IPC CHAPTER

GENERAL REGULATIONS

3

SECTION 301
GENERAL

301.3 Connections to the sanitary drainage system. All plumbing fixtures, drains, appurtenances and appliances used to receive or discharge liquid wastes 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 the indirect waste systems required by Chapter 8.

Q: We are designing a large parking and maintenance facility for a trucking firm. There is no sewer system at the location, so we are installing an absorption septic field system for the toilet rooms and break room. For the parking and repair garages, we will have trench drains with oil separators going to a holding tank (to be pumped and hauled). Although the Department of Environmental Quality (DEQ) says we can discharge drains from the parking garage area to the surface, we have chosen a design that incorporates trench drains, oil separators, and a holding tank for both areas. However, the plumbing code plan reviewer says we have to connect the floor trench drains to either a public-owned treatment works (which is non-existent at this location) or the septic system. If we connect with the septic system, we will be in violation of DEQ and EPA. This is the first time we have encountered such a problem. We have always pumped and hauled when there is no municipal system. Does the IPC permit this? The only plumbing fixtures in the parking and maintenance areas are eyewash and handwash sinks, which connect to the sanitary lines that go to the septic system and not to the trench drains.

A: In the context of a repair facility, a trench drain is a plumbing fixture, and according to IPC Sections 301.3 and 701.2 it must be connected to a sanitary drainage system. An oil separator is required per Section 1003.4. The sanitary drainage system must connect to either a sewer system (which leads to a public or privately-owned treatment works) or a septic system.

Trench drains in a repair facility are only intended to receive rainwater runoff and general vehicle washdown runoff. Because the floor area may have a slight oily or greasy film due to the nature of the operations, an oil separator is necessary to keep any incidental wash-off of these films out of the sewer or septic system. Trench drains are not for the disposal of any motor vehicle fluids such as oils, fuels, coolants, or specialized cleaning agents, such as degreasers, acids, or caustics. General repair facility housekeeping rules typically require that any spills of fluids be soaked up with towels, pads, or absorbent sweeping compounds and disposed of as a solid waste. Captured motor vehicle fluids are stored and removed by recycling or hazardous waste removal companies. Therefore, since the discharge of the trench drains after the liquid has passed through the oil separator is intended to be essentially water having very limited oil content, public sewer systems and properly sized septic systems are not affected by inclusion of this type of waste flow.

However, the reluctance of an environmental quality department to approve a connection of the repair facility trench drains to a septic system is understandable. Once a septic system is installed, there is only a hope that it is functioning properly, because there is no monitoring of the discharge to the absorption field. And given that there isn't any DEQ monitoring of what actually happens in the repair facility, there is a potential for undesirable fluids to be flushed to the septic system, which could cause the system to become ineffective. Given enough volume of undesirable fluids discharged to the septic system, the fluids could find their way into the absorption field and thus into the local waterways.

Septic systems are covered by the *International Private Sewage Disposal Code* (IPSDC). In Section 805, holding tanks are only approved where the site cannot accommodate a septic system. Essentially, the DEQ has said that the site cannot be used for a septic system having discharge from a repair facility

trench drain system. Therefore, it seems reasonable that the code official could approve the holding tank method for the trench drain waste by using the modifications or alternative methods provisions of IPC Section 105.1 or 105.2. [3-1]

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**.**

303.2 Installation of materials. All 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 installation 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. All plastic pipe, fittings and components shall be third-party certified as conforming to NSF 14.

303.4 Third-party testing and certification. All plumbing products and materials shall comply with the referenced standards, specifications and performance criteria of this code and shall be identified in accordance with Section 303.1. When required by Table 303.4, plumbing products and materials shall either be tested by an approved third-party testing agency or certified by an approved third-party certification agency.

Q: The local jurisdiction is requiring HDPE storm sewer pipe to meet the requirements of IPC Chapter 3, General Regulations. Section 303.4 requires all plastic pipe and fittings to be third-party certified to NSF 14 standards. Section 301.1 states these regulations apply to “plumbing not specific to other chapters." We believe the specific requirements of Chapter 11 apply to HDPE storm sewer pipe that is for underground installation from the building to the property line. This pipe is listed as complying with ASTM F2306, an approved standard in Table 1102.4. Shouldn’t this storm sewer pipe be subject to Chapter 11 regulations rather than Chapter 3?

A: ASTM F2306 is an approved standard for building storm sewer pipe and fittings as shown in Tables 1102.4 and 1102.7. However, the material must also comply with the general requirements in Section 303, which includes meeting NSF 14 and having third-party certification (Table 303.4, row 4). NSF is concerned with making sure that plastic pipe and related components are manufactured to an approved standard, that a quality assurance program is in place, and that the product is tested and marked. The intent of Section 301.1 is to include a variety of requirements that are not covered in other chapters of the code. [3-2]

Q: Which section of the IPC requires UV protection of plastic pipe used for vent terminations?

TABLE 303.4
PRODUCTS AND MATERIALS REQUIRING THIRD-PARTY TESTING AND THIRD-PARTY CERTIFICATION

PRODUCT OR MATERIAL	THIRD-PARTY CERTIFIED	THIRD-PARTY TESTED
Potable water supply system components and potable water fixture fittings	Required	—
Sanitary drainage and vent system components	Plastic pipe, fittings and pipe-related components	All others
Waste fixture fittings	Plastic pipe, fittings and pipe-related components	All others
Storm drainage system components	Plastic pipe, fittings and pipe-related components	All others
Plumbing fixtures	—	Required
Plumbing appliances	Required	—
Backflow prevention devices	Required	—
Water distribution system safety devices	Required	—
Special waste system components	—	Required
Subsoil drainage system components	—	Required

A: There are no specific IPC requirements for painting or otherwise protecting ABS or PVC pipe from the effects of ultraviolet (UV) radiation. Section 303 sets minimum material requirements for plumbing components, including identification, and requires conformance to NSF 14 and third-party certification for plastic pipe and fittings. Section 303.2 requires installation in accordance with the listing standard. In cases where the standard lacks specific installation instructions, the manufacturer's instructions must be followed. Plastic pipe typically contains UV inhibitors in the material. In addition, the effects of UV radiation vary greatly depending on climate, location, altitude, and a number of other environmental factors. If desired or if recommended by the manufacturer, painting pipe exposed to sunlight with a compatible paint may reduce the possible effects of UV radiation, such as surface discoloration. [3-3]

SECTION 305
PROTECTION OF PIPES AND PLUMBING SYSTEM COMPONENTS

305.1 Corrosion. Pipes passing through concrete or cinder walls and floors or other corrosive material shall be protected against external corrosion by a protective sheathing or wrapping or other means that will withstand any reaction from the lime and acid of concrete, cinder or other corrosive material. Sheathing or wrapping shall allow for movement including expansion and contraction of piping. Minimum wall thickness of material shall be 0.025 inch (0.64 mm).

Q: When underground CPVC piping is stubbed up through a concrete slab, does Section 305.1 require sheathing or wrapping of the piping? As an inspector, my concern is damage to a pipe that is not wrapped due to expansion and contraction. I know Section 305.1 is titled "Corrosion"; however, it also addresses expansion and contraction of the piping.

A: With respect to the intent of Section 305.1, the answer is no. This section is primarily concerned with the protection of pipes from corrosion when the piping material is affected by direct contact with concrete or other corrosive elements. There are no corrosion issues with CPVC in direct contact with a concrete slab. Therefore, CPVC piping does not require a plastic sleeve (i.e. sheathing or wrapping) in this application for the purposes of corrosion protection.

The language in the second to last sentence of the section is concerned with the application of the sheathing or wrapping in a manner that allows expansion and contraction movement of the piping. The sheathing or wrapping is not intended as protection against physical damage in the event of pipe movement. [3-4]

Q: Please clarify the term "passing through concrete" as it applies to protection against corrosion in Section 305.1. Some designers have interpreted this section as applying only to piping that is embedded in concrete.

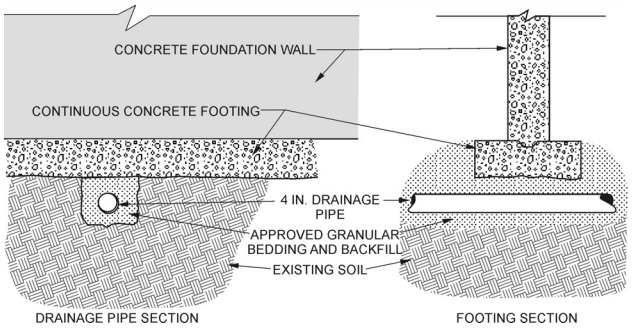
A: Section 305.1 requires any piping passing through concrete or corrosive material to be protected against external corrosion. For piping subject to corrosion, protection is achieved by the application of a protective sheathing or wrapping to isolate the pipe from the concrete. In the context of this section, "passing through concrete" describes a pipe embedded in concrete or a pipe penetrating a concrete slab or wall. To avoid wrapping an entire run of piping that is embedded in a concrete slab, the piping is typically buried with approved backfill material. Thus it only requires wrapping where it turns up to penetrate the concrete slab. The protective sheathing must allow for expansion and contraction of the piping and must have a minimum wall thickness of .025 inch. In addition, Section 605.1 prohibits the installation of water service or water distribution piping in soil conditions that might cause the pipe to degrade or corrode at an accelerated rate. For example, certain soils containing sulfur compounds attack unprotected copper pipe, and the pipe or tubing in these instances must be coated with a protective layer. [3-5]

305.5 Pipes through or under footings or foundation walls. Any pipe that passes under a footing or through a foundation wall shall be provided with a relieving arch, or a pipe sleeve pipe shall be built into the foundation wall. The sleeve shall be two pipe sizes greater than the pipe passing through the wall.

Q: Is engineering required for excavating and installing plumbing pipes under a footing that is already in place? The piping is perpendicular to the footing. I'm not sure I understand the intent of IPC

Sections 305.5 and 307.5 and what level of protection is required for the piping.

A: The intent of Section 305.5 is to ensure that structural loads of the building foundation are not placed on the pipe. Digging under an existing concrete footing for installing a pipe perpendicular to the footing is common practice. Assuming the footing is continuous, as opposed to isolated, typical footing design permits bridging over a small excavation without transferring loads to the pipe. Backfill should be appropriate material, such as crushed stone or sand. Installation of a 4-inch pipe under a typical continuous footing can be accomplished without engineering or additional protection of the pipe. For larger excavations or unusual conditions, the building designer and contractor should be consulted for an appropriate design to maintain the structural integrity of the footing and prevent structural loads from being transferred to the pipe. Section 307.5 protects the structural integrity of the footing from excavations that are parallel and below the bearing plane of the footing and does not apply to an installation that is perpendicular. See Figure 3-6. [3-6]

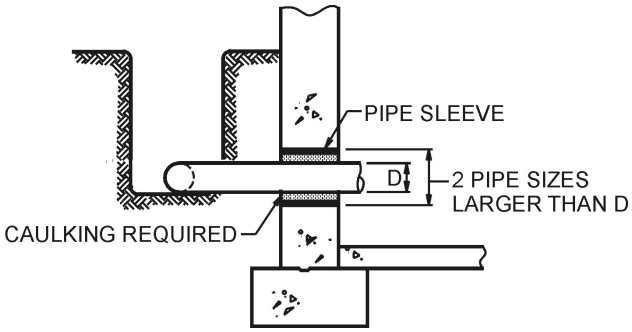


DRAINAGE PIPE PLACED UNDER EXISTING FOOTING
FIGURE 3-6

Q: Does a rubber gasket (doughnut) manufactured in accordance with ASTM-443, ASTM-361, and ASTM-923 meet the intent of Section 305.5 for providing relief from the transfer of structural loading where a Schedule 40 PVC sewer pipe penetrates a concrete foundation wall? The gaskets serve to seal the penetration from moisture and provide separation between the penetrating piping and the concrete structure that surrounds it.

A: No. Section 305.5 requires a sleeve two pipe sizes greater than the pipe passing through the foundation wall. The tight-fitting gasket does not prevent transfer of possible stresses to the pipe. A gasket is not considered equivalent to a relieving arch or pipe sleeve. See Figure 3-7. [3-7]

305.6 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.



PIPE PASSING THROUGH FOUNDATION WALL
FIGURE 3-7

305.6.1 Sewer depth. Building sewers that connect to private sewage disposal systems shall be a minimum of [NUMBER] inches (mm) below finished grade at the point of septic tank connection. Building sewers shall be a minimum of [NUMBER] inches (mm) below grade.

Q: Does Section 305.6 apply to a seasonal-use building that is winterized by having the water distribution system drained and the traps filled with antifreeze solution?

A: No. This section is intended to apply only to buildings that have plumbing systems in service for the building occupant's use. In cold climates, it is common practice to winterize the plumbing systems of buildings that are not to be occupied or heated. Examples are summer cottages, campgrounds, swimming pool bathhouses, and a variety

of commercial buildings. The code does not address plumbing system design that enables proper drain-down or winterizing methods for ensuring against freeze damage. It is the building owner's responsibility to take the appropriate actions to prevent damage. [3-8]

Q: For protection from freezing, what is the minimum depth of cover for a building drain and branches under a concrete slab that is inside the building envelope?

A: There is no minimum cover requirement or minimum depth below grade for this application. Section 305.6 requires protection for piping subjected to freezing temperatures. Sub-slab piping within the building envelope typically is not at risk of freezing. Section 305.6.1 applies to building sewers only, which are entirely outside the building. [3-9]

Q: Is it acceptable to run water lines in the attic?

A: Section 305.6 addresses this installation. In geographic locations where the attic space is subject to freezing temperatures, water lines installed in the attic must be protected against freezing. This is typically accomplished by installing insulation above the piping, but not between the piping and conditioned space. The amount of insulation required will vary by climate. The code also permits the use of heat for protection, which would be applied when the attic area is within the thermal envelope of the building. [3-10]

Q: Section 305.6 requires protection for plumbing piping that is located in an area subject to freezing temperatures. To what extent must the piping be protected from freezing?

A: The code official makes the determination on the extent of freeze protection necessary based on his or her experience and the available data for a particular geographic location. Often, local tradition provides a good rule of thumb. Any number of alternatives may be submitted to the code official for approval. [3-11]

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 materials 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 of 6 inches (152 mm) maximum 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 a minimum of 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 a minimum of 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.

Q: In our area, slab-on-grade buildings are very common. These require the drain lines to be installed under the slabs. A quality assurance inspector has been requiring drain and vent piping to be fixed in place unless it has sufficient backfill cover. Plumbers began to use steel rebar scraps and steel wire ties to hold the piping in place. Does the code require these anchors or supports for the under-slab installation? Are rebars and tie wire approved for this installation?

A: Section 306.1 requires buried piping to have continuous support. Section 306.2 sets the requirements for suitable bedding material in providing that support. In other words, the code requires