



BUILDINGS BULLETIN 2018-010

Technical

Issuer: Gus Sirakis, P.E.
Assistant Commissioner for Technical Affairs and Code Development

Issuance Date: August 1, 2018

Purpose: This document provides guidance on code-compliant configurations of fuel oil piping for day tanks and addresses dual certification of day tanks.

Section(s): MC 1305.7 MC 1305.8 MC 1305.12.2 UL 142
MC 1305.14 MC 1305.3 UL 80

Subject(s): Venting, day tanks; fuel oil piping; NYC-approved day tank; UL 80; UL 142; emergency venting; supply piping; fuel oil installation

A. DESCRIPTION

This bulletin provides guidance on code-compliant fuel oil piping configurations for day tanks supplying fuel to building equipment, and addresses common issues related to the use of dual-certified fuel oil tanks as day tanks.

B. BACKGROUND

The New York City Mechanical Code (MC) requirements allow for several configurations of fuel oil piping connected to day tanks. This bulletin provides clarification of numerous fuel oil piping configurations acceptable for venting of day tanks located above the lowest floor, including those on roof levels of buildings. Fuel oil piping systems are required to be designed and installed in compliance with MC 1305. The piping arrangement is required to be designed and installed in a manner that allows for effective venting, a functioning overflow pipe, and that functional emergency venting is achieved where required by correctly designed piping. There are multiple acceptable configurations for vent piping of day tanks. This bulletin provides clarifications with regards to more commonly provided arrangements of piping and the associated acceptable cross-connections of vent piping and emergency relief vent piping connections to the primary storage tank.

This bulletin also provides clarification for use of tanks that have been certified to conform to multiple standards, including: Underwriters Laboratory standards 80 and 142, as well as the "Alternate tank design and construction standards" requirements of MC 1305.14.

C. SPECIFICS

The 2014 New York City Mechanical Code (MC) provides piping requirements for fuel oil delivery systems between day tanks above the lowest floor and the primary tanks that supply them. This bulletin addresses the *two-pipe* and *three-pipe* systems that are commonly specified on plans, which include pipes used for supply, return, and overflow of fuel as well as venting of fuel oil gases. For purposes of this bulletin, a 'day tank above the lowest floor' includes a day tank that is situated on an elevated floor of the building and which MC 1305 considers inside the building, even if the day tank is located on a roof. Although the current Code refers to it as

“return piping,” the pipe running from the day tank above the lowest floor to the primary storage tank in the basement is actually an overflow pipe, which remains empty except in the event of a system failure resulting in overflow of the day tank. A return pipe would only be present in systems where there is no storage, only piping and headers, where the return pipe would be full of liquid fuel during normal operation.

D. THREE-PIPE SYSTEMS

Three-pipe systems include a supply line, an overflow line, and vent line between the primary storage tank and the day tank above the lowest floor. This system does not vent at the day tank’s level; it instead uses the vent piping at the primary tank by connecting to the top of the primary tank or directly into the primary tank’s vent line. The vent pipe design and function depends on the type of day tank being designed, constructed, and installed.

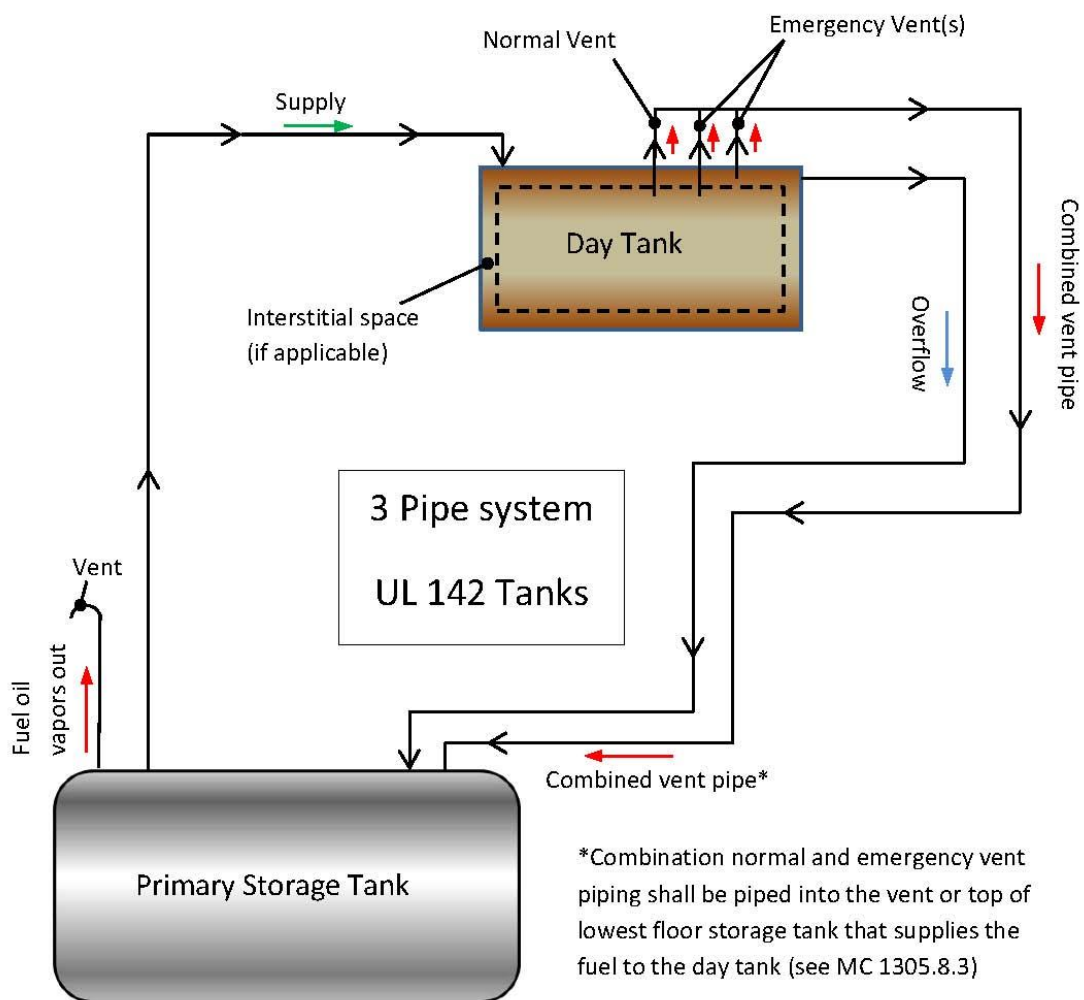


Fig 1. 3-Pipe Fuel Oil Piping System with a UL 142 Day Tank

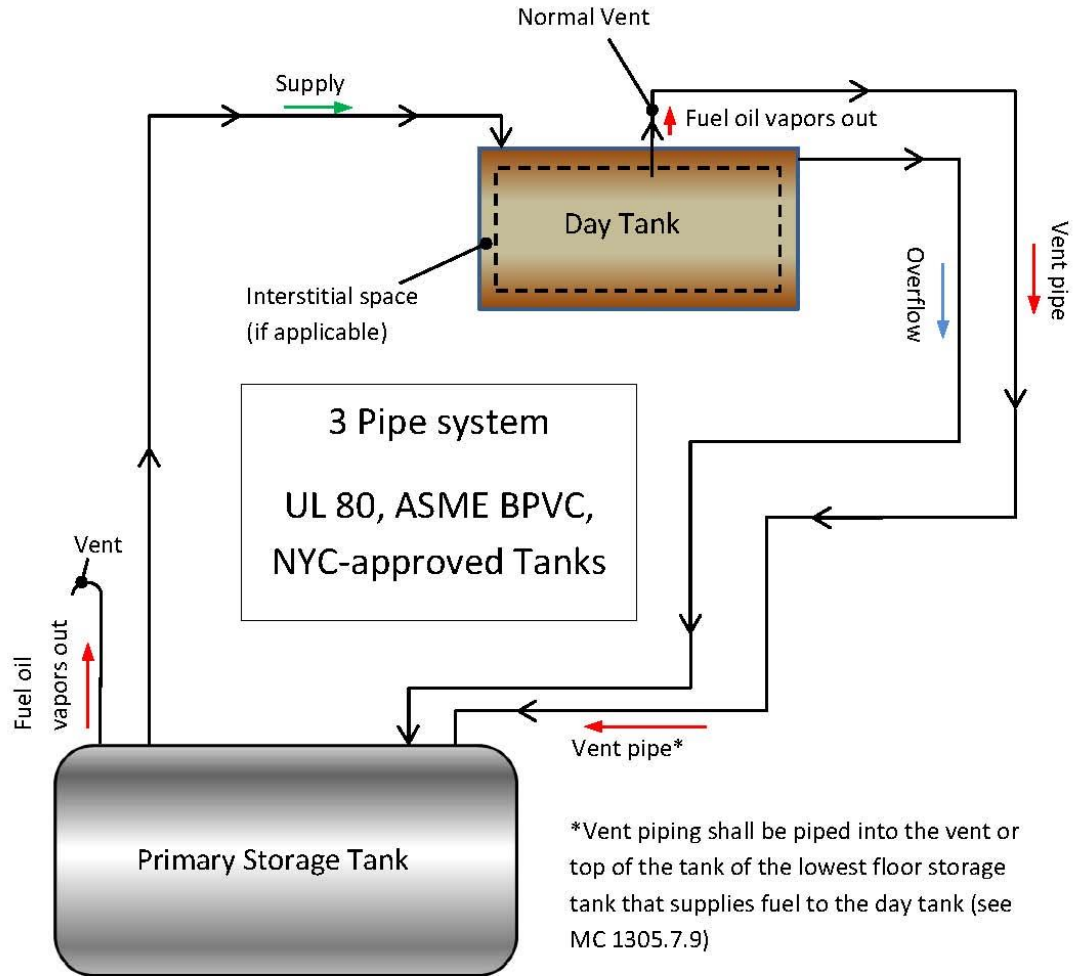


Fig 2. 3-Pipe Fuel Oil Piping System with a UL 80, ASME BPVC or NYC-Approved Day Tank

1. Vent Piping Requirements for Three-Pipe Systems

a. UL 142 Compliant Day Tanks

Day tanks that conform to UL 142 require both normal and emergency venting of the tank and its interstitial containment space if present. Normal and emergency vent connections are combined into one vent pipe that connects the day tank to the primary storage tank as shown in Figure 1. Design of the combined emergency and normal vent piping must meet requirements of both MC 1305.7 and MC 1305.8.1 through 1305.8.4, which includes compliance with NFPA 30.

b. UL 80, ASME BPVC Section VII Div 1 or 2 Compliant Day Tanks

Day tanks on floors above the lowest floor that conform to the above standards require only normal venting and piping shown in Figure 2. The normal vent piping must comply with design requirements of MC 1305.7, including Table 1305.7(2) and applicable footnotes. However, the code only supplies minimum vent diameters in Table 1305.7 and requires that normal vent piping shall not be smaller in size than the supply pipe, which must comply with requirements of MC 1305.3.

c. MC 1305.14 Compliant Day Tanks (“NYC-approved Tanks”)

Day tanks on floors above the lowest floor that comply with the alternate tank design and construction standards of MC 1305.14, or “NYC-approved tanks,” do not require emergency venting. Normal vent

piping for MC 1305.14 compliant day tanks must comply with the design requirements of MC 1305.7 and the piping arrangement shown in Figure 2.

E. TWO-PIPE SYSTEMS

Two-pipe systems contain a supply pipe and an overflow pipe that connect the rooftop day tank and primary fuel oil storage tank at the lowest level. A two-pipe system vents to an exterior termination point above the level at which the day tank is located. It does not have a venting pipe between the day tank above the lowest level of the building and the primary storage tank at the lowest level. The vent functions by allowing vapors to rise from the tank connection into the vent pipe, and exhaust at the exterior vent termination point, located above the level of the day tank.

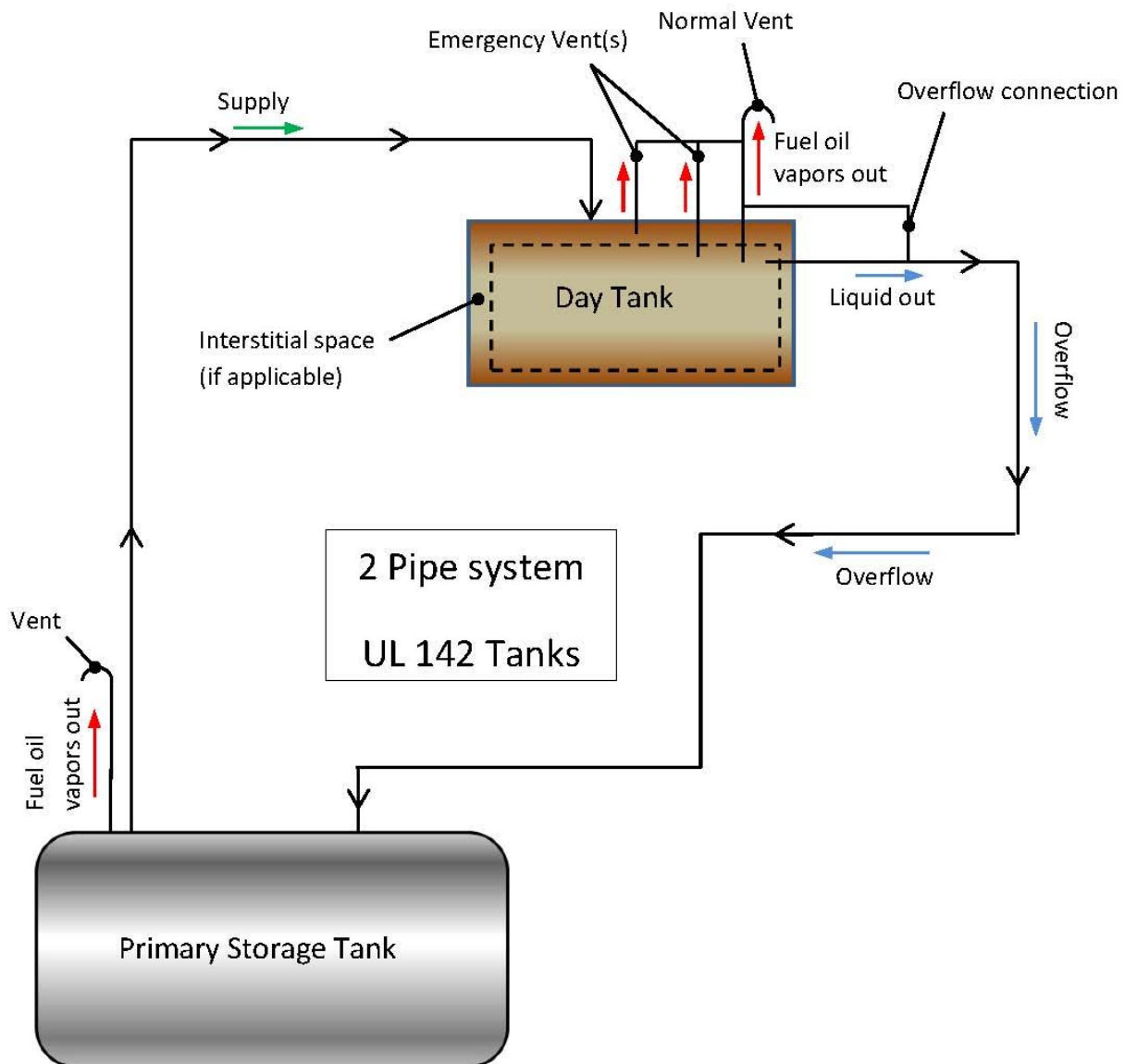


Fig 3. 2-Pipe Fuel Oil Piping System with a UL 142 Tank

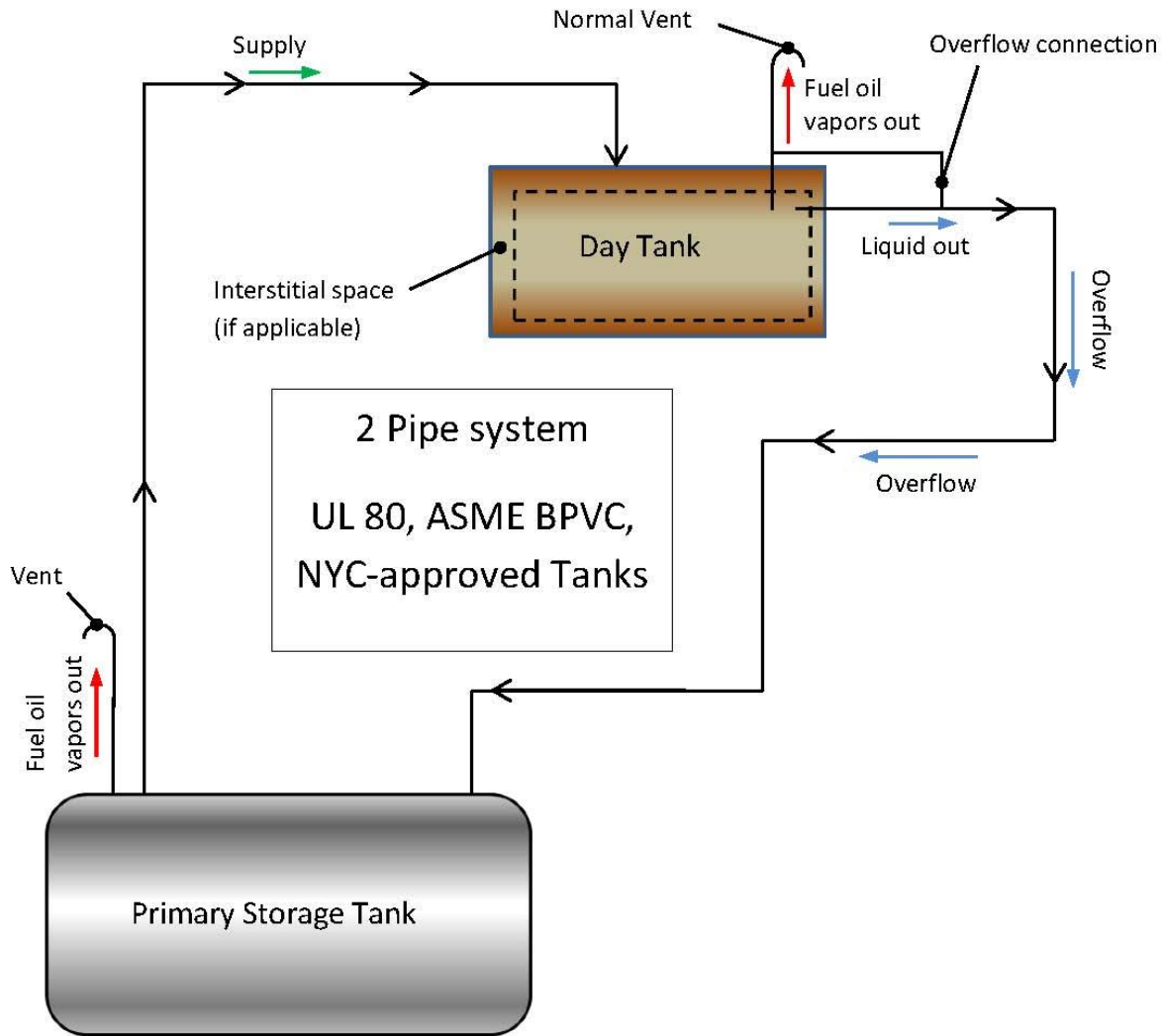


Fig 4. 2-Pipe Fuel Oil Piping System with a UL 80, ASME BPVC or NYC-Approved Tank

1. Venting Requirements for Two-Pipe Systems

a. UL 142 Compliant Day Tanks

Like 3-pipe systems, 2-pipe systems with day tanks that conform to UL 142 require both normal and emergency venting of the tank and its interstitial containment space if present. Normal and emergency vent connections are combined into one vent pipe, but instead of venting a separate pipe down to the lowest level primary storage tank, the gases are conveyed through vent piping up and out at an exterior termination point above the level of the day tank as shown in Figure 3. Design of the combined emergency and normal vent piping must meet requirements of both MC 1305.7 and MC 1305.8.1 through 1305.8.4, which includes compliance with NFPA 30.

b. UL 80, ASME BPVC Section VII Div 1 or 2 Compliant Day Tanks

Day tanks on floors above the lowest floor that conform to the above standards require only normal venting, with piping configurations as shown in Figure 4. The normal vent piping must comply with design requirements of MC 1305.7, including Table 1305.7(2) and applicable footnotes. However, the code only supplies minimum vent diameters in Table 1305.7 and requires that normal vent piping shall not be smaller in size than the supply pipe, which must comply with requirements of MC 1305.3. Gases are vented to an exterior termination point above the level of the day tank. The system does not require

a third pipe connecting the vent connection outlet of the day tank to the lowest level primary storage tank.

c. *MC 1305.14 Compliant Day Tanks (NYC-approved Tanks)*

Day tanks on floors above the lowest floor that comply with the alternate tank design and construction standards of MC 1305.14, or “NYC-approved tanks,” do not require emergency venting. Normal vent piping for MC 1305.14 compliant day tanks must comply with the design requirements of MC 1305. Gases are vented through vent piping as shown in Figure 4 to a termination point above the level of the day tank, with only the overflow pipe connected to the lowest level primary storage tank.

2. Additional Piping Connections to the Overflow Line in a Two-Pipe System

Sections MC 1305.7.9 and MC 1305.8.3 indicate that vent pipes shall be piped in an approved manner to the vent or top of the lowest level fuel storage tank. For a two-pipe system, this is achieved by connecting the vent pipe and overflow pipe as shown in Figures 3 and 4. All piping, when designed in accordance with Sections MC 1305.7 and 1305.8, shall be of sufficient size to prevent the supply flow rate from exceeding the return/overflow rate, and will not allow liquid overflow to enter the gas vent piping that runs upward from the day tank connection.

The creation of an additional overflow line from the vent outlet elevation into the dedicated overflow pipe is not considered a cross-connection as prohibited in MC 1305.7.8. During normal operating and venting conditions, the overflow pipe is empty for a day tank and does not inhibit the function of the vent piping that conveys gases to the vent termination point above the day tank.

F. DUAL CERTIFICATIONS FOR DAY TANKS

A dual-certified day tank that has been certified by the manufacturer to meet both applicable UL standards and MC 1305.14 for NYC alternate tank design is acceptable as long as the prescribed tests for each standard are performed and the tank meets the applicable code requirements for each certification. A dual certified day tank shall have all vent openings piped to a code compliant vent termination point. Plugging or capping of the emergency vent outlet after testing shall not be permitted.