaces on manufactured plumbing fixtures or plumbing fixtures constructed on-site shall meet the design requirements of ASME A112.19.2/CSA B45.1 or ASME A112.19.3/CSA B45.4.

Section 406 automatic clothes washers

406.2 Waste connection.

- The waste from an automatic clothes washer shall discharge through an air break into a standpipe in accordance with Section 802.4.3 or into a laundry sink.
- The trap and fixture drain for an automatic clothes washer standpipe shall be not less than 2 inches (51 mm) in diameter.
- The fixture drain for the standpipe serving an automatic clothes washer shall connect to a 3-inch (76 mm) or larger diameter fixture branch or stack.
- Automatic clothes washers that discharge by gravity shall be permitted to drain to a waste receptor or an approved trench drain.

Section 407 bathtubs

407.2 Bathtub waste outlets and overflows.

- Bathtubs shall be equipped with a waste outlet that is not less than $1^1/_2$ inches (38 mm) in diameter. The waste outlet shall be equipped with a watertight stopper. Where an overflow is installed, the overflow shall be not less than $1^1/_2$ inches (38 mm) in diameter.

Section 408 bidets

408.3 Bidet water temperature.

- The discharge water temperature from a bidet fitting shall be limited to not greater than 110°F (43°C) by a water-temperature-limiting device conforming to ASSE 1070/ASME A112.1070/CSA B125.70.

Section 410 Drinking Fountains

410.1 Approval.

- Drinking fountains shall conform to ASME A112.19.1/CSA B45.2, ASME A112.19.2/CSA B45.1 or ASME A112.19.3/CSA B45.4, and water coolers shall conform to ASHRAE 18.
- Drinking fountains, water coolers and water dispensers shall conform to NSF 61, Section 9.
- Electrically operated, refrigerated drinking water coolers and water dispensers shall be listed and labeled in accordance with UL 399.

Figure 14: Drinking Water Fountains Shall Conform to ASME Standards

Section 422 sinks

422.1 Approval.

- Sinks shall conform to ASME A112.19.1/CSA B45.2, ASME A112.19.2/CSA B45.1, ASME A112.19.3/CSA B45.4 or CSA B45.5/IAPMO Z124.

422.2 Sink waste outlets.

- Sinks shall be provided with waste outlets having a diameter not less than $1^1/_2$ inches (38 mm). A strainer or crossbar shall be provided to restrict the clear opening of the waste outlet.

422.3 Movable sink systems.

- Movable sink systems shall comply with ASME A112.19.12.

Section 425 Water Closets

- **425.1 Approval.**

Water closets shall conform to the water consumption requirements of Section 604.4 and shall conform to ASME A112.19.2/CSA B45.1, ASME A112.19.3/CSA B45.4 or CSA B45.5/IAPMO Z124.

425.1.1 Hydraulic performance.

- Water closets shall conform to the hydraulic performance requirements of ASME A112.19.2/CSA B45.1.

425.1.2 Water closet tanks.

- Water closet tanks shall conform to ASME A112.19.2/CSA B45.1. ASME A112.19.3/CSA B45.4 OR CSA B45.5/IAPMO

425.1.3 Dual flush water closets.

- Water closets equipped with a dual flushing device shall comply with ASME A112.19.14.

425.2 Water closets for public or employee toilet facilities.

- Water closet bowls for public or employee toilet facilities shall be of the elongated type.

425.3 Water closet seats.

- Water closets shall be equipped with seats of smooth, nonabsorbent material. Seats of water closets provided for public or employee toilet facilities shall be of the hinged open-front type. Integral water closet seats shall be of the same material as the fixture. Water closet seats shall be sized for the water closet bowl type.

425.4 Water closet connections.

- A 4-inch by 3-inch (102 mm by 76 mm) closet bend shall be acceptable. Where a 3-inch (76 mm) bend is utilized on water closets, a 4-inch by 3-inch (102 mm by 76 mm) flange shall be installed to receive the fixture horn.

Section 426 Whirlpool Bathtubs

426.1 Approval.

- Whirlpool bathtubs shall comply with ASME A112.19.7/CSA B45.10 and shall be listed and labeled in accordance with UL1795.

426.2 Installation.

- Whirlpool bathtubs shall be installed and tested in accordance with the manufacturer's instructions. The pump shall be located above the weir of the fixture trap.

426.3 Drain.

- The pump drain and circulation piping shall be sloped to drain the water in the volute and the circulation piping when the whirlpool bathtub is empty.

426.4 Suction fittings.

- Suction fittings for whirlpool bathtubs shall comply with ASME A112.19.7/CSA B45.10.

426.5 Access to pump.

- Access shall be provided to circulation pumps in accordance with the fixture or pump manufacturer's installation instructions. Where the manufacturer's instructions do not specify the location and minimum size of field-fabricated access openings, an opening not less than 12 inches by 12 inches (305 mm by 305 mm) shall be installed to provide access to the circulation pump. Where pumps are located more than 2 feet (609 mm) from the access opening, an opening not less than 18 inches by 18 inches (457 mm by 457 mm) shall be installed. A door or panel shall be permitted to close the opening. In all cases, the access opening shall be unobstructed and of the size necessary to permit the removal and replacement of the circulation pump.

CHAPTER 5 WATER HEATERS

Chapter 5 contains regulations concerning the safety of water heating units and hot water storage tanks.

Heated (hot or tempered) potable water is needed for plumbing fixtures that are associated with handwashing, bathing, culinary activities and building maintenance.

Heated water is commonly stored in large pressurized storage tanks that must be protected against explosion by pressure and temperature relief valves specified in this chapter.

This chapter also covers the access requirements to water heaters and hot water storage tanks to allow for the maintenance and replacement of that equipment.

Newly Added Sections to the 2024 IPC Version:

501.1.1 TEMPERATURE CONROL FOR HOT WATER DISTRIBUTION SYSTEMS ONLY

- Additional downstream safety devices may be required.
- Water heaters, tank style and tankless, shall be equipped with an ASSE 1017 (or 1017/1070 listing where applicable) Temperature actuated mixing valve in accordance with 602.2, 605.2.1 & 613.1

Newly Added Sections to the 2024 IPC Version:

501.9 Lead content.

- Water heaters that are part of the potable water distribution system shall comply with NSF 372 and shall have a weighted average lead content of 0.25 percent or less.

(2021)

504.7 Required pan.

- Where a storage tank-type water heater or a hot water storage tank is installed leakage [...] constructed of one of the following:
- 1. Galvanized steel or aluminum of not less than 0.0236 inch (0.6010 mm) in thickness.
- 2. Plastic not less than 0.036 inch (0.9 mm) in thickness.
- 3. Other approved materials.

(2024)

504.7 Required pan.

- […] A plastic pan installed beneath a gas-fired water heater shall be constructed of material having a flame spread index of 25 or less and a smoked-developed index of 450 or less when tested in accordance with ASTM E84 or UL723. Water heaters installed in pans shall comply with Section 314.2.3.2.

Section 501 general

501.1 Scope.

- The provisions of this chapter shall govern the materials, design and installation of water heaters and the related safety devices and appurtenances.

501.2 Water heater as space heater.

- Where a combination potable water and space heating system is utilized, a temperature actuated mixing valve complying with ASSE 1017 shall be provided to limit the water supplied to the potable hot water distribution system to a temperature of 120˚F (49˚C) or less. The potability of the water shall be maintained throughout the system.

501.3 Drain valves.

- Drain valves for emptying shall be installed at the bottom of each tank-type water heater and hot water storage tank. The drain valve inlet shall be not less than 3/4-inch (19 mm) nominal iron pipe size and the outlet shall be provided with male garden hose threads.

501.4 Location.

- Water heaters and storage tanks shall be located and connected so as to provide access for observation, maintenance, servicing and replacement.

501.5 Water heater labeling.

- Water heaters shall be third-party certified.

501.6 Water temperature control in piping from tankless heaters.

- The temperature of water from tankless water heaters shall be a maximum 120˚F (49˚C) after the ASSE 1017 temperature actuated mixing valve when intended for domestic uses. This provision shall not supersede the requirement for protective shower valves in accordance with Section 412.3.

Section 502 installation

502.1 General.

- Water heaters shall be installed in accordance with the manufacturer's instructions. Oil-fired water heaters shall conform to the requirements of this code and the International Mechanical Code. Electric water heaters shall conform to the requirements of this code and provisions of NFPA 70. Gas-fired water heaters shall conform to the requirements of the International Fuel Gas Code. Solar thermal water heating systems shall conform to the requirements of the International Mechanical Code and ICC 900/SRCC 300.

502.1.1 Elevation and protection.

- Elevation of water heater ignition sources and mechanical damage protection requirements for water heaters shall be in accordance with the International Mechanical Code and the International Fuel Gas Code.

Section 503 Connections

503.1 Cold water line valve.

- The cold water branch line from the main water supply line to each hot water storage tank or water heater shall be provided with a valve, located near the equipment and serving only the hot water storage tank or water heater.
- The valve shall not interfere or cause a disruption of the cold water supply to the remainder of the cold water system.
- The valve shall be provided with access on the same floor level as the water heater served.

Section 503 Connections

503.3 Water Heater Connections

- All connections to the water heater including the ASSE 1017 temperature actuated mixing valve and the full port cold water shut off valve shall be rigidly supported using code compliant metallic piping. Metallic piping must extend a minimum of three feet or greater from both the hot and cold water connection points.

Section 504 safety devices

504.1 Antisiphon devices.

- An approved means, such as a cold water "dip" tube with a hole at the top or a vacuum relief valve installed in the cold water supply line above the top of the heater or tank, shall be provided to prevent siphoning of any storage water heater or tank.

504.2 Vacuum relief valve.

- Bottom fed water heaters and bottom fed tanks connected to water heaters shall have a vacuum relief valve installed. The vacuum relief valve shall comply with ANSI Z21.22.

504.6 Requirements for discharge piping.

- The discharge piping serving a pressure relief valve, temperature relief valve or combination thereof shall:
  1. Not be directly connected to the drainage system.
  2. Discharge through an air gap located in the same room as the water heater.
  3. Not be smaller than the diameter of the outlet of the valve served and shall discharge full size to the air gap.
  4. Serve a single relief device and shall not connect to piping serving any other relief device or equipment.
  5. Discharge to the floor, to the pan serving the water heater or storage tank, to a waste receptor or to the outdoors.
  6. Discharge in a manner that does not cause personal injury or structural damage.

7. Discharge to a termination point that is readily observable by the building occupants.
8. Not be trapped.
9. Be installed so as to flow by gravity.
10. Terminate not more than 6 inches (152 mm) above and not less than two times the discharge pipe diameter above the floor or flood level rim of the waste receptor.
11. Not have a threaded connection at the end of such piping.
12. Not have valves or tee fittings.
13. Be constructed of those materials listed in Section 605.4 or materials tested, rated and approved for such use in accordance with ASME A112.4.1.
14. Be one nominal size larger than the size of the relief valve outlet, where the relief valve discharge piping is installed with insert fittings. The outlet end of such tubing shall be fastened in place.
15. Outlet of all relief valve piping shall be cut on a 45-degree angle.

Section 505 insulation

505.1 Unfired vessel insulation.

- Unfired hot water storage tanks shall be insulated to:

R-12.5 (h × ft^2 × °F)/Btu (R-2.2 m^2 × K/W).

CHAPTER 6 WATER SUPPLY AND DISTRIBUTION

Many plumbing fixtures require a supply of potable water. Other fixtures could be supplied with nonpotable water such as reclaimed water.

Chapter 6 covers the requirements for water distribution piping systems to and within buildings.

The regulations include the types of materials and the connection methods for such systems.

The prevention of backflow of contaminated or polluted water into any potable water system is critical for protection of users of potable water.

This chapter regulates the assemblies, devices and methods that are used for this purpose.

Newly Added Sections to the 2024 IPC Version:

607.2.1 Commercial energy provisions.

- In occupancies that are required to comply with the commercial provisions of the International Energy Conservation Code, the developed length of hot or tempered water piping shall be limited in accordance with Sections C404.5.1 through C404.5.2.1 of that code.

(2021)

605.14.2 Solvent cementing.

- Joint surfaces shall be clean and free from moisture. Joints shall be made in accordance with the pipe manufacturer's installation instructions. Where such instructions require that a primer be used, the primer shall be applied to the joint surfaces and a solvent cement orange in color and conforming to ASTM F493 […]

(2024)

605.14.2 Solvent cementing.

- […] Solvent-cement joints shall be permitted above or below ground. […]. The joint shall be made in accordance with ASTM D2855 and while the cement is fluid. Where such instructions allow for a one-step solvent cement, yellow or green in color and conforming to ASTM F493, to be used, […] . The joint shall be made in accordance with ASTM F3328 and while the cement is wet.

(2021)

605.15.2 Solvent cementing.

- Joint surfaces shall be clean and free from moisture, and an approved primer shall be applied. [….] Exception: A primer is not required where all of the following conditions apply:
- 1 → 4 […]

(2024)

605.15.2 Solvent cementing.

- Joint surfaces shall be clean and free from moisture, and an approved primer shall be applied. [….] Exception: A primer is not required where all of the following conditions apply:
- 1 → 4 […]
- 5. The joint is made in accordance with ASTM F3328.

(2021)

606.1 Location of full-open valves.

- Full-open valves shall be installed in the following locations: […]
- 2. On the water distribution supply pipe at the entrance into the structure.
- 2.1. In multiple-tenant buildings, where a common water supply piping system is installed to supply other than one- and two-family dwellings, […]

(2024)

606.1 Location of full-open valves.

- Full-open valves shall be installed in the following locations: […]
- 2. On the water distribution supply pipe at the entrance into the structure.
- 2.1. In multiple-tenant buildings three stories or less in height, where a common water supply piping system is installed to supply other than one- and two-family dwellings […]

Section 601 general

601.1 Scope.

- This chapter shall govern the materials, design and installation of water supply systems, both hot and cold, for utilization in connection with human occupancy and habitation and shall govern the installation of individual water supply systems.

601.2 Solar energy utilization.

- Solar energy systems used for heating potable water or using an independent medium for heating potable water shall comply with the applicable requirements of this code. The use of solar energy shall not compromise the requirements for cross connection or protection of the potable water supply system required by this code.

Section 602 Water Required

602.1 General.

- Structures equipped with plumbing fixtures and utilized for human occupancy or habitation shall be provided with a potable supply of water in the amounts and at the pressures specified in this chapter

602.2 Potable water required.

- Only potable water shall be supplied to plumbing fixtures that provide water for drinking, bathing or culinary purposes, or for the processing of food, medical or pharmaceutical products. Unless otherwise required by law or code, potable water shall be supplied to all plumbing fixtures at a maximum temperature of 120˚F (49˚C).

Section 602 Water Required

602.3 Individual water supply.

- Where a potable public water supply is not available, individual sources of potable water supply shall be utilized.
- Individual water supply systems are also regulated by Vermont Agency of Natural Resources. [Refer to page 15 for ANR info.]

Section 602 Water Required

602.3.2 Minimum quantity.

- The combined capacity of the source and storage in an individual water supply system shall supply the fixtures with water at rates and pressures as required by this chapter.

602.3.3 Water quality.

- Water from an individual water supply shall be *approved* as potable by the authority having jurisdiction prior to connection to the plumbing system.

602.3.4 Disinfection of system.

- After construction, the individual water supply system shall be purged of deleterious matter and disinfected in accordance with Section 610.
- After construction or major repair, the individual water supply system shall be purged of deleterious matter and disinfected in accordance with Section 610.

Section 603 Water Service

603.1 Size of Water Service Pipe.

- The water service pipe shall be sized to supply water to the structure in the quantities and at the pressures required in this code.
- The water service pipe shall be not less than $^{3}/_{4}$ inch (19.1 mm) in diameter.

Figure 15: Water Service Pipes Shall Not be Less Than ¾ Inch in Diameter

Section 603 Water Service

603.2 Separation of water service and building sewer.

- Where water service piping is located in the same trench with the building sewer, such sewer shall be constructed of materials listed in Table 702.2
- Where the building sewer piping is not constructed of materials listed in Table 702.2, the water service pipe and the building sewer shall be horizontally separated by not less than 10 feet (3048 mm) of undisturbed or compacted earth.
- The required separation distance shall not apply where a water service pipe crosses a sewer pipe, provided that the water service is sleeved to a point at least 10 feet (3048 mm) from the sewer pipe centerline on both sides of such crossing.
- The sleeve shall be of pipe materials listed in Table 605.3, 702.2 or 702.3. The required separation distance shall not apply where the bottom of the water service pipe, located within 10 feet (3048 mm) of the sewer, is not less than 18 inches (458 mm) above the highest point of the top of the building sewer.

Section 604 design of building water distribution system

604.1 General.

- The design of the water distribution system shall conform to accepted engineering practice. Methods utilized to determine pipe sizes shall be approved.

604.3 Water distribution system design criteria.

- The water distribution system shall be designed, and pipe sizes shall be selected such that under conditions of peak demand, the capacities at the fixture supply pipe outlets shall be not less than shown in Table 604.3. The minimum flow rate and flow pressure provided to fixtures and appliances not listed in Table 604.3 shall be in accordance with the manufacturer's installation instructions.

Table 3: water distribution system design criteria required capacity at fixture supply pipe outlets (*Source: INTERNATIONAL CODE COUNCIL, 2024 International Plumbing Code – Table 604.3)*

FIXTURE SUPPLY OUTLET SERVING	FLOW RATE[a] (gpm)	FLOW PRESSURE (psi)
Bathtub, balanced-pressure, thermostatic or combination balanced-pressure/thermostatic mixing valve	4	20
Bidet, thermostatic mixing valve	2	20
Combination fixture	4	8
Dishwasher, residential	2.75	8
Drinking fountain	0.75	8
Laundry tray	4	8
Lavatory, private	0.8	8
Lavatory, private, mixing valve	0.8	8
Lavatory, public	0.4	8
Shower	~~2.5~~ 2.0	8
Shower, balanced-pressure, thermostatic or combination balanced-pressure/thermostatic mixing valve	~~2.5~~[b] 2.0	20
Sillcock, hose bibb	5	8
Sink, residential	1.75	8
Sink, service	3	8
Urinal, valve	12	25
Water closet, blow out, flushometer valve	25	45
Water closet, flushometer tank	1.6	20
Water closet, siphonic, flushometer valve	25	35
Water closet, tank, close coupled	3	20
Water closet, tank, one piece	6	20

604.4 Maximum flow and water consumption.

- The maximum water consumption flow rates and quantities for all plumbing fixtures and fixture fittings shall be in accordance with Table 604.4.
  - Exceptions:
    1. Blowout design water closets having a water consumption not greater than $3^1/_2$ gallons (13 L) per flushing cycle.
    2. Vegetable sprays.
    3. Clinical sinks having a water consumption not greater than $4^1/_2$ gallons (17 L) per flushing cycle.
    4. Service sinks.
    5. Emergency showers.

- Exceptions (Cont'd):
    6. In new construction, low flow water closets with a flow rate of 1.28 gallons per flush as outlined in the Vermont Residential Energy Code may be used in lieu of the maximum flow rate of 1.6 gallons per flush as outlined in Table 604.4 of the International Plumbing Code.

PLUMBING FIXTURE OR FIXTURE FITTING	MAXIMUM FLOW RATE OR QUANTITY[b]
Lavatory, private	1.5 ~~2.2~~ gpm at 60 psi
Lavatory, public (metering)	0.25 gallon per metering cycle
Lavatory, public (other than metering)	0.5 gpm at 60 psi
Shower head[a, c]	2.0 gpm at 80 psi
Sink faucet	1.8 ~~2.2~~ gpm at 60 psi
Urinal	1.0 gallon per flushing cycle
Water closet	1.6 gallons per flushing cycle

Table 4: maximum flow rates and consumption for plumbing fixtures and fixture fittings
(*Source: INTERNATIONAL CODE COUNCIL, 2024 International Plumbing Code – Table 604.4)*

604.5 Size of fixture supply.

- The minimum size of a fixture supply pipe shall be as shown in Table 604.5. The fixture supply pipe shall terminate not more than 30 inches (762 mm) from the point of connection to the fixture.
- A reduced-size flexible water connector installed between the supply pipe and the fixture shall be of an approved type.
- The supply pipe shall extend to the floor or wall adjacent to the fixture.
- The minimum size of individual distribution lines utilized in gridded or parallel water distribution systems shall be as shown in Table 604.5.

Table 5: Minimum sizes of fixture water supply pipes
(*Source: INTERNATIONAL CODE COUNCIL, 2024 International Plumbing Code – Table 604.5)*

FIXTURE	MINIMUM PIPE SIZE (inch)
Bathtubs[a] (60″ × 32″ and smaller)	1/2
Bathtubs[a] (larger than 60″ × 32″)	1/2
Bidet	3/8
Combination sink and tray	1/2
Dishwasher, domestic[a]	1/2
Drinking fountain	3/8
Hose bibbs	1/2
Kitchen sink[a]	1/2
Laundry, 1, 2 or 3 compartments[a]	1/2
Lavatory	3/8
Shower, single head[a]	1/2
Sinks, flushing rim	3/4
Sinks, service	1/2
Urinal, flush tank	1/2
Urinal, flushometer valve	3/4
Wall hydrant	1/2
Water closet, flush tank	3/8
Water closet, flushometer tank	3/8
Water closet, flushometer valve	1
Water closet, one piece[a]	1/2

604.7 Inadequate water pressure.

- Wherever water pressure from the street main or other source of supply is insufficient to provide flow pressures at fixture outlets as required under Table 604.3, a water pressure booster system conforming to Section 606.5 shall be installed on the building water supply system.
- Water pressure booster systems are also regulated under the Vermont Water Supply Rules; chapter 21, as adopted by the Vermont agency of natural resources. [Refer to page 15 for ANR info.]

604.8 Water pressure-reducing valve or regulator.

- Where water pressure within a building exceeds 80 psi (552 kPa) static, an approved water pressure-reducing valve conforming to ASSE 1003 or CSA B356 with strainer shall be installed to reduce the pressure in the building water distribution piping to not greater than 80 psi (552 kPa) static.

  - Exception: Service lines to sill cocks and outside hydrants, and main supply risers where pressure from the mains is reduced to 80 psi (552 kPa) or less at individual fixtures.

Section 605 materials, joints and connections

605.1 Soil and ground water.

- The installation of a water service or water distribution pipe shall be prohibited in soil and ground water contaminated with solvents, fuels, organic compounds or other detrimental materials causing permeation, corrosion, degradation or structural failure of the piping material.
- Where detrimental conditions are suspected, a chemical analysis of the soil and ground water conditions shall be required to ascertain the acceptability of the water service or water distribution piping material for the specific installation. Where detrimental conditions exist, approved alternative materials or routing shall be required.

605.2 Lead content of water supply pipe and fittings.

- Pipe and pipe fittings, including valves and faucets, utilized in the water supply system shall have not more than 8-percent lead content.

Section 605 materials, joints and connections

605.3 Water service pipe.

- Water service pipe shall conform to NSF 61 and shall conform to one of the standards listed in Table 605.3. Water service pipe or tubing, installed underground and outside of the structure, shall have a working pressure rating of not less than 160 psi (1100 kPa) at 73.4ºF (23ºC).
- Where the water pressure exceeds 160 psi (1100 kPa), piping material shall have a working pressure rating not less than the highest available pressure.
- Water service piping materials not *third-party certified* for water distribution shall terminate at or before the *full-open valve* located at the entrance to the structure.
- Ductile iron water service piping shall be cement mortar lined in accordance with AWWA C104/A21.4.

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe	ASTM D1527; ASTM D2282
Chlorinated polyvinyl chloride (CPVC) plastic pipe	ASTM D2846; ASTM F441; ASTM F442; CSA B137.6
Chlorinated polyvinyl chloride/aluminum/chlorinated polyvinyl chloride (CPVC/AL/CPVC)	ASTM F2855
Copper or copper-alloy pipe	ASTM B42; ASTM B43; ASTM B302
Copper or copper-alloy tubing (Type K, WK, L, or WL)	ASTM B75; ASTM B88; ASTM B251; ASTM B447
Cross-linked polyethylene (PEX) plastic pipe and tubing	ASTM F876; AWWA C904; CSA B137.5
Cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX) pipe	ASTM F1281; ASTM F2262; CSA B137.10
Cross-linked polyethylene/aluminum/high-density polyethylene (PEX-AL-HDPE)	ASTM F1986
Ductile iron water pipe	AWWA C115/A21.15; AWWA C151/A21.51
Galvanized steel pipe	ASTM A53
Polyethylene (PE) plastic pipe	ASTM D2239; ASTM D3035; AWWA C901; CSA B137.1
Polyethylene (PE) plastic tubing	ASTM D2737; AWWA C901; CSA B137.1
Polyethylene/aluminum/polyethylene (PE-AL-PE) pipe	ASTM F1282; CSA B137.9
Polyethylene of raised temperature (PE-RT) plastic tubing	ASTM F2769; CSA B137.18
Polypropylene (PP) plastic pipe or tubing	ASTM F2389; CSA B137.11
Polyvinyl chloride (PVC) plastic pipe	ASTM D1785; ASTM D2241; ASTM D2672; CSA B137.3
Stainless steel pipe (Type 304/304L)	ASTM A269/A269M; ASTM A312; ASTM A778
Stainless steel pipe (Type 316/316L)	ASTM A269/A269M; ASTM A312; ASTM A778
Stainless steel tubing (Type 304/304L)	ASTM A269/A269M; ASTM A312; ASTM A778
Stainless steel tubing (Type 316/316L)	ASTM A269/A269M; ASTM A312; ASTM A778

Table 5: WATER SERVICE PIPE
(*Source: INTERNATIONAL CODE COUNCIL, 2024 International Plumbing Code – Table 605.3)*

605.7 Valves.

- Valves shall be compatible with the type of piping material installed in the system. Valves shall conform to one of the standards listed in Table 5 or shall be approved. Valves intended to supply drinking water shall meet the requirements of NSF 61.

MATERIAL	STANDARD
Chlorinated polyvinyl chloride (CPVC) plastic	ASME A112.4.14; ASME A112.18.1/CSA B125.1; ASTM F1970; CSA B125.3; IAPMO Z1157; MSS SP-122
Copper or copper alloy	ASME A112.4.14; ASME A112.18.1/CSA B125.1; ASME B16.34; CSA B125.3; IAPMO Z1157; MSS SP-67; MSS SP-80; MSS SP-110; MSS SP-139
Cross-linked polyethylene (PEX) plastic	ASME A112.4.14; ASME A112.18.1/CSA B125.1; CSA B125.3; IAPMO Z1157; NSF 359
Gray iron and ductile iron	AWWA C500; AWWA C504; AWWA C507; IAPMO Z1157; MSS SP-67; MSS SP-70; MSS SP-71; MSS SP-72; MSS SP-78
Polypropylene (PP) plastic	ASME A112.4.14; ASTM F2389; IAPMO Z1157
Polyvinyl chloride (PVC) plastic	ASME A112.4.14; ASTM F1970; IAPMO Z1157; MSS SP-122
Stainless steel (Type 304/304L)	ASME A112.4.14; IAPMO Z1157
Stainless steel (Type 316/316L)	ASME A112.4.14; IAPMO Z1157

Table 6: VALVES
(*Source: INTERNATIONAL CODE COUNCIL, 2024 International Plumbing Code – Table 605.7)*

605.9 Prohibited joints and connections.

- The following types of joints and connections shall be prohibited:
  1. Cement or concrete joints.
  2. Joints made with fittings not approved for the specific installation.
  3. Solvent-cement joints between different types of plastic pipe.
  4. Saddle-type fittings.

605.14 CPVC plastic.

- Joints between CPVC plastic pipe and fittings shall comply with Sections 605.14.1 through 605.14.4.

605.14.1 Mechanical joints.

- Mechanical joints shall be installed in accordance with the manufacturer's instructions.

605.14.2 Solvent cementing.

- Joint surfaces shall be clean and free from moisture. Joints shall be made in accordance with the pipe manufacturer's installation instructions.
- Where such instructions require that a primer be used, the primer shall be applied to the joint surfaces and a solvent cement orange in color and conforming to ASTM F493 shall be applied to the joint surfaces.
- Where such instructions allow for a one-step solvent cement, yellow in color and conforming to ASTM F493, to be used, the joint surfaces shall not require application of a primer before the solvent cement is applied.
- The joint shall be made while the cement is wet and in accordance with ASTM D2846 or ASTM F493. Solvent-cement joints shall be permitted above or below ground.

605.17 Steel.

- Joints between galvanized steel pipe and fittings shall comply with Sections 605.17.1 through 605.17.3.

605.17.1 Threaded joints.

- Threads shall conform to ASME B1.20.1. Pipe-joint compound or tape shall be applied on the male threads only.

605.17.2 Mechanical joints.

- Joints shall be made with an approved elastomeric seal. Mechanical joints shall be installed in accordance with the manufacturer's instructions.

605.17.3 Grooved and shouldered mechanical joints.

- Grooved and shouldered mechanical joints shall comply with ASTM F1476, shall be made with an approved elastomeric seal and shall be installed in accordance with the manufacturer's instructions. Such joints shall be exposed or concealed.

605.21 PVC plastic.

- Joints between PVC plastic pipe and fittings shall comply with Sections 605.21.1 through 605.21.3.

605.21.1 Mechanical joints.

- Mechanical joints on water pipe shall be made with an elastomeric seal conforming to ASTM D3139. Mechanical joints shall not be installed in above-ground systems unless otherwise approved. Joints shall be installed in accordance with the manufacturer's instructions.

605.21.2 Grooved and shouldered mechanical joints.

- Grooved and shouldered mechanical joints shall comply with ASTM F1476, shall be made with an approved elastomeric seal and shall be installed in accordance with the manufacturer's instructions. Such joints shall be exposed or concealed.

605.22 Stainless steel.

- Joints between stainless steel pipe and fittings shall comply with Sections 605.22.1 through 605.22.3.

605.22.1 Mechanical joints.

- Mechanical joints shall be installed in accordance with the manufacturer's instructions.

Figure 16: Joints Between Stainless Steel Pipe and Fittings Shall Comply with Sections 605.22.1 Through 605.22.3 of the IPC.

605.22.2 Welded joints.

- Joint surfaces shall be cleaned. The joint shall be welded autogenously or with an approved filler metal as referenced in ASTM A312.

605.22.3 Grooved and shouldered mechanical joints.

- Grooved and shouldered mechanical joints shall comply with ASTM F1476, shall be made with an approved elastomeric seal and shall be installed in accordance with the manufacturer's instructions. Such joints shall be exposed or concealed.

Section 606 installation of the building water distribution system

606.1 Location of full-open valves.

- Full-open valves shall be installed in the following locations:
  1. On the building water service pipe from the public water supply near the curb.
  2. On the water distribution supply pipe at the entrance into the structure.
     a) In multiple-tenant buildings, where a common water supply piping system is installed to supply other than one- and two-family dwellings, a main shutoff valve shall be provided for each tenant.
  3. On the discharge side of every water meter.

  4. On the base of every water riser pipe in occupancies other than multiple-family residential occupancies that are two stories or less in height and in one- and two-family residential occupancies.
  5. On the top of every water down-feed pipe in occupancies other than one- and two-family residential occupancies.
  6. On the entrance to every water supply pipe to a dwelling unit, except where supplying a single fixture equipped with individual stops.
  7. On the water supply pipe to a gravity or pressurized water tank.
  8. On the water supply pipe to every water heater.

606.5 Water pressure booster systems.

- Water pressure booster systems shall be provided as required by Sections 606.5.1 through 606.5.10.
- Water pressure booster systems are also regulated under the Vermont Public Water Supply Rules, as adopted by the Vermont Agency of Natural Resources. [Refer to page 15 for ANR info.]

Section 607 Hot Water Supply System

607.1 Where required.

- In residential occupancies, hot water shall be supplied to plumbing fixtures and equipment utilized for bathing, washing, culinary purposes, cleansing, laundry or building maintenance. In nonresidential occupancies, hot water shall be supplied for culinary purposes, cleansing, laundry or building maintenance purposes. In nonresidential occupancies, hot water or tempered water shall be supplied for bathing and washing purposes.

607.2 Hot or tempered water supply to fixtures.

- The developed length of hot or tempered water piping, from the source of hot water to the fixtures that require hot or tempered water, shall not exceed 50 feet (15 240 mm). Recirculating system piping and heat-traced piping shall be considered to be sources of hot or tempered water.

607.3 Thermal expansion control.

- Where a storage water heater is supplied with cold water that passes through a check valve, pressure reducing valve or backflow preventer, a thermal expansion control device shall be connected to the water heater cold water supply pipe at a point that is downstream of all check valves, pressure reducing valves and backflow preventers.
- Thermal expansion tanks shall be sized in accordance with the tank manufacturer's instructions and shall be sized such that the pressure in the water distribution system shall not exceed that required by Section 604.8.

607.5 Insulation of piping.

- For other than Group R2, R3 and R4 occupancies that are three stories or less in height above grade plane, piping to the inlet of a water heater and piping conveying water heated by a water heater shall be insulated in accordance with Section C404.4 of the International Energy Conservation Code.
- For Group R2, R3 and R4 occupancies that are three stories or less in height above grade plane, piping to the inlet of a water heater and piping conveying water heated by a water heater shall be insulated in accordance with Section R403.5.3 of the International Energy Conservation Code.
- Install in accordance with VT Energy Standards. For additional information contact the Vermont Energy Code Hotline at 855-877-0673 or https://publicservice.vermont.gov/content/building-energy-standards

Section 608 Protection of Potable Water Supply

608.1 General.

- A potable water supply system shall be designed, installed and maintained in such a manner so as to prevent contamination from nonpotable liquids, solids or gases being introduced into the potable water supply through cross connections or any other piping connections to the system. Backflow preventer applications shall conform to Table 608.1, except as specifically stated in Sections 608.2 through 608.17.10.
- Plumbing under the scope of these rules shall also conform to the Vermont Water Supply Rules, as adopted by the Vermont Agency of Natural Resources, regarding the prevention of cross-connections. [Refer to page 15 for ANR info.]

Section 608 Protection of Potable Water Supply

608.1.1 Installation and testing of Backflow Assemblies

- Installation and testing of Backflow Assemblies shall be in accordance with ASSE Backflow Prevention Reference Manual or AWWA Backflow Prevention and Cross-connection Control: Recommended Practices M14.
- Backflow assembly testers must hold a valid certification card, issued by an ASSE/AWWA approved testing organization. shall be in accordance with ASSE Backflow Prevention Reference Manual or AWWA Backflow Prevention and Cross-connection Control: Recommended Practices M14.
- Backflow assembly testers must hold a valid certification card, issued by an ASSE/AWWA approved testing organization.

Section 608 Protection of Potable Water Supply

608.2 Plumbing fixtures.

- The supply lines and fittings for plumbing fixtures shall be installed so as to prevent backflow. Plumbing fixture fittings shall provide backflow protection in accordance with ASME A112.18.1/CSA B125.1

608.3 Devices, appurtenances, appliances and apparatus.

- Devices, appurtenances, appliances and apparatus intended to serve some special function, such as sterilization, distillation, processing, cooling, or storage of ice or foods, and that connect to the water supply system, shall be provided with protection against backflow and contamination of the water supply system.

608.3.1 Special equipment, water supply protection.

- The water supply for hospital fixtures shall be protected against backflow with a reduced pressure principle backflow prevention assembly, an atmospheric or spill-resistant vacuum breaker assembly, or an air gap. Vacuum breakers for bedpan washer hoses shall not be located less than 5 feet (1524 mm) above the floor. Vacuum breakers for hose connections in health care or laboratory areas shall be not less than 6 feet (1829 mm) above the floor.

608.9.1 Signage required.

- Nonpotable water outlets, such as hose connections, open-ended pipes and faucets, shall be identified with signage that reads as follows: "Nonpotable water is utilized for [application name]. CAUTION: NONPOTABLE WATER – DO NOT DRINK."
- The words shall be legibly and indelibly printed on a tag or sign constructed of corrosion-resistant waterproof material or shall be indelibly printed on the fixture. The letters of the words shall be not less than 0.5 inch (12.7 mm) in height and in colors in contrast to the background on which they are applied.
- Equivalent wording and signage acceptable to code official.

Figure 17: Pictograph—Do Not Drink
(*Source: INTERNATIONAL CODE COUNCIL, 2021 International Plumbing Code – Figure 608.9.1)*

608.14 Backflow protection.

- Means of protection against backflow shall be provided in accordance with Sections 608.14.1through 608.14.9.

608.14.8 Chemical dispenser backflow devices.

- Back-flow devices for chemical dispensers shall comply with ASSE 1055 or shall be equipped with an air gap fitting.
- Soap/chemical dispensers that are connected to potable water shall have an individual, dedicated water supply connection that provides for adequate backflow protection.

608.15 Location of backflow preventers.

- Access shall be provided to backflow preventers as specified by the manufacturer's instructions.

Figure 18: Backflow Preventer System

608.15.1 Outdoor enclosures for backflow prevention devices.

- Outdoor enclosures for backflow prevention devices shall comply with ASSE 1060.

608.17.2 Connections to boilers.

- The potable supply to the boiler shall be equipped with a backflow preventer with an intermediate atmospheric vent complying with ASSE 1012, ASSE 1081 or CSA B64.3. Where conditioning chemicals or antifreeze are introduced into the system, the potable water connection shall be protected by an *air gap* or a reduced pressure principle backflow preventer, complying with ASSE 1013, AWWA C511 or CSA B64.4.

608.18 Protection of individual water supplies.

- Individual water supplies are regulated by the Vermont Agency of Natural Resources.

608.18.1 Well locations.

- A potable ground water source or pump suction line shall not be located closer to potential sources of contamination than the distances shown in Table 608.18.1. In the event the underlying rock structure is limestone or fragmented shale, the local or state health department shall be consulted on well site location.
- The distances in Table 608.18.1 constitute minimum separation and shall be increased in areas of creviced rock or limestone, or where the direction of movement of the ground water is from sources of contamination toward the well.

608.18.6 Dug or bored well casings.

- Dug or bored well casings shall be of watertight concrete, tile or galvanized or corrugated metal pipe extending to not less than 10 feet (3048 mm) below the ground surface.
- Where the water table is more than 10 feet (3048 mm) below the ground surface, the watertight casing shall extend below the table surface.
- Well casings for dug wells or bored wells constructed with sections of concrete, tile or galvanized or corrugated metal pipe shall be surrounded by 6 inches (152 mm) of grout poured into the hole between the outside of the casing and the ground and extending not less than 10 feet (3048 mm) below the ground surface.

610.1 General.

New or repaired potable water systems shall be purged of deleterious matter and disinfected prior to utilization. The method to be followed shall be that prescribed by the health authority or water purveyor having jurisdiction or, in the absence of a prescribed method, the procedure described in either AWWA C651 or AWWA C652, or as described in this section. This requirement shall apply to "on-site" or "in-plant" fabrication of a system or to a modular portion of a system.

1. The pipe system shall be flushed with clean, potable water until dirty water does not appear at the points of outlet.

2. The system or part thereof shall be filled with a water/chlorine solution containing not less than 50 parts per million (50 mg/L) of chlorine, and the system or part thereof shall be valved off and allowed to stand for 24 hours; or the system or part thereof shall be filled with a water/chlorine solution containing not less than 200 parts per million (200 mg/L) of chlorine and allowed to stand for 3 hours.

3. Following the required standing time, the system shall be flushed with clean potable water until the chlorine is purged from the system.

4. Repetition of Disinfection: The procedure shall be repeated where shown by a bacteriological examination that contamination remains present in the system. Consecutive bacteriological samples must be taken 24 hours apart before the water system is put back into service.

Section 612 solar systems

612.1 Solar systems.

- The construction, installation, alterations and repair of systems, equipment and appliances intended to utilize solar energy for space heating or cooling, domestic hot water heating, swimming pool heating or process heating shall be in accordance with the Vermont Plumbing Rules.

Section 613 temperature control devices and valves

613.1 Temperature-actuated mixing valves.

- Temperature-actuated mixing valves, are required to be installed to reduce water temperatures to defined limits. These valves shall comply with ASSE 1017 (or ASSE 1017/1070 listing where applicable) and are required to be installed at the hot water source.

CHAPTER 7 SANITARY DRAINAGE

Chapter 7 regulates the methods and piping systems that remove water that has served a purpose such as flushing water closets, bathing, culinary activities and equipment discharges.

The types of materials, drainage fitting and the connection methods are covered for these systems that begin at the receiving fixtures and end at the point of disposal for the liquid waste.

A design method for a gravity flow system of vertical and horizontal piping is provided based on the probability of flows from specific fixtures.

Vacuum and pumped types of liquid waste removal methods are also regulated by this chapter.

Newly Added Sections to the 2024 IPC Version:

705.2.4 Mechanical joints above ground.

- Mechanical joint couplings used above ground to connect ABS pipe to ABS pipe shall be of the shielded type and shall be marked by the manufacturer as being recommended for the application.

705.10.5 Mechanical joints above ground.

- Mechanical joint couplings used above ground to connect PVC pipe to PVC pipe shall be of the shielded type and shall be marked by the manufacturer as being recommended for the application.

Newly Added Sections to the 2024 IPC Version:

MATERIAL	STANDARD
Chlorinated polyvinyl chloride (CPVC)	ASTM F2618
Borosilicate glass	ASTM C1053
High silicon iron	ASTM A518/A518M
Polyolefin	ASTM F1412, CSA B181.3
Polyvinylidene fluoride (PVDF)	ASTM F1673, CSA B181.3

Table 1: Chemical Waste Drainage System Pipe and Fittings
(*Source: INTERNATIONAL CODE COUNCIL, 2024 International Plumbing Code – Table 702.6)*

(2021)

702.6 Chemical waste system.

- A chemical waste system shall be completely separated from the sanitary drainage system. The chemical waste shall be treated in accordance with Section 803.2 before discharging to the sanitary drainage system. Separate drainage systems for chemical wastes and vent pipes shall be of an approved […]

(2024)

702.6 Chemical waste system.

- […] Separate drainage systems for chemical waste and vent pipes shall conform to one of the standards indicated in Table 702.6. […] Chemical waste drainage system pipe and fitting materials shall be resistant to corrosion and degradation for the concentrations of chemicals involved per manufacturer recommendations.

Section 701 General

701.1 Scope.

- The provisions of this chapter shall govern the materials, design, construction and installation of sanitary drainage systems.

701.2 Sewer required.

- Every building in which plumbing fixtures are installed shall be connected to a public or private sewerage system. Public and private sewerage systems are regulated by the Vermont Agency of Natural Resources.

701.3 Separate sewer connection.

- A building having plumbing fixtures installed and intended for human habitation, occupancy or use on premises abutting on a street, alley or easement in which there is a public sewer shall have a separate connection with the sewer. Where located on the same lot, multiple buildings shall not be prohibited from connecting to a common building sewer that connects to the public sewer.

701.4 Sewage treatment.

- Sewage treatment is regulated by the Vermont Agency of Natural Resources

701.8 Drainage piping in food service areas.

- Waste piping above any working, storage or eating surfaces in food service establishments shall be suitably protected to prevent contamination from leakage.

Section 703 building sewer

703.1 Building sewer pipe near the water service.

- The proximity of a sewer to a water service shall comply within installed within 10 feet (3048 mm) of the water service.

703.2 Drainage pipe in filled ground.

- Where a building sewer or building drain is installed on filled or unstable ground, the drainage pipe shall conform to one of the standards for ABS plastic pipe, cast-iron pipe, copper or copper-alloy tubing, PVC plastic pipe or polypropylene plastic pipe indicated in Table 702.3.

703.3 Sanitary and storm sewers.

- Where separate systems of sanitary drainage and storm drainage are installed in the same property, the sanitary and storm building sewers or drains shall be permitted to be laid side by side in one trench.

704.5 Dead Ends.

- Drainage piping shall not be installed or altered that creates a dead-end section of piping that exceeds 24 inches. Cleanout extensions and piping for future fixtures shall not be considered as a dead- end.

705.10.2 Solvent cementing.

- Joint surfaces shall be clean and free from moisture. A purple primer that conforms to ASTM F656 shall be applied. Solvent cement not purple in color and conforming to ASTM D2564, CSA B137.3, CSA B181.2 or CSA B182.1 shall be applied to all joint surfaces. The joint shall be made while the cement is wet and shall be in accordance with ASTM D2855. Solvent-cement joints shall be permitted above or below ground.

705.16.4 Plastic pipe or tubing to other piping material.

- Joints between different types of plastic pipe and/or other piping material shall be made with an approved adapter fitting. Joints between plastic pipe and cast-iron hub pipe shall be made by caulked joint or a mechanical compression joint.

708.1.5 Cleanout size.

- Cleanouts shall be the same size as the piping served by the cleanout, except that cleanouts for piping larger than 4 inches (102 mm) need not be larger than 4 inches (102 mm).

Exceptions:

1. Cleanouts located on stacks can be one size smaller than the stack size.

2. The size of cleanouts for cast-iron piping can be in accordance with the referenced standards for cast-iron fittings as indicated in Table 702.4

Section 709 Fixture Units

709.1 Values for fixtures.

- Drainage fixture unit values as given in Table 709.1 designate the relative load weight of different kinds of fixtures that shall be employed in estimating the total load carried by a soil or waste pipe, and shall be used in connection with Tables 710.1(1) and 710.1(2) of sizes for soil, waste and vent pipes for which the permissible load is given in terms of fixture units.

FIXTURE TYPE	DRAINAGE FIXTURE UNIT VALUE AS LOAD FACTORS	MINIMUM SIZE OF TRAP (inches)
Automatic clothes washers, commercial[a,g]	3	2
Automatic clothes washers, residential[g]	2	2
Bathroom group as defined in Section 202 (1.6 gpf water closet)[f]	5	—
Bathroom group as defined in Section 202 (water closet flushing greater than 1.6 gpf)[f]	6	—
Bathtub[b] (with or without overhead shower or whirlpool attachments)	2	1 1/2
Bidet	1	1 1/4
Combination sink and tray	2	1 1/2
Dental lavatory	1	1 1/4
Dental unit or cuspidor	1	1 1/4
Dishwashing machine[c], domestic	2	1 1/2
Drinking fountain	1/2	1 1/4
Emergency floor drain	0	2
Floor drains[h]	2[h]	2
Floor sinks	Note h	2
Kitchen sink, domestic	2	1 1/2
Kitchen sink, domestic with food waste disposer, dishwasher or both	2	1 1/2

Table 7: DRAINAGE FIXTURE UNITS FOR FIXTURES AND GROUPS
(*Source: INTERNATIONAL CODE COUNCIL, 2024 International Plumbing Code – Table 709.1)*

FIXTURE TYPE	DRAINAGE FIXTURE UNIT VALUE AS LOAD FACTORS	MINIMUM SIZE OF TRAP (inches)
Laundry tray (1 or 2 compartments)	2	1 1/2
Lavatory	1	1 1/4
Shower (based on the total flow rate through showerheads and body sprays) — 5.7 gpm or less	2	1 1/2
Shower (based on the total flow rate through showerheads and body sprays) — Greater than 5.7 gpm to 12.3 gpm	3	2
Shower (based on the total flow rate through showerheads and body sprays) — Greater than 12.3 gpm to 25.8 gpm	5	3
Shower (based on the total flow rate through showerheads and body sprays) — Greater than 25.8 gpm to 55.6 gpm	6	4
Service sink	2	1 1/2
Sink	2	1 1/2
Urinal	4	Note d
Urinal, 1 gallon per flush or less	2*	Note d
Urinal, nonwater supplied	1/2	Note d
Wash sink (circular or multiple) each set of faucets	2	1 1/2
Water closet, flushometer tank, public or private	4*	Note d
Water closet, private (1.6 gpf)	3*	Note d
Water closet, private (flushing greater than 1.6 gpf)	4*	Note d
Water closet, public (1.6 gpf)	4*	Note d
Water closet, public (flushing greater than 1.6 gpf)	6*	Note d

Table 7 Cont'd: DRAINAGE FIXTURE UNITS FOR FIXTURES AND GROUPS
(*Source: INTERNATIONAL CODE COUNCIL, 2024 International Plumbing Code – Table 709.1)*

Section 710 Drainage System Sizing

710.1 Maximum fixture unit load.

- The maximum number of drainage fixture units connected to a given size of building sewer, building drain or horizontal branch of the building drain shall be determined using Table 710.1(1) The maximum number of drainage fixture units connected to a given size of horizontal branch or vertical soil or waste stack shall be determined using Table 710.2(2)

DIAMETER OF PIPE (inches)	MAXIMUM NUMBER OF DRAINAGE FIXTURE UNITS CONNECTED TO ANY PORTION OF THE BUILDING DRAIN OR THE BUILDING SEWER, INCLUDING BRANCHES OF THE BUILDING DRAIN[a]			
	Slope per foot			
	1/16 inch	1/8 inch	1/4 inch	1/2 inch
1 1/4	—	—	1	1
1 1/2	—	—	3	3
2	—	—	21	26
2 1/2	—	—	24	31
3	—	36	42	50
4	—	180	216	250
5	—	390	480	575
6	—	700	840	1,000
8	1,400	1,600	1,920	2,300
10	2,500	2,900	3,500	4,200
12	3,900	4,600	5,600	6,700
15	7,000	8,300	10,000	12,000

Table 8: BUILDING DRAINS AND SEWERS
(*Source: INTERNATIONAL CODE COUNCIL, 2024 International Plumbing Code – Table 710.1(1)*)

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CHAPTER 7 SANITARY DRAINAGE (CONT'D)

Vermont Plumbing Rules and 2024 IPC with Changes from 2021 including VT Amendments to the Code
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DIAMETER OF PIPE (inches)	MAXIMUM NUMBER OF DRAINAGE FIXTURE UNITS (dfu)			
	Total for horizontal branch	Stacks[b]		
		Total discharge into one branch interval	Total for stack of three branch intervals or less	Total for stack greater than three branch intervals
1 1/2	3	2	4	8
2	6	6	10	24
2 1/2	12	9	20	42
3	20	20	48	72
4	160	90	240	500
5	360	200	540	1,100
6	620	350	960	1,900
8	1,400	600	2,200	3,600
10	2,500	1,000	3,800	5,600
12	3,900	1,500	6,000	8,400
15	7,000	Note c	Note c	Note c

Table 9: HORIZONTAL FIXTURE BRANCHES AND STACKS[a]
(*Source: INTERNATIONAL CODE COUNCIL, 2024 International Plumbing Code – Table 710.1(2)*)

Section 711 Offsets in Drainage Piping in Buildings of Five Stories or More

711.2 Horizontal stack offsets.

- A stack with a horizontal offset located more than four branch intervals below the top of the stack shall be vented in accordance with Section 907 and sized as follows:
  1. The portion of the stack above the offset shall be sized as for a vertical stack based on the total number of drainage fixture units above the offset.
  2. The offset shall be sized in accordance with Section 710.1.1.
  3. The portion of the stack below the offset shall be sized as for the offset or based on the total number of drainage fixture units on the entire stack, whichever is larger [see Table 710.1(2), Column 5].

Section 713 computerized drainage design

713.1 Design of drainage system.

- The sizing, design and layout of the drainage system shall be permitted to be designed by approved computer design methods.

713.2 Load on drainage system.

- The load shall be computed from the simultaneous or sequential discharge conditions from fixtures, appurtenances and appliances or the peak usage design condition

713.2.1 Fixture discharge profiles.

- The discharge profiles for flow rates versus time from fixtures and appliances shall be in accordance with the manufacturer's specifications.

Section 714 Backwater Valves

714.1 Sewage backflow.

- Where plumbing fixtures are installed on a floor with a finished floor elevation below the elevation of the manhole cover of the next upstream manhole in the public sewer, such fixtures shall be protected by a backwater valve installed in the building drain, or horizontal branch serving such fixtures.
- Plumbing fixtures installed on a floor with a finished floor elevation above the elevation of the manhole cover of the next upstream manhole in the public sewer shall not discharge through a backwater valve.

Section 715 Vacuum Drainage Systems

715.2 System design.

- Vacuum drainage systems shall be designed in accordance with the vacuum drainage system manufacturer's instructions.
- The system layout, including piping layout, tank assemblies, vacuum pump assembly and other components necessary for proper function of the system shall be in accordance with the manufacturer's instructions.
- Plans, specifications and other data for such systems shall be submitted to the code official for review and approval prior to installation.

Section 716 Replacement of Underground Building Sewers and Building Drains by Pipe-Bursting Methods

716.1 General.

- This section shall govern the replacement of existing building sewer and building drain piping by pipe-bursting methods.

716.2 Applicability.

- The replacement of building sewer and building drain piping by pipe-bursting methods shall be limited to gravity drainage piping of sizes 6 inches (152 mm) and smaller. The replacement piping shall be of the same nominal size as the existing piping.

716.3 Pre-installation inspection.

- The existing piping sections to be replaced shall be inspected internally by a recorded video camera survey. The survey shall include notations of the position of cleanouts and the depth of connections to the existing piping.

716.4 Pipe.

- The replacement pipe shall be made of high-density polyethylene (HDPE) and shall have a standard dimension ratio (SDR) of 17. The pipe shall be in compliance with ASTM F714.

716.5 Pipe fittings.

- Pipe fittings to be connected to the replacement pipe shall be made of high-density polyethylene (HDPE) and shall be in compliance with ASTM D2683.

716.6 Cleanouts.

- Where the existing building sewer or building drain did not have cleanouts meeting the requirements of this code, cleanout fittings shall be installed as required by this code.

716.7 Post-installation inspection.

- The completed replacement piping section shall be inspected internally by a recorded video camera survey. The video survey shall be reviewed and approved by the code official prior to pressure testing of the replacement piping system.

Section 717 Relining Building Sewers and Building Drains

717.1 General.

- This section shall govern the relining of existing building sewers and building drainage piping.

717.2 Applicability.

- The relining of existing building sewers and building drainage piping shall be limited to gravity drainage piping 4 inches (102 mm) in diameter and larger. The relined piping shall be of the same nominal size as the existing piping.

717.3 Preinstallation requirements.

- Prior to commencement of the relining installation, the existing piping sections to be relined shall be descaled and cleaned. After the cleaning process has occurred and water has been flushed through the system, the piping shall be inspected internally by a recorded video camera survey.

717.3.1 Preinstallation recorded video camera survey.

- The video survey shall include verification of the project address location. The video shall include notations of the cleanout and fitting locations, and the approximate depth of the existing piping. The video shall also include notations of the length of piping at intervals not greater than 25 feet (7620 mm).

717.4 Permitting.

- Prior to permit issuance, the code official shall review and evaluate the preinstallation recorded video camera survey to determine if the piping system is able to be relined in accordance with the proposed lining system manufacturer's installation requirements and applicable referenced standards.

717.5 Prohibited applications.

- Where review of the preinstallation recorded video camera survey reveals that piping systems are not installed correctly or defects exist, relining shall not be permitted. The defective portions of piping shall be exposed and repaired with pipe and fittings in accordance with this code. Defects include, but are not limited to, backgrade or insufficient slope, complete pipe wall deterioration or complete separations such as from tree root invasion or improper support.

717.6 Relining materials.

- The relining materials shall be manufactured in compliance with applicable standards and certified as required in Section 303. Fold-and-form pipe reline materials shall be manufactured in compliance with ASTM F1504 or ASTM F1871.

717.7 Installation.

- The installation of relining materials shall be performed in accordance with the manufacturer's installation instructions, applicable referenced standards and this code.

717.7.1 Material data report.

- The installer shall record the data as required by the relining material manufacturer and applicable standards. The recorded data shall include but is not limited to the location of the project, relining material type, amount of product installed and conditions of the installation. A copy of the data report shall be provided to the code official prior to final approval.

717.8 Post-installation recorded video camera survey.

- The completed, relined piping system shall be inspected internally by a recorded video camera survey after the system has been flushed and flow-tested with water. The video survey shall be submitted to the code official prior to finalization of the permit. The video survey shall be reviewed and evaluated to provide verification that no defects exist. Any defects identified shall be repaired and replaced in accordance with this code.

Section 718 Rehabilitation of Building Sewers and Building Drains

718.1 Cure-in-place.

- Sectional cure-in-place rehabilitation of building sewer piping and sewer service lateral piping shall be in accordance with ASTM F2599. Main and lateral cure-in-place rehabilitation of building sewer and sewer service lateral pipe and their connections to the main sewer pipe shall be in accordance with ASTM F2561. Hydrophilic rings or gaskets in cure-in-place rehabilitation of building sewer piping and sewer service laterals shall be in accordance with ASTM F3240 to ensure water tightness and elimination of ground water penetration.

CHAPTER 8 INDIRECT/SPECIAL WASTE

There are drainage applications in buildings where a backup of liquid waste in a drainage system could contaminate equipment and appliances.

Chapter 8 covers the applications that require an indirect discharge connection to the building's drainage system.

The chapter has provisions for the types of indirect connections and waste receptor configurations.

Summary of changes from previous version

There are no significant changes in this chapter.

Section 801 general

801.1 Scope.

- This chapter shall govern matters concerning indirect waste piping and special wastes. This chapter shall further control matters concerning food-handling establishments, sterilizers, humidifiers, clear-water waste, swimming pools, methods of providing air breaks or air gaps, and neutralizing devices for corrosive wastes.

801.2 Protection.

- Devices, appurtenances, appliances and apparatus intended to serve some special function, such as sterilization, humidification, distillation, processing, cooling, or storage of ice or foods, and that discharge to the drainage system, shall be provided with protection against backflow, flooding, fouling, contamination and stoppage of the drain.

Section 802 Indirect Wastes

802.1 Where required.

- Food-handling equipment, in other than dwelling units, clear-water waste, humidifiers, dishwashing machines and utensils, pots, pans and dishwashing sinks shall discharge through an indirect waste pipe as specified in Sections 802.1.1 through 802.1.7.
- Fixtures not required to be indirectly connected by this section and the exception to Section 301.6 shall be directly connected to the plumbing system in accordance with Chapter 7.

802.1.1 Food handling.

- Equipment and fixtures utilized for the storage, preparation and handling of food shall discharge through an indirect waste pipe by means of an air gap. Each well of a multiple-compartment sink shall discharge independently to a waste receptor.

802.1.2 Floor drains in food storage areas.

- Floor drains located within walk-in refrigerators or freezers in food service and food establishments shall be indirectly connected to the sanitary drainage system by means of an air gap.
- Where a floor drain is located within an area subject to freezing, the waste line serving the floor drain shall not be trapped and shall indirectly discharge into a waste receptor located outside of the area subject to freezing.
    - Exception: Where protected against backflow by a backwater valve, such floor drains shall be indirectly connected to the sanitary drainage system by means of an air break or an air gap.

802.1.3 Potable Clear-Water Waste.

- Where devices and equipment, such as sterilizers and relief valves, discharge potable water to the building drainage system, the discharge shall be through an indirect waste pipe by means of an air gap.

802.1.4 Swimming Pools.

- Where wastewater from swimming pools, backwash from filters and water from pool deck drains discharge to the building drainage system, the discharge shall be through an indirect waste pipe by means of an air gap.

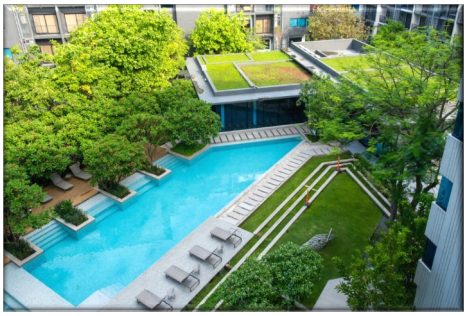

Figure 21: Swimming Pools discharge shall be through an indirect waste pipe by means of an air gap when discharging to the building drainage system

802.1.5 Nonpotable Clear-Water Waste.

- Where devices and equipment such as process tanks, filters, drips and boilers discharge nonpotable water to the building drainage system, the discharge shall be through an indirect waste pipe by means of an air break or an air gap.

802.1.7 Food Utensils, Dishes, Pots and Pans Sinks.

- Sinks, in other than dwelling units, used for the washing, rinsing or sanitizing of utensils, dishes, pots, pans or service ware used in the preparation, serving or eating of food shall discharge indirectly through an air gap or an air break to the drainage system.

802.3 Installation.

- Indirect waste piping shall discharge through an air gap or air break into a waste receptor. Waste receptors shall be trapped and vented and shall connect to the building drainage system.
- Indirect waste piping that exceeds 30 inches (762 mm) in developed length measured horizontally, or 54 inches (1372 mm) in total developed length, shall be trapped.
  - Exception: Where a waste receptor receives only clearwater waste and does not directly connect to a sanitary drainage system, the receptor shall not require a trap.

802.4 Waste receptors.

- For other than hub drains that receive only clear-water waste and standpipes, a removable strainer or basket shall cover the outlet of waste receptors. Waste receptors shall not be installed in concealed spaces. Waste receptors shall not be installed in plenums, crawl spaces, attics, interstitial spaces above ceilings and below floors. Ready access shall be provided to waste receptors.

802.4.1 Size of receptors.

- A waste receptor shall be sized for the maximum discharge of all indirect waste pipes served by the receptor. Receptors shall be installed to prevent splashing or flooding.

802.4.2 Hub drains.

- A hub drain shall be in the form of a hub or a pipe extending not less than 1 inch (25 mm) above a water-impervious floor.

802.4.3 Standpipes.

- Standpipes shall be individually trapped. Standpipes shall extend not less than 18 inches (457 mm) but not greater than 42 inches (1067 mm) above the trap weir. Access shall be provided to standpipes and drains for rodding.

Section 803 Special Wastes

803.1 Neutralizing device required for corrosive wastes.

- Corrosive liquids, spent acids or other harmful chemicals that destroy or injure a drain, sewer, soil or waste pipe, or create noxious or toxic fumes or interfere with sewage treatment processes shall not be discharged into the plumbing system without being thoroughly diluted, neutralized or treated by passing through an approved dilution or neutralizing device.
- Such devices shall be automatically provided with a sufficient supply of diluting water or neutralizing medium so as to make the contents noninjurious before discharge into the drainage system.
- The nature of the corrosive or harmful waste and the method of its treatment or dilution shall be approved prior to installation.

803.2 System design.

- A chemical drainage and vent system shall be designed and installed in accordance with this code. Chemical drainage and vent systems shall be completely separated from the sanitary systems. Chemical waste shall not discharge to a sanitary drainage system until such waste has been treated in accordance with Section 803.1

803.3 Special Wastes System Design

- Special wastes system design shall conform to ANR regulations.

CHAPTER 9 VENTS

Chapter 9 regulates connection locations, various venting system arrangements and the sizing of piping for vent systems.

The proper operation of a gravity flow drainage system (Chapter 7) depends on maintaining an air path throughout the system to prevent waste and odor "blow back" into fixtures and siphoning of the trap seal in fixture traps (Chapter 10).

Newly Added Sections to the 2024 IPC Version:

902.1.1 Chemical waste drainage system vents.

- The pipe and fitting materials for a chemical waste drainage vent system shall be in accordance with Section 702.6.
- The methods utilized for construction and installation of such venting system shall be in accordance with the pipe and fitting manufacturers' instructions.

(2021)

901.3 Chemical waste vent systems.

- The vent system for a chemical waste system shall be independent of the sanitary vent system and shall terminate separately through the roof to the outdoors or to an air admittance valve that complies with ASSE 1049. Air admittance valves for chemical waste systems shall be constructed of materials approved in accordance with Section 702.6 […]

(2024)

901.3 Chemical waste drainage vent systems.

- The vent system for a chemical waste drainage system shall be independent of any sanitary drainage vent system. The termination of a chemical waste drainage vent system shall be through the the roof to the outdoors or to an air admittance valve that complies with ASSE 1049. Air admittance valves for chemical waste drainage systems shall be constructed of one of the materials indicated in Table 702.6 […]

Section 901 general

901.1 Scope.

- The provisions of this chapter shall govern the materials, design, construction and installation of vent systems.

901.2 Trap seal protection.

- The plumbing system shall be provided with a system of vent piping that will permit the admission or emission of air so that the seal of any fixture trap shall not be subjected to a pressure differential of more than 1 inch of water column (249 Pa).

901.3 Chemical waste vent systems.

- The vent system for a chemical waste system shall be independent of the sanitary vent system and shall terminate separately through the roof to the outdoors or to an air admittance valve that complies with ASSE 1049.
- Air admittance valves for chemical waste systems shall be constructed of materials approved in accordance with Section 702.6 and shall be tested for chemical resistance in accordance with ASTM F1412.

901.4 Use limitations.

- The plumbing vent system shall not be utilized for purposes other than the venting of the plumbing system.

Section 902 materials

902.1 Vents.

- The materials and methods utilized for the construction and installation of venting systems shall comply with the applicable provisions of Section 702.

902.2 Sheet copper.

- Sheet copper for vent pipe flashings shall conform to ASTM B152 and shall weigh not less than 8 ounces per square foot (2.5 kg/m^2).

902.3 Sheet lead.

- Sheet lead for vent pipe flashings shall weigh not less than 3 pounds per square foot (15 kg/m^2) for field-constructed flashings and not less than $2^1/_2$ pounds per square foot (12 kg/m^2) for prefabricated flashings.

Section 903 Vent Terminals

903.1 Vent terminal required.

- The vent pipe shall terminate by extending to the outdoors through the roof or the side wall in accordance with one of the methods identified in Sections 903.1.1through 903.1.4.

903.1.1.1 Vent penetration through roof

- Vent penetration through roof shall be protected against shear force.

903.2 Frost closure.

- Where the 97.5-percent value for outdoor design temperature is 0°F (-18°C) or less, vent extensions through a roof or wall shall be not less than 3 inches (76 mm) in diameter.

903.3 Flashings.

- The juncture of each vent pipe with the roof line shall be made watertight by an approved flashing.

903.5 Location of vent terminal.

- An open vent terminal from a drainage system shall not be located directly beneath any door, openable window, or other air intake opening of the building or of an adjacent building, and any such vent terminal shall not be within 10 feet (3048 mm) horizontally of such an opening unless it is 3 feet (914 mm) or more above the top of such opening.

903.6 Extension outside a structure.

- In climates where the 97.5-percent value for outside design temperature is less than 0°F (-18°C), vent pipes installed on the exterior of the structure shall be protected against freezing by insulation, heat or both.

Section 904 Outdoor Vent Extensions

904.1 Required vent extension.

- The vent system serving each building drain shall have not less than one vent pipe that extends to the outdoors.

904.1.1 Installation.

- The required vent shall be a dry vent that connects to the building drain or an extension of a drain that connects to the building drain. Such vent shall not be an island fixture vent as allowed by Section 916.

904.1.2 Size.

- The required vent shall be sized in accordance with Section 906.2 based on the required size of the building drain.

904.3 Vent termination.

- Vent stacks or stack vents shall terminate outside the building to the open air.

904.4 Vent connection at base.

- Vent stacks shall connect to the base of the drainage stack. The vent stack shall connect at or below the lowest horizontal branch.
- Where the vent stack connects to the building drain, the connection shall be located downstream of the drainage stack and within a distance of 10 times the diameter of the drainage stack.

Figure 22: Ventilation Pipes

904.5 Vent Headers.

- Stack vents and vent stacks connected into a common vent header at the top of the stacks and extending to the open air at one point shall be sized in accordance with the requirements of Section 906.1.
- The number of fixture units shall be the sum of all fixture units on all stacks connected thereto, and the developed length shall be the longest vent length from the intersection at the base of the most distant stack to the vent terminal in the open air, as a direct extension of one stack.

Section 905 vent connections and grades

905.1 Connection.

- Individual, branch and circuit vents shall connect to a vent stack, stack vent, air admittance valve or extend to the open air.

905.2 Grade.

- Vent and branch vent pipes shall be so graded and connected as to drain back to the drainage pipe by gravity.

905.3 Vent connection to drainage system.

- Every dry vent connecting to a horizontal drain shall connect above the centerline of the horizontal drain pipe.

905.5 Height above fixtures.

- A connection between a vent pipe and a vent stack or stack vent shall be made at not less than 6 inches (152 mm) above the flood level rim of the highest fixture served by the vent. Horizontal vent pipes forming branch vents, relief vents or loop vents shall be located not less than 6 inches (152 mm) above the flood level rim of the highest fixture served.

905.6 Vent for future fixtures.

- Where the drainage piping has been roughed-in for future fixtures, a rough-in connection for a vent shall be installed. The vent size shall be not less than one-half the diameter of the rough-in drain to be served. The vent rough-in shall connect to the vent system, or shall be vented by other means as provided for in this chapter. The connection shall be identified to indicate that it is a vent.

Section 906 Vent Pipe Sizing

906.1 Size of stack vents and vent stacks.

- The minimum required diameter of stack vents and vent stacks shall be determined from the developed length and the total of drainage fixture units connected thereto in accordance with Table 906.1, but in no case shall the diameter be less than one-half the diameter of the drain served or less than $1^1/_4$ inches (32 mm).

906.1.1 Size of stack vents and vent stacks.

- Every building shall have at least one 3-inch continuous stack vent or 3-inch continuous vent stack that extends to outside the building.

906.2 Vents other than stack vents or vent stacks.

- The diameter of individual vents, branch vents, circuit vents and relief vents shall be not less than one-half the required diameter of the drain served.
- The required size of the drain shall be determined in accordance with Table 710.1(2).
- Vent pipes shall be not less than $1^1/_4$ inches (32 mm) in diameter.
- Vents exceeding 40 feet (12 192 mm) in developed length shall be increased by one nominal pipe size for the entire developed length of the vent pipe.
- Relief vents for soil and waste stacks in buildings having more than 10 branch intervals shall be sized in accordance with Section 908.2.

906.3 Developed length.

- The developed length of individual, branch, circuit and relief vents shall be measured from the farthest point of vent connection to the drainage system to the point of connection to the vent stack, stack vent or termination outside of the building.

906.4 Multiple branch vents.

- Where multiple branch vents are connected to a common branch vent, the common branch vent shall be sized in accordance with this section based on the size of the common horizontal drainage branch that is or would be required to serve the total drainage fixture unit load being vented.

906.6 Horizontal venting.

- Horizontal fixture, branch or stack vents within unheated areas shall be protected against freezing

Section 907 Vents for Stack Offsets

907.1 Vent for horizontal offset of drainage stack.

- Horizontal offsets of drainage stacks shall be vented where five or more branch intervals are located above the offset. The offset shall be vented by venting the upper section of the drainage stack and the lower section of the drainage stack.

907.2 Upper section.

- The upper section of the drainage stack shall be vented as a separate stack with a vent stack connection installed in accordance with Section 904.4. The offset shall be considered to be the base of the stack.

907.3 Lower section.

- The lower section of the drainage stack shall be vented by a yoke vent connecting between the offset and the next lower horizontal branch.
- The yoke vent connection shall be permitted to be a vertical extension of the drainage stack.
- The size of the yoke vent and connection shall be not less than the size required for the vent stack of the drainage stack.

Section 908 relief vents—stacks of more than 10 branch intervals

908.1 Where required.

- Soil and waste stacks in buildings having more than 10 branch intervals shall be provided with a relief vent at each tenth interval installed, beginning with the top floor.

908.2 Size and connection.

- The size of the relief vent shall be equal to the size of the vent stack to which it connects. The lower end of each relief vent shall connect to the soil or waste stack through a wye below the horizontal branch serving the floor, and the upper end shall connect to the vent stack through a wye not less than 3 feet (914 mm) above the floor.

Section 909 fixture vents

909.1 Distance of trap from vent.

- Each fixture trap shall have a protecting vent located so that the slope and the developed length in the fixture drain from the trap weir to the vent fitting are within the requirements set forth in Table 909.1.
  - Exception: The developed length of the fixture drain from the trap weir to the vent fitting for self-siphoning fixtures, such as water closets, shall not be limited.

SIZE OF TRAP (inches)	SLOPE (inch per foot)	DISTANCE FROM TRAP (feet)
$1\frac{1}{4}$	$\frac{1}{4}$	5
$1\frac{1}{2}$	$\frac{1}{4}$	6
2	$\frac{1}{4}$	8
3	$\frac{1}{8}$	12
4	$\frac{1}{8}$	16

Table 14: Maximum distance of fixture trap from vent
(*Source: INTERNATIONAL CODE COUNCIL, 2021 International Plumbing Code – Table 909.1)*

909.2 Venting of fixture drains.

- The total fall in a fixture drain due to pipe slope shall not exceed the diameter of the fixture drain, nor shall the vent connection to a fixture drain, except for water closets, be below the weir of the trap.

909.3 Crown vent.

- A vent shall not be installed within two pipe diameters of the trap weir.

Section 910 Individual Vent

910.1 Individual vent permitted.

- Each trap and trapped fixture is permitted to be provided with an individual vent. The individual vent shall connect to the fixture drain of the trap or trapped fixture being vented.

Section 911 Common Vent

911.1 Individual vent as common vent.

- An individual vent is permitted to vent two traps or trapped fixtures as a common vent. The traps or trapped fixtures being common vented shall be located on the same floor level.

911.2 Connection at the same level.

- Where the fixture drains being common vented connect at the same level, the vent connection shall be at the interconnection of the fixture drains or downstream of the interconnection.

911.3 Connection at different levels.

- Where the fixture drains connect at different levels, the vent shall connect as a vertical extension of the vertical drain. The vertical drain pipe connecting the two fixture drains shall be considered to be the vent for the lower fixture drain, and shall be sized in accordance with Table 911.3. The upper fixture shall not be a water closet.

PIPE SIZE (inches)	MAXIMUM DISCHARGE FROM UPPER FIXTURE DRAIN (dfu)
$1^1/_2$	1
2	4
$2^1/_2$ to 3	6

Table 15: Common vent sizes
(*Source: INTERNATIONAL CODE COUNCIL, 2021 International Plumbing Code – Table 911.3)*

Section 913 Waste Stack Vent

913.1 Waste stack vent permitted.

- A waste stack shall be considered to be a vent for all of the fixtures discharging to the stack where installed in accordance with the requirements of this section.

913.2 Stack installation.

- The waste stack shall be vertical, and both horizontal and vertical offsets shall be prohibited between the lowest fixture drain connection and the highest fixture drain connection. Fixture drains shall connect separately to the waste stack. The stack shall not receive the discharge of water closets or urinals.

913.4 Waste Stack Size.

- The waste stack shall be sized based on the total discharge to the stack and the discharge within a branch interval in accordance with Table 913.4. The waste stack shall be the same size throughout its length.

STACK SIZE (inches)	MAXIMUM NUMBER OF DRAINAGE FIXTURE UNITS (dfu)	
	Total discharge into one branch interval	Total discharge for stack
$1^1/_2$	1	2
2	2	4
$2^1/_2$	No limit	8
3	No limit	24
4	No limit	50
5	No limit	75
6	No limit	100

Table 16: Waste stack vent size
(*Source: INTERNATIONAL CODE COUNCIL, 2021 International Plumbing Code – Table 913.4)*

Section 915 Combination Waste and Vent System

915.1 Type of fixtures.

- A combination waste and vent system shall not serve fixtures other than floor drains, sinks, lavatories and drinking fountains. Combination waste and vent systems shall not receive the discharge from a clinical sink.

915.2 Installation.

- The only vertical pipe of a combination waste and vent system shall be the connection between the fixture drain and the horizontal combination waste and vent pipe. The vertical distance shall not exceed 8 feet (2438 mm).

915.2.1 Slope.

- The slope of a horizontal combination waste and vent pipe shall not exceed one-half unit vertical in 12 units horizontal (4-percent slope) and shall be not less than that indicated in Table 704.1.

915.2.2 Size and length.

- The size of a combination waste and vent pipe shall be not less than that indicated in Table 915.2.2. The horizontal length of a combination waste and vent system shall be unlimited.

DIAMETER PIPE (inches)	MAXIMUM NUMBER OF DRAINAGE FIXTURE UNITS (dfu)	
	Connecting to a horizontal branch or stack	Connecting to a building drain or building subdrain
2	3	4
$2^1/_2$	6	26
3	12	31
4	20	50
5	160	250
6	360	575

Table 17: Size of combination waste and vent pipe
(*Source: INTERNATIONAL CODE COUNCIL, 2021 International Plumbing Code – Table 915.2.2)*

Section 917 Single-Stack Vent System

917.1 Single-stack vent system permitted.

- A drainage stack shall serve as a single-stack vent system where sized and installed in accordance with Sections 917.2 through 917.9. The drainage stack and branch piping shall be the vents for the drainage system. The drainage stack shall have a stack vent.

917.1.1 Single Stack Vent System

- Single stack vent systems may not be used in single family homes. Single stack vent systems in all other occupancies may only to be used for engineered systems when approved by the plumbing inspector.

917.2 Stack size.

- Drainage stacks shall be sized in accordance with Table 917.2. Stacks shall be uniformly sized based on the total connected drainage fixture unit load. The stack vent shall be the same size as the drainage stack. A 3-inch (76 mm) stack shall serve not more than two water closets.

STACK SIZE (inches)	MAXIMUM CONNECTED DRAINAGE FIXTURE UNITS		
	Stacks less than 75 feet in height	Stacks 75 feet to less than 160 feet in height	Stacks 160 feet and greater in height
3	24	NP	NP
4	225	24	NP
5	480	225	24
6	1,015	480	225
8	2,320	1,015	480
10	4,500	2,320	1,015
12	8,100	4,500	2,320
15	13,600	8,100	4,500

Table 18: Single stack size
(*Source: INTERNATIONAL CODE COUNCIL, 2021 International Plumbing Code – Table 917.2)*

917.4 Length of horizontal branches.

- The length of horizontal branches shall conform to the requirements of Sections 917.4.1 through 917.4.3.

917.4.1 Water closet connection.

- Water closet connections shall be not greater than 4 feet (1219 mm) in developed length measured horizontally from the stack.
  - Exception: Where the connection is made with a sanitary tee, the maximum developed length shall be 8 feet (2438 mm).

917.4.2 Fixture connections.

- Fixtures other than water closets shall be located not greater than 12 feet (3657 mm) in developed length, measured horizontally from the stack.

917.4.3 Vertical piping in branch.

- The length of vertical piping in a fixture drain connecting to a horizontal branch shall not be considered in computing the fixture's distance in. developed length measured horizontally from the stack.

Section 918 Air Admittance Valves

918.1 General.

- Vent systems utilizing air admittance valves for individual and branch-type air admittance valves shall conform to ASSE 1051. Stack-type air admittance valves are not permitted.

918.3 Where permitted.

- Individual, *branch* and circuit vents shall be permitted to terminate with a connection to an individual or branch-type air admittance valve in accordance with Section 918.3.1.

Section 918.7 Vent required.

- Within each plumbing system, a minimum of one continuous 3 inch stack vent or one continuous 3 inch vent stack shall extend outdoors to the open air.

Section 919 Engineered Vent Systems

919.1 General.

- Engineered vent systems shall comply with this section and the design, submittal, approval, inspection and testing requirements of Section 316.

919.2 Individual branch fixture and individual fixture header vents.

- The maximum developed length of individual fixture vents to vent branches and vent headers shall be determined in accordance with Table 919.2 for the minimum pipe diameters at the indicated vent airflow rates.

- The individual vent airflow rate shall be determined in accordance with the following:
  - $Q_{h,b} = N_{n,b} Q_v$
  - For SI: $Q_{h,b} = N_{n,b} Q_v (0.4719 \frac{L}{s})$

where:

- $N_{n,b}$= Number of fixtures per header (or vent branch) ÷ total number of fixtures connected to vent stack.
- $Q_{h,b}$= Vent branch or vent header airflow rate (cfm).
- Q_v = Total vent stack airflow rate (cfm).
- Q_v (gpm) = 27.8 $r_s^{2/3}$ (1 – r_s) D $^{8/3}$
- Q_v (cfm) = 0.134 Q_v(gpm)

where:

- D = Drainage stack diameter (inches).
- Q_w = Design discharge load (gpm).
- r_s = Wastewater flow area to total area.
- = $Q_{h,b} = \frac{Q_v}{27.8 D^{8/3}}$

- Individual vent airflow rates are obtained by equally distributing $Q_{h,b}$ into one-half the total number of fixtures on the branch or header for more than two fixtures; for an odd number of total fixtures, decrease by one; for one fixture, apply the full value of $Q_{h,b}$.
- Individual vent developed length shall be increased by 20 percent of the distance from the vent stack to the fixture vent connection on the vent branch or header.

DIAMETER OF VENT PIPE (inches)	INDIVIDUAL VENT AIRFLOW RATE (cubic feet per minute)																			
	Maximum developed length of vent (feet)																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1/2	95	25	13	8	5	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1
3/4	100	88	47	30	20	15	10	9	7	6	5	4	3	3	3	2	2	2	2	1
1	—	—	100	94	65	48	37	29	24	20	17	14	12	11	9	8	7	7	6	6
1 1/4	—	—	—	—	—	—	—	100	87	73	62	53	46	40	36	32	29	26	23	21
1 1/2	—	—	—	—	—	—	—	—	—	—	—	100	96	84	75	65	60	54	49	45
2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100

Table 19: Minimum diameter and maximum length of individual branch fixture vents and individual fixture header vents for smooth pipes
(*Source: INTERNATIONAL CODE COUNCIL, 2021 International Plumbing Code – Table 919.2)*

Section 920 Computerized Vent Design

920.1 Design of vent system.

- The sizing, design and layout of the vent system shall be permitted to be determined by approved computer program design methods.

920.2 System capacity.

- The vent system shall be based on the air capacity requirements of the drainage system under a peak load condition.

CHAPTER 10 TRAPS, INTERCEPTORS AND SEPARATORS

Chapter 10 regulates the design of fixture traps, methods for preventing evaporation of trap seals in traps and the required locations for interceptors and separators.

The trap seal of a trap is an essential feature of a drainage system to prevent odors from the drainage piping from entering the building.

The discharge of various processes, such as cooking and laundry, creates the need for equipment to retain detrimental greases and solids from entering the drainage systems.

Summary of changes from previous version

There are no significant changes in this chapter.

Section 1001 general

1001.1 Scope.

- This chapter shall govern the material and installation of traps, interceptors and separators.

Section 1002 trap requirements

1002.1 Fixture traps.

- Each plumbing fixture shall be separately trapped by a liquid-seal trap, except as otherwise permitted by this code. The vertical distance from the fixture outlet to the trap weir shall not exceed 24 inches (610 mm), and the horizontal distance shall not exceed 30 inches (762 mm) measured from the centerline of the fixture outlet to the centerline of the inlet of the trap. The height of a clothes washer standpipe above a trap shall conform to Section 802.4.3. A fixture shall not be double trapped.

1002.2 Design of Traps.

- Fixture traps shall be self-scouring.
- Fixture traps shall not have interior partitions, except where such traps are integral with the fixture or where such traps are constructed of an approved material that is resistant to corrosion and degradation.
- Slip joints shall be made with an approved elastomeric gasket and shall be installed only on the trap inlet, trap outlet and within the trap seal.

Figure 23: Fixture Traps

1002.3 Prohibited traps.

- The following types of traps are prohibited:
  1. Traps that depend on moving parts to maintain the seal.
  2. Bell traps.
  3. Crown-vented traps.
  4. Traps not integral with a fixture and that depend on interior partitions for the seal, except those traps constructed of an approved material that is resistant to corrosion and degradation.
  5. "S" traps.
  6. Drum traps.

1002.4 Trap seals.

- Each fixture trap shall have a liquid seal of not less than 2 inches (51 mm) and not more than 4 inches (102 mm), or deeper for special designs relating to accessible fixtures.

1002.5 Size of fixture traps.

- Fixture trap size shall be sufficient to drain the fixture rapidly and not less than the size indicated in Table 709.1. A trap shall not be larger than the drainage pipe into which the trap discharges.

1002.6 Building traps.

- Building house traps shall be prohibited, except where local conditions necessitate such traps. Building traps shall be provided with clean-outs on the inlet and outlet sides of trap and a fresh air vent or intake on the inlet side of the trap. The size of the fresh air vent or fresh air intake shall not be less than one-half the diameter of the drain to which the fresh air vent or air intake connects. Such fresh air vent shall be carried above grade and shall be terminated in a screened outlet located outside the building at or near the sill.

1002.7 Trap setting and protection.

- Traps shall be set level with respect to the trap seal and, where necessary, shall be protected from freezing.

1002.8 Recess for trap connection.

- A recess provided for connection of the underground trap, such as one serving a bathtub in slab-type construction, shall have sides and a bottom of corrosion-resistant, insect- and verminproof construction.

1002.9 Acid-resisting traps.

- Where a vitrified clay or other brittleware, acid-resisting trap is installed underground, such trap shall be embedded in concrete extending 6 inches (152 mm) beyond the bottom and sides of the trap.

1002.10 Plumbing in mental health centers.

- In mental health centers, pipes and traps shall not be exposed.

Section 1003 interceptors and Separators

1003.1 Where required.

- Interceptors and separators shall be provided to prevent the discharge of oil, grease, sand and other substances harmful or hazardous to the public sewer, the private sewage system or the sewage treatment plant or processes. External interceptors and separators located more than 10 feet from the building are regulated by the Agency of Natural Resources.

1003.1.1 Placement of Interceptors.

- An indoor or outdoor grease interceptor shall be placed within 25 feet (developed length) of the 3-bay sink indirect waste receptor. If this is impracticable, the operator of the food service establishment shall be responsible for the maintenance of the grease waste piping upstream of the grease interceptor.

1003.2 Approval.

- The size, type and location of each interceptor and of each separator shall be designed and installed in accordance with the manufacturer's instructions and the requirements of this section based on the anticipated conditions of use. Wastes that do not require treatment or separation shall not be discharged into any interceptor or separator.

1003.3 Grease Interceptors.

1003.3.1 Grease interceptors and automatic grease removal devices required.

- A grease interceptor or automatic grease removal device shall be required to receive the drainage from fixtures and equipment with grease-laden waste located in food preparation areas, such as in restaurants, hotel kitchens, hospitals, school kitchens, bars, factory cafeterias and clubs.
- Fixtures and equipment shall include pot sinks, prerinse sinks; soup kettles or similar devices; wok stations; floor drains or sinks into which kettles are drained; automatic hood wash units and dishwashers without prerinse sinks.
- Grease interceptors and automatic grease removal devices shall receive waste only from fixtures and equipment that allow fats, oils or grease to be discharged.

1003.3.2 Food waste disposers restriction.

- A food waste disposer shall not discharge to a grease interceptor.

1003.3.3 Additives to grease interceptors.

- Dispensing systems that dispense interceptor performance additives to grease interceptors shall not be installed except where such systems dispense microbes for the enhancement of aerobic bioremediation of grease and other organic material, or for inhibiting growth of pathogenic organisms by anaerobic methods.
- Such microbial dispensing systems shall be installed only where the grease interceptor manufacturer's instructions allow such systems and the systems conform to ASME A112.14.6.

1003.4 Oil separators required.

- At repair garages where floor or trench drains are provided, car washing facilities, factories where oily and flammable liquid wastes are produced and hydraulic elevator pits, oil separators shall be installed into which oil-bearing, grease-bearing or flammable wastes shall be discharged before emptying into the building drainage system or other point of disposal.

  - Exception: An oil separator is not required in hydraulic elevator pits where an approved alarm system is installed. Such alarm systems shall not terminate the operation of pumps utilized to maintain emergency operation of the elevator by fire fighters.

1003.5 Sand interceptors in commercial establishments.

- Sand and similar interceptors for heavy solids shall be designed and located so as to be provided with ready access for cleaning, and shall have a water seal of not less than 6 inches (152 mm).

1003.6 Clothes washer discharge interceptor.

- Clothes washers shall discharge through an interceptor that is provided with a wire basket or similar device, removable for cleaning, that prevents passage into the drainage system of solids $^1/_2$ inch (12.7 mm) or larger in size, string, rags, buttons or other materials detrimental to the public sewage system.

  - Exceptions:

1. Clothes washers in individual dwelling units shall not be required to discharge through an interceptor.

2. A single clothes washer designed for use in individual dwelling units and installed in a location other than an individual dwelling unit shall not be required to discharge through an interceptor.

1003.7 Bottling establishments.

- Bottling plants shall discharge process wastes into an interceptor that will provide for the separation of broken glass or other solids before discharging waste into the drainage system.

1003.8 Slaughterhouses.

- Slaughtering room and dressing room drains shall be equipped with approved separators. The separator shall prevent the discharge into the drainage system of feathers, entrails and other materials that cause clogging.

1003.9 Venting of interceptors and separators.

- Interceptors and separators shall be designed so as not to become air bound. Interceptors and separators shall be vented in accordance with one of the methods in Chapter 9.

1003.10 Access and maintenance of interceptors and separators.

- Access shall be provided to each interceptor and separator for service and maintenance. Interceptors and separators shall be maintained by periodic removal of accumulated grease, scum, oil, or other floating substances and solids deposited in the interceptor or separator.

Section 1004 Materials, Joints And Connections

1004.1 General.

- The materials and methods utilized for the construction and installation of traps, interceptors and separators shall comply with this chapter and the applicable provisions of Chapters 4 and 7.
- The fittings shall not have ledges, shoulders or reductions capable of retarding or obstructing flow of the piping.

CHAPTER 11 STORM DRAINAGE

Rainfall onto buildings must be removed and directed to a location that can accommodate storm water.

Chapter 11 specifies the design rainfall event for the geographic area and provides sizing methods for piping and gutter systems to convey the storm water away from the building.

Included in this chapter are regulations for piping materials and subsoil drainage systems.

Summary of changes from previous version

There are no significant changes in this chapter.

Section 1101 general

1101.1 Scope.

- The provisions of this chapter shall govern the materials, design, construction and installation of storm drainage.

1101.2 Disposal.

- Storm drainage for a building roof or courtyard shall be regulated by this section. Storm drainage from paved areas, yards and courts are regulated by Agency of Natural Resources Watershed Management Division, stormwater program (802-828-1535).

1101.3 Prohibited drainage.

- Storm water shall not be drained into sewers intended for sewage only.

1101.4 Tests.

- The conductors and the building storm drain shall be tested in accordance with Section 312.

1101.5 Change in size.

- The size of a drainage pipe shall not be reduced in the direction of flow.

1101.6 Fittings and connections.

- Connections and changes in direction of the storm drainage system shall be made with approved drainage-type fittings in accordance with Table 706.3. The fittings shall not obstruct or retard flow in the system.

1101.7 Roof design.

- Roofs shall be designed for the maximum possible depth of water that will pond thereon as determined by the relative levels of roof deck and overflow weirs, scuppers, edges or serviceable drains in combination with the deflected structural elements. In determining the maximum possible depth of water, all primary roof drainage means shall be assumed to be blocked.
- The maximum possible depth of water on the roof shall include the height of the water required above the inlet of the secondary roof drainage means to achieve the required flow rate of the secondary drainage means to accommodate the design rainfall rate as required by Section 1106.

Figure 24: Roof Drain Design

1101.8 Cleanouts required.

- Cleanouts shall be installed in the storm drainage system and shall comply with the provisions of this code for sanitary drainage pipe cleanouts.
  - Exception: Subsurface drainage system.

1101.9 Backwater valves.

- Storm drainage systems shall be provided with backwater valves as required for sanitary drainage systems in accordance with Section 714.

Section 1102 materials

1102.1 General.

- The materials and methods utilized for the construction and installation of storm drainage systems shall comply with this section and the applicable provisions of Chapter 7.

1102.2 Inside storm drainage conductors.

- Inside storm drainage conductors installed above ground shall conform to one of the standards listed in Table 702.1.

1102.3 Underground building storm drain pipe.

- Underground building storm drain pipe shall conform to one of the standards listed in Table 702.2.

1102.6 Roof drains.

- Roof drains shall conform to ASME A112.3.1 or ASME A112.6.4. Roof drains, other than siphonic roof drains, shall be tested and rated in accordance with ASME A112.6.4 or ASPE/IAPMO Z1034.

1102.7 Fittings.

- Pipe fittings shall be approved for installation with the piping material installed, and shall conform to the respective pipe standards or one of the standards listed in Table 1102.7. The fittings shall not have ledges, shoulders or reductions capable of retarding or obstructing flow in the piping. Threaded drainage pipe fittings shall be of the recessed drainage type.

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2661; ASTM F628; ASTM F1488; CSA B181.1; CSA B182.1
Cast-iron pipe	ASTM A74; ASTM A888; CISPI 301
Concrete pipe	ASTM C14; ASTM C76; CSA A257.1; CSA A257.2
Copper or copper-alloy tubing (Type K, L, M or DWV)	ASTM B75; ASTM B88; ASTM B251; ASTM B306
Polyethylene (PE) plastic pipe	ASTM F667; ASTM F2306/F2306M; ASTM F2648/F2648M
Polypropylene (PP) pipe	ASTM F2881; CSA B182.13
Polyvinyl chloride (PVC) plastic pipe (Type DWV, SDR26, SDR35, SDR41, PS50 or PS100) in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2665; ASTM D3034; ASTM F891; ASTM F1488; CSA B181.2; CSA B182.2; CSA B182.4
Stainless steel drainage systems, Type 316L	ASME A112.3.1
Vitrified clay pipe	ASTM C4; ASTM C700

Table 20: Pipe Fittings
(*Source: INTERNATIONAL CODE COUNCIL, 2021 International Plumbing Code – Table 1102.7)*

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CHAPTER 11 STORM DRAINAGE (CONT'D)

Vermont Plumbing Rules and 2024 IPC with Changes from 2021 including VT Amendments to the Code
P08C-05I
8 Hours

Section 1103 traps

1103.1 Main trap.

- Leaders and storm drains connected to a combined sewer shall be trapped.
- Individual storm water traps shall be installed on the storm water drain branch serving each conductor, or a single trap shall be installed in the main storm drain just before its connection with the combined building sewer or the public sewer. Leaders and storm drains connected to a building storm sewer shall not be required to be trapped.

1103.2 Material.

- Storm water traps shall be of the same material as the piping system to which they are attached.

1103.3 Size.

- Traps for individual conductors shall be the same size as the horizontal drain to which they are connected.

1103.4 Cleanout.

- A cleanout shall be installed on the building side of the trap and shall be provided with access.

Section 1104 Conductors and Connections

1104.1 Prohibited use.

- Conductor pipes shall not be used as soil, waste or vent pipes, and soil, waste or vent pipes shall not be used as conductors.

1104.2 Floor drains.

- Floor drains shall not be connected to a storm drain.

Section 1106 size of conductors, leaders and storm drains

1106.1 General.

- The size of the vertical conductors and leaders, building storm drains, building storm sewers and any horizontal branches of such drains or sewers shall be based on the 100-year hourly rainfall rate indicated in Figures 1106.1(1) through 1106.1(5) or on other rainfall rates determined from approved local weather data.

1106.2 Size of storm drain piping.

- Vertical and horizontal storm drain piping shall be sized based on the flow rate through the roof drain.
- The flow rate, as calculated in accordance with Section 1106.2.1, shall be checked against the roof drain manufacturer's published flow rate for the specific roof drain model and size to verify that the selected roof drain will handle the anticipated flow.
- The flow rate in storm drain piping shall not exceed that specified in Table 1106.2.

PIPE SIZE (inches)	CAPACITY (gpm)				
	VERTICAL DRAIN	SLOPE OF HORIZONTAL DRAIN			
		1/16 inch per foot	1/8 inch per foot	1/4 inch per foot	1/2 inch per foot
2	34	15	22	31	44
3	87	39	55	79	111
4	180	81	115	163	231
5	311	117	165	234	331
6	538	243	344	487	689
8	1,117	505	714	1,010	1,429
10	2,050	927	1,311	1,855	2,623
12	3,272	1,480	2,093	2,960	4,187
15	5,543	2,508	3,546	5,016	7,093

Table 21: Storm drain pipe sizing
(*Source: INTERNATIONAL CODE COUNCIL, 2021 International Plumbing Code – Table 1106.2)*

1106.3 Vertical leader sizing.

- Vertical leaders shall be sized based on the flow rate from horizontal gutters or the maximum flow rate through roof drains. The flow rate through vertical leaders shall not exceed that specified in Table 1106.3.

1106.4 Vertical walls.

- In sizing roof drains and storm drainage piping, one-half of the area of any vertical wall that diverts rainwater to the roof shall be added to the projected roof area for inclusion in calculating the required size of vertical conductors, leaders and horizontal storm drainage piping.

Table 22: vertical leader sizing
(Source: INTERNATIONAL CODE COUNCIL, 2021 International Plumbing Code – Table 1106.3)

SIZE OF LEADER (inches)	CAPACITY (gpm)
2	30
2 × 2	30
$1^1/_2 \times 2^1/_2$	30
$2^1/_2$	54
$2^1/_2 \times 2^1/_2$	54
3	92
2 × 4	92
$2^1/_2 \times 3$	92
4	192
$3 \times 4^1/_4$	192
$3^1/_2 \times 4$	192
5	360
4 × 5	360
$4^1/_2 \times 4^1/_2$	360
6	563
5 × 6	563
$5^1/_2 \times 5^1/_2$	563
8	1208
6 × 8	1208

1109.1 General

- Where the public sewer is a combined system for both sanitary and storm water, the storm sewer shall be connected independently to the public sewer in accordance to Agency of Natural Resources Rules.

Section 1110 Controlled Flow Roof Drain Systems

- **1110.1 General.**
- The roof of a structure shall be designed for the storage of water where the storm drainage system is engineered for controlled flow.
- The controlled flow roof drain system shall be an engineered system in accordance with this section and the design, submittal, approval, inspection and testing requirements of Section 316.1.
- The controlled flow system shall be designed based on the required rainfall rate in accordance with Section 1106.1.

1110.3 Installation.

- Runoff control shall be by control devices. Control devices shall be protected by strainers.

1110.4 Minimum number of roof drains.

- Not less than two roof drains shall be installed in roof areas 10,000 square feet (929 m^2) or less and not less than four roof drains shall be installed in roofs over 10,000 square feet (929 m^2) in area.

Section 1111 Subsoil Drains

1111.1 Subsoil drains.

- Subsoil drains shall be open-jointed, horizontally split or perforated pipe conforming to one of the standards listed in Table 1102.5. Such drains shall be not less than 4 inches (102 mm) in diameter.
- Where the building is subject to backwater, the subsoil drain shall be protected by an accessibly located backwater valve.
- Subsoil drains shall discharge to a trapped area drain, sump, dry well or approved location above ground.
- The subsoil sump shall not be required to have either a gastight cover or a vent. The sump and pumping system shall comply with Section 1113.1.

Section 1112 Building Subdrains

1112.1 Building subdrains.

- Building subdrains located below the public sewer level shall discharge into a sump or receiving tank, the contents of which shall be automatically lifted and discharged into the drainage system as required for building sumps. The sump and pumping equipment shall comply with Section 113.1.

Section 1113 Sumps and Pumping Systems

1113.1 Pumping system.

- The sump pump, pit and discharge piping shall conform to Sections 1113.1.1 through 1113.1.4.

1113.1.1 Pump capacity and head.

- The sump pump shall be of a capacity and head appropriate to anticipated use requirements.

1113.1.2 Sump pit.

- The sump pit shall be not less than 18 inches (457 mm) in diameter and not less than 24 inches (610 mm) in depth, unless otherwise approved. The pit shall be provided with access and shall be located such that all drainage flows into the pit by gravity. The sump pit shall be constructed of tile, steel, plastic, cast iron, concrete or other approved material, with a removable cover adequate to support anticipated loads in the area of use. The pit floor shall be solid and provide permanent support for the pump.

1113.1.3 Electrical.

- Electrical service outlets, where required, shall meet the requirements NFPA 70.

1113.1.4 Piping.

- Discharge piping shall meet the requirements of Section 1102.2, 1102.3, or 1102.4 and shall include a gate valve and a full flow check valve. Pipe and fittings shall be the same size as, or larger than, the pump discharge tapping.

CHAPTER 12 SPECIAL PIPING AND STORAGE SYSTEMS

This is for Reference Code information for Medical Gas Systems.

Chapter 12 specifies the standards covering the installation of nonflammable medical gas piping systems and nonmedical oxygen piping systems.

Summary of changes from previous version

There are no significant changes in this chapter.

Section 1201 general

1201.1 Scope.

- The provisions of this chapter shall govern the design and installation of piping and storage systems for nonflammable medical gas systems and nonmedical oxygen systems.
- All maintenance and operations of such systems shall be in accordance with the Vermont Fire and Building Safety Code.

Figure 8: Healthcare Gas Pipe System

Section 1202 medical gases

1202.1 Nonflammable medical gases.

- Refer to NFPA 99 AND ASSE 6000 (Health Care Facilities)

Section 1203 oxygen systems

- **1203.1 Design and installation.**
- Nonmedical oxygen systems refer to NFPA 51 & NFPA 55

CHAPTER 13 NON-POTABLE WATER SYSTEMS

Storm water and some liquid waste from a building can be a source of nonpotable water that can be used to reduce the volume of potable water supplied to the building.

Chapter 13 provides the requirements for storage, treatment and distribution of this resource.

This chapter also regulates the piping systems for reclaimed water supplied by a wastewater treatment facility.

Summary of changes from previous version

There are no significant changes in this chapter.

Section 1301 General

1301.1 General.

- The provisions of Chapter 13 shall govern the materials, design, construction and installation of systems for the collection, storage, treatment and distribution of nonpotable water.
- For nonpotable rainwater systems, the provisions of CSA B805/ICC 805 shall be an alternative for regulating the materials, design, construction and installation of systems for rainwater collection, storage, treatment and distribution of nonpotable water.
- The use and application of nonpotable water shall comply with laws, rules and ordinances applicable in the jurisdiction.

1301.1.1 Non-potable Water Systems.

- Contact Agency of Natural Resources Drinking Water and Groundwater Protection Division for prior approval.

Section 1301 General

1301.2 Water Quality.

- Nonpotable water for each end use application shall meet the minimum water quality requirements as established for the intended application by the laws, rules and ordinances applicable in the jurisdiction.
- Where nonpotable water from different sources is combined in a system, the system shall comply with the most stringent of the requirements of this code that are applicable to such sources.

1301.2.2 Filtration required.

- Nonpotable water utilized for water closet and urinal flushing applications shall be filtered by a 100-micron (0.1 mm) or finer filter.
  - Exception: Reclaimed water sources shall not be required to comply with these requirements.

Figure 9: Filtration is required when using Non-Potable Water for Water Closet and Urinal Flushing Applications

Section 1302 on-site nonpotable water reuse systems

1302.1 General.

- The provisions of ASTM E2635 and Section 1302 shall govern the construction, installation, alteration and repair of on-site nonpotable water reuse systems for the collection, storage, treatment and distribution of on-site sources of nonpotable water as permitted by the jurisdiction.

1302.2 Sources.

- On-site nonpotable water reuse systems shall collect waste discharge from only the following sources: bathtubs, showers, lavatories, clothes washers and laundry trays. Where approved and as appropriate for the intended application, water from other nonpotable sources shall be collected for reuse by on-site nonpotable water reuse systems.

1302.2.1 Prohibited sources.

- Wastewater containing urine or fecal matter shall not be diverted to on-site nonpotable water reuse systems and shall discharge to the sanitary drainage system of the building or premises in accordance with Chapter 7.
- Reverse osmosis system reject water, water softener discharge water, kitchen sink wastewater, dishwasher wastewater and wastewater discharged from wet-hood scrubbers shall not be collected for reuse in an on-site nonpotable water reuse system.

1302.3 Traps.

- Traps serving fixtures and devices discharging wastewater to on-site nonpotable water reuse systems shall comply with Section 1002.4.

1302.4 Collection pipe.

- On-site nonpotable water reuse systems shall utilize drainage piping approved for use in plumbing drainage systems to collect and convey untreated water for reuse. Vent piping approved for use in plumbing venting systems shall be utilized for vents in the graywater system. Collection and vent piping materials shall comply with Section 702.

1302.4.1 Installation.

- Collection piping conveying untreated water for reuse shall be installed in accordance with Section 704.

1302.4.2 Joints.

- Collection piping conveying untreated water for reuse shall utilize joints approved for use with the distribution piping and appropriate for the intended applications as specified in Section 705.

1302.4.3 Size.

- Collection piping conveying untreated water for reuse shall be sized in accordance with drainage sizing requirements specified in Section 710.

1302.4.4 Marking.

- Additional marking of collection piping conveying untreated water for reuse shall not be required beyond that required for sanitary drainage, waste and vent piping by Chapter 7.

1302.5 Filtration.

- Untreated water collected for reuse shall be filtered as required for the intended end use.
- Filters shall be provided with access for inspection and maintenance.
- Filters shall utilize a pressure gauge or other approved method to provide indication when a filter requires servicing or replacement.
- Filters shall be installed with shutoff valves immediately upstream and downstream to allow for isolation during maintenance.

1302.6 Disinfection and treatment.

- Where the intended application for nonpotable water collected on-site for reuse requires disinfection or other treatment or both, it shall be disinfected as needed to ensure that the required water quality is delivered at the point of use.
- Nonpotable water collected on-site containing untreated graywater shall be retained in collection reservoirs for not longer than 24 hours.

1302.6.1 Graywater used for fixture flushing.

- Graywater used for flushing water closets and urinals shall be disinfected and treated by an on-site water reuse treatment system complying with NSF 350.

1302.7 Storage tanks.

- Storage tanks utilized in on-site nonpotable water reuse systems shall comply with Sections 1301.9, 1302.7.1 and 1302.7.2.

1302.7.1 Location.

- Storage tanks shall be located with a minimum horizontal distance between various elements as indicated in Table 1302.7.1.

1302.7.2 Outlets.

- Outlets shall be located not less than 4 inches (102 mm) above the bottom of the storage tank and shall not skim water from the surface.

ELEMENT	MINIMUM HORIZONTAL DISTANCE FROM STORAGE TANK (feet)
Critical root zone (CRZ) of protected trees	2
Lot line adjoining private lots	5
Public water main	10
Seepage pits	5
Septic tanks	5
Streams and lakes	50
Water service	5
Water wells	50

Table 23: location of nonpotable water reuse storage tanks
(*Source: INTERNATIONAL CODE COUNCIL, 2021 International Plumbing Code – Table 1302.7.1)*

Section 1303 Nonpotable Rainwater Collection and Distribution Systems

1303.1 General.

- The provisions of Section 1303 shall govern the construction, installation, alteration and repair of rainwater collection and conveyance systems for the collection, storage, treatment and distribution of rainwater for nonpotable applications, as permitted by the jurisdiction.

1303.1.1 Fire protection systems.

- The storage, treatment and distribution of nonpotable water to be used for fire protection systems shall be in accordance with the International Fire Code.

1303.2 Collection surface.

- Rainwater shall be collected only from above-ground impervious roofing surfaces constructed from approved materials and where approved, vehicular parking or pedestrian walking surfaces.

1303.3 Debris excluders.

- Downspouts and leaders shall be connected to a debris excluder or equivalent device that is designed to remove leaves, sticks, pine needles and similar debris to prevent such from entering the storage tank.

1303.4 First-flush diverter.

- First-flush diverters shall operate automatically and shall not rely on manually operated valves or devices.
- Diverted rainwater shall not be drained to the roof surface, and shall be discharged in a manner consistent with the storm water runoff requirements of the jurisdiction.
- First-flush diverters shall be provided with access for maintenance and service.

1303.6 Drainage.

- Water drained from the roof washer or debris excluder shall not be drained to the sanitary sewer.
- Such water shall be diverted from the storage tank and discharge in a location that will not cause erosion or damage to property in accordance with the International Building Code.
- Roof washers and debris excluders shall be provided with an automatic means of self-draining between rain events, and shall not drain onto roof surfaces.

1303.7 Collection pipe.

- Rainwater collection and conveyance systems shall utilize drainage piping approved for use within plumbing drainage systems to collect and convey captured rainwater.
- Vent piping approved for use within plumbing venting systems shall be utilized for vents within the rainwater system. Collection and vent piping materials shall comply with Section 702.

1303.7.1 Installation.

- Collection piping conveying captured rainwater shall be installed in accordance with Section 704.

1303.7.2 Joints.

- Collection piping conveying captured rainwater shall utilize joints approved for use with the distribution piping and appropriate for the intended applications as specified in Section 705.

1303.7.3 Size.

- Collection piping conveying captured rainwater shall be sized in accordance with drainage sizing requirements specified in Section 710.

1303.7.4 Marking.

- Additional marking of collection piping conveying captured rainwater for reuse shall not be required beyond that required for sanitary drainage, waste and vent piping by Chapter 7.

1303.12 Pumping and control system.

- Mechanical equipment including pumps, valves and filters shall be provided with access that allows for removal in order to perform repair, maintenance and cleaning. The minimum flow rate and flow pressure delivered by the pumping system shall be appropriate for the application and in accordance with Section 604.

1303.13 Water pressure-reducing valve or regulator.

- Where the water pressure supplied by the pumping system exceeds 80 psi (552 kPa) static, a pressure-reducing valve shall be installed to reduce the pressure in the rainwater distribution system piping to 80 psi (552 kPa) static or less. Pressure-reducing valves shall be specified and installed in accordance with Section 604.8.

Section 1304 Reclaimed Water Systems

1304.1 General.

- The provisions of this section shall govern the construction, installation, alteration and repair of systems supplying nonpotable reclaimed water.

1304.2 Water pressure-reducing valve or regulator.

- Where the reclaimed water pressure supplied to the building exceeds 80 psi (552 kPa) static, a pressure-reducing valve shall be installed to reduce the pressure in the reclaimed water distribution system piping to 80 psi (552 kPa) static or less.
- Pressure-reducing valves shall be specified and installed in accordance with Section 604.8.

1304.3 Reclaimed water systems.

- The design of the reclaimed water systems shall conform to accepted engineering practice.

1304.3.1 Distribution piping.

- Distribution piping shall comply with Sections 1304.3.1.1 through 1304.3.1.3.

  - Exception: Irrigation piping located outside of the building and downstream of a backflow preventer.

1304.3.1.1 Materials, joints and connections.

- Distribution piping conveying reclaimed water shall conform to standards and requirements specified in Section 605 for nonpotable water.

1304.3.1.2 Design.

- Distribution piping systems shall be designed and sized in accordance with Section 604 for the intended application.

1304.3.1.3 Labeling and marking.

- Nonpotable distribution piping labeling and marking shall comply with Section 608.9.

1304.4 Tests and inspections.

- Tests and inspections shall be performed in accordance with Sections 1304.4.1 and 1304.4.2.

1304.4.1 Water supply system test.

- The testing of makeup water supply piping and reclaimed water distribution piping shall be conducted in accordance with Section 312.6.

1304.4.2 Inspection and testing of backflow prevention assemblies.

- The testing of backflow preventers shall be conducted in accordance with Section 312.11.

THANK YOU FOR LISTENING!

This concludes our presentation, and we hope that you enjoyed it.

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REFERENCES

This part of the interactive presentation was adapted from chapters 1 to 14 of the international code council, 2024 International Plumbing Code and changes from 2021 International Plumbing Code.

COURSE PROVIDER BIOGRAPHY

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