

## Official Code Interpretation

Bureau of Petroleum Products and Tanks  
December 2009

**CODE SECTION:** Comm 10.505(2)(b) Spill and Overfill prevention. This interpretation supersedes all previous interpretations on this subject.

Comm 10.505(2)(b) (b) Storage tank overfill prevention equipment shall be provided that complies with NFPA 30 section 21.7.1.5 **and** PEI RP100 chapter 7. Existing tank systems shall comply with this paragraph within 2 years after February 1, 2009.

**Note:** NFPA 30 section 21.7.1.5 requires equipment that will (1) automatically shut off the flow into a tank when the tank is no more than 95 percent full; and (2) alert the transfer operator when the tank is no more than 90 percent full, by restricting the flow into the tank or triggering a high-level alarm.

### Issues:

The Commerce Tank Program's position on compliance with overfill prevention in accordance with this code section has been modified over time, along with several addendum communications relating to the overfill prevention requirement. Modifications and addendums have been the result of the bureau technical group receiving inquiries and information. As a result of different opinions continuing to debate the language or the application of the code overfill prevention language this "Official Code Interpretation" is developed with input from the bureau technical staff, the division code writer and division legal counsel in relation to the code language and comments from inspectors and the industry.

Debate on the requirement includes:

- ◆ Opinions that requiring both the visual and audible alert function is excessively costly to the operator, exceeded the minimum requirement of the code, and in some situations is not doable.
- ◆ Comm 10 does not directly require both audible and visual alerting mechanisms because it refers to and adopts two standards with different approaches to overfill prevention.
- ◆ The NFPA 30 does not clearly require both audible and visual alerting mechanisms for USTs, as it does for double-wall ASTs.
- ◆ PEI 100 recommends both audible and visual alerting mechanisms, however this can be interpreted as only applying if the alerting mechanism is also to fulfill all aspects of the overfill prevention requirement. (Note: Terms such as "recommends" or "should" as used in adopted standards become a requirement of the code.)

### Discussion / consideration:

Division management has not received comments from operators or contractors that installing both an audible and visual alerting mechanism is problematic or excessively costly in relation to the equipment and the purpose of the overfill devices.

NFPA 30 - 21.7.1.5 has two components to overfill; one being 90% alert and the other being 95% auto shut-off. NFPA 30 uses the term "alert" at 90% without specific qualifications **and** requires auto shut-off at 95%.

NFPA 30-21.7.1.5 An underground tank shall be equipped with overfill prevention equipment that will operate as follows:

- (1) Automatically shut off the flow of liquid into the tank when the tank is no more than 95 percent full.
- (2) Alert the transfer operator when the tank is no more than 90 percent full by restricting the flow of liquid into the tank or triggering the high-level alarm.
- (3) Other approved methods.

We could find no logic in the fact that NFPA 30 has a more restrictive audible and visual overfill requirement for double-wall ASTs than it does for USTs; especially when overfill incidents are more prevalent with USTs - the most catastrophic being the Biloxi, MS incident of August 9, 1998.

PEI 100 -7.3. refers to three overfill prevention methods but does not break them into a 90% / 95% alert/auto shut-off overfill prevention action. The three methods of overfill prevention are: alarms, flow shut-off and vent restriction. They are lumped together as "overfill prevention" devices that should operate when the tank is nearly full.

7.3 Overfill Prevention. Three types of overfill-prevention devices are commonly used: alarms, flow shut-off devices, and vent-restriction devices. Overfill-prevention devices should operate when the tank is nearly full. **Consult the authority having jurisdiction to determine the level at which the overfill device should operate.**

Consult with the storage system owner to determine the delivery procedures that will be used to fill the tank. Select and install an overfill device that will be compatible with the anticipated delivery procedures.

7.3.1 Alarms. Alarms consist of an external signaling device that is typically connected to an automatic tank-gauging system. To be effective, the alarm should:

- **provide visual and audible signals to the delivery person**
- be located in close proximity to where the delivery person stands during the delivery
- be clearly labeled as a "tank overfill alarm" so that delivery personnel will recognize the device as an overfill alarm.

7.3.2 Flow Shut-Off Devices. Flow shut-off devices, often called "flapper valves," are installed in the fill pipe of underground tanks and automatically stop the flow of product into the tank during a delivery. After the main valve closes, various bypass mechanisms allow the contents of the delivery hose to be drained into the tank. In order to operate properly, shut-off devices should be installed according to the manufacturer's instructions, particularly with regard to attaching the shut-off device to the drop tube and attaching the drop tube to the fill pipe.

Shut-off devices that are designed for use with underground tanks should only be used with gravity deliveries and where there are liquid-tight connections between the delivery hose and the fill pipe.

In a remote-fill installation, the gauge riser above the flow shut-off device must be properly sealed or else product will pour from the gauge opening when the shut-off device closes.

The fact that the two primary standards use different terminology: "alert" versus "alarm" has an element of confusion because an "alarm" is usually associated with an audible stimulus actuated by an electronic mechanism that must be manually cancelled to deactivate.

Initially we recognized the language in the referenced NFPA and PEI standards and Comm 10 code as the 90% alert can be provided via an audible alarm along with a visual flashing light, or flow restriction (via hose jump and the sound of the delivery flow changing). This was based upon:

1. Contractors stating that the first stage of the two stage drop tube auto shut-off was a hose kick flow-restriction alerting device similar to the ball float.

2. The NFPA 30 Handbook includes a comment in section -21.7.1.5 that “the requirement applies specifically to USTs and are intended to coordinate with the rules established by the EPA.”

Initially we took the position that as the code is written we could not successfully argue against the drop tube “hose kick” and the changing sound of the reduced flow being audible and visual since that is the principle behind the ball float alert methodology originating with the federal EPA rule (40 CFR 280) as some drop tube manufacturer's installation instructions associated with drop tube flappers use the term "hose kick" in their literature. EBW in bold print states the drop tube mechanism is intended for “emergency overfill only.”

However, a ball float could not meet the NFPA 30 alert option of restricting the flow because a ball float must be at a level higher than the auto shut-off or it will over-ride the auto shut-off. This is consistent with what has been communicated during the Comm 10 revision seminars.

After the contractor training sessions last winter, OPW contacted the Division and stated that the OPW drop tube two-stage flapper does not provide the 90% alert function and should not be perceived as such. With that information, staff contacted Emco-Weaton and EBW, who expressed the same feedback. Collectively the drop-tube manufacturer feed back is:

- ❖ While sales literature may refer to “hose kick” the manufacturers do not recognize it as the “alerting” mechanism. The hose “kick” is a one-to-two second event, not adequate in duration to be considered an alert or alarm. The first flapper action of the two stage mechanism was never intended for flow restriction or alerting. It is intended to reduce hydraulic shock if the auto shut-off activates.
- ❖ It is assumed that the 90% overfill prevention mechanisms will be wired to a panel and subsequently an audible and visual alarm located near the delivery point; (PEI 100-7.4 Install overfill devices according to manufacture’s instructions.)

Additionally:

- ❖ Manufacturer reps, as well as some of our inspectors, are stating that in reality most delivery drivers will not notice the hose kick from a drop tube flapper because it may not be very evident with many of the larger and heavier delivery hoses, and the driver is not likely to be positioned to notice it; and the flow of the delivery is generally so rapid that there is little time for the driver to react to a hose kick or an alarm before the auto shut-off is activated. So in reality, the flappers as an alert is not reliable as the alerting mechanism, and the auto shut-off is the most reliable component of overfill prevention.
- ❖ Inspectors have observed numerous incidents of delivery drivers placing sticks in the drop tube. Not only will this over-ride the drop tube mechanism should there be an overfill; it will likely damage the flapper mechanism significantly impacting its functionality.

After consideration of the points above and hearing accounts by inspectors of operators quieting alarms and electricians locating the flashing light where the delivery driver is unlikely to notice it (at least during daylight hours) it was determined that an interpretation needed to be based upon the language of the code and the public safety objective of the code.

Additional supporting code sections are:

- ◆ Comm 10.020(7) DIFFERING RULES. (a) Where any department-written rule in this chapter differs from a requirement within a standard referenced in this chapter, the department-written rule shall govern.  
(b) Where a rule prescribes a general requirement and another rule prescribes a specific or more detailed requirement regarding the same subject, the specific or more detailed requirement shall govern, except as provided in par. (a).  
(c) Where different sections of this chapter specify conflicting requirements, the most restrictive requirement, as determined by the department, shall govern, except as provided in pars. (a) and (b).

- ◆ Comm 10.020(10) INTERPRETATIONS. Under s. 101.02 (1), Stats., the department reserves the right to interpret the requirements in this chapter and in all adopted codes and standards.
- ◆ Comm 10.200 Adoption of standards. (1) INCORPORATION BY REFERENCE. The standards listed in Tables 10.200-1 to 10.200-11 are hereby incorporated by reference into this chapter.

**Determination:**

In addition to a 95% capacity auto shut-off, the Comm 10.505(2)(b) overfill prevention requirement requires a 90% alarm to function via both an audible alarm and a visual light. A flow restriction device will not meet the audible portion of the alarm requirement unless qualified as such by the manufacturer and acceptable by the department.

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