

Petroleum and Petrochemical Bulletin

**FULLNESS OF PIPELINES BETWEEN VESSELS
AND SHORE TANKS – LIMITATIONS OF API
Chapter 17.6 SECOND EDITION 2014**

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Introduction

IFIA members would like to draw attention to a number of limitations regarding the determination of pipeline fullness and API MPMS Chapter 17.6, which addresses this issue.

The standard identifies five recommended procedures for verification of pipeline fullness; specifically:

- High point bleed method
- Internal circulation method
- Line displacement method
- Line press / Line Pack Method
- Pigging method

The standard does not recommend any particular method and states that the responsibility for selecting a method appropriate for a given terminal, and documenting its effectiveness, rests with those responsible for operating the terminal where it is applied. However, no criteria for assessing the effectiveness of the methods are given and terminals do not generally have documentation to support the method(s) which they use. The only documented method for conducting or evaluating the effectiveness of line fullness verification relates to the pigging method, which is mostly limited to petrochemical cargoes.

Line Displacement Method and Agreed Tolerance

Probably the most common of the five methods recommended in the standard is line displacement, which compares a volume transferred (usually from a ship's tank) to a volume received (usually in shore tank). The critical factor is the "agreed tolerance" ie the permitted difference between the two measurements. However, the standard gives no detailed guidance on how this tolerance should be determined.

Section 9, which is titled, "Establishing Agreed Tolerance" advises considering the precision of the liquid level measurement for each tank as is stated in API *MPMS* Chapters 3.1A and 3.1B. Unfortunately, neither of these standards specifies the precision of the liquid level measurement. Specifications for the accuracy of measurement equipment are given but these are not extrapolated to the final level measurements.

Revisions/Reaffirmations

Rev. 0 Dec 2014
Reaffirmed June 2019

It was suggested that the agreed tolerance could be represented by twice the Gauging Tolerance of the sending and receiving tanks. Gauging Tolerance is specified in API *MPMS* Chapter 3.1A. However this approach was not adopted and no definitive guidance is given.

The standard states that Total Observed Volume [TOV] should be used to quantify volumes transferred, although total calculated volume can be used in certain circumstances. However, if a void in a pipeline is determined using TOV no guidance is given on how to convert this observed volume to standard volume; i.e. how to determine what density and temperature to use in the calculation process.

Additional Issues

While the document recommends that line fullness verification is performed after cargo transfer (in addition to before the transfer) this is not a requirement of the standard. In order for shore measurements to accurately reflect the quantity of liquid transferred, the shore pipeline must be in the same or in a known condition before and after the transfer. If the condition is only known before the transfer, uncertainty in the amount of the volume of the pipeline remains.

Section 8.1.3 states that parties should “agree on the method of pipeline fullness verification to be used and on the extent—if any—of corrective actions that may be required”. However, no guidance is given on which parties should agree these issues. Presumably, this would be the commercial parties, However, where third-party terminals are involved their representatives will also want to be take part in these discussions.

Conclusion

While API *MPSM* Chapter 17.6 may well represent the best that a consensus standard can achieve on such a complex subject it is mostly a listing of possible methods with little or no detailed guidance. IFIA member companies strongly recommend that its clients make themselves familiar with the limitations of this standard and agree with their trading partners how line fill is to be addressed for specific transactions. General statements to inspection companies, such as, “conduct the inspection according to API standards” will not provide sufficient detail.

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