



Technical Notes
008

Exceeding Expectations

You heard the saying... "Is the glass half empty or half full?"

Inspectors refer to this daily...."is it empty or full".....what are they referring to? For the sake of accurate volume reporting, the inspector needs to be concerned about the fullness condition of the product transfer pipeline. They need to know whether it is empty, full, or slacked.

The ultimate condition for the product transfer pipeline is to be either 'Full' or 'Empty' of product before and after movements. But what causes "slack" ("half full / half empty") product lines and what is the impact on product volume variations?

Although there are several reasons why a shore line could become slack., some of the most common and issues occur right before the completion of a ship to shore (or vice versa) or shore to / shore transfer movements.

When product levels are low, pumps often have the tendency to push or suck air into the line which leaves it semi full of product. Also, changes in ambient temperatures causes the cargo in the pipelines to expand and / or contract. This condition is referred to as a 'slack line'.

This line needs to be repacked or emptied using an API approved method. Transfer lines can hold a large volume depending on diameter and length. High points such as Risers, the section of pipe that is designed to go over roadways are most subject to being slack.

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If product is transferred into slack lines on an outbound movement, your barrels may never be properly accounted for unless the following methods are strictly adhered to.

(API Chapter 17.6.7.1 AGREED TOLERANCE: Before executing any line fill determination procedure, all authorized parties should agree on the amount of difference in measurement that will be accepted when comparing measurements taken before the procedure to measurements taken after the procedure. This agreement may be in terms of volume rather than level measurement. In this section of API MPMS 17, the term agreed tolerance refers to this agreed upon span of acceptable difference.)

According to API Chapter 17.6 There are five methods of line fullness verification:

- **Internal circulation method:**

Product is circulated between two shore tanks, through the pipeline system designated for the transfer of cargo, including the dock manifold if possible. This must take place immediately before and after custody transfer.

Gauge the delivery and receiving tanks, circulate at least 120% of the combined line volumes.

Record and compare the TOV (Total Observed Volume). If over the agreed tolerance, repeat the operation.

- **Line displacement method:**

Refers to measuring the amount of liquid pumped from vessel to a shore tank or vice versa, through the pipeline system designated for cargo transfer. Gauge & temperature ship and shore tanks.

Transfer at least 120% of combined vessel and shore pipeline volumes.

Record and compare volumes delivered to volumes received. If difference is over the agreed tolerance, repeat the operation.

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- **High point bleed valve/sight glass method:**

These valves / glasses should be installed for the purpose of line fill verification only.

They are installed at the high points on a pipeline such as road crossings, or other elevated sections, beginning at a point near the vessel.

Valves are opened and the pipeline is placed under positive pressure. Checks are made for air or vapor in the line, allow air/vapor to bleed off.

Repeat each designated point, when only liquid is seen at all points, the line is considered to be full.

- **Pigging the line method:**

This method is acceptable only when the terminal is fitted with the launching and retrieving systems designated for this purpose.

The "pig" is a tight fitting device that is propelled through the line by liquid, gas or compressed air, the original contents of the pipeline system are therefore completely displaced.

In case of empty before, full after, or vice versa, the line capacity must be accounted for in the custody transfer calculation.

- **Line pack / Line press method:**

This procedure assumes that the designated pipeline system is tight and able to withstand pressure applied during line press operation.

The dock valve is closed and the shore tank and pump valves to line up the pipeline system are open.

Shore tank measurement must be taken before line press, using either reliable automatic gauging or manual measurement equipment.

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The pump is started and run until the pressure stabilizes or reaches a predetermined pressure.

Valves are closed to isolate the system.

The shore tank is re-gauged using the same method and equipment.

If a difference within 1/8" or (3mm) pipelines are considered to be full.

AmSpec inspectors pride themselves in following the above API procedures for checking product transfer line fullness to ensure all parties and volumes are properly accounted for.

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