

# Petroleum and Petrochemical Bulletin

## Thermal Expansion Factor (TEF or CTSh) on Bitumen and Asphalt vessels

**Bulletin 20-01  
Rev. 0**

TIC Council Member Companies conduct marine vessel inspections on a variety of commodities that are performed in accordance to our principal(s) instructions. These instructions typically cite global industry standards, such as API MPMS and EI HM series of documents; as representing best practice in the industry. However, one commodity group that appears to pose specific difficulties and where conflicts with the industry standards are known to occur are cargoes of Bitumen / Asphalt. One common issue is the application of the tank shell thermal expansion factor [TEF], also referred to as CTSh, to tanks on ships and barges.

The current industry best practice is stated in 4th edition of API MPMS Chapter 12.1.1 / Energy Institute HM1 Part 1 dated Feb 2019 wherein it states:

### **9.2.3.7**

***The use of a tank shell temperature correction [CTSh] is not appropriate for marine vessels (as there is no way to determine the tank shell temperature [TSh]) and shall not be used.***

Some of the reasons for this are as follows:

- The temperature of inner cargo tank walls varies from the temperature of outer vessel shell which is more exposed to the sea.
- The cargo ullage and temperature itself effects the shell correction for the adjacent tanks.
- Shell temperatures are expected to vary in the same tank depending on the draft.
- Internal tank structures, especially corrugated bulkheads do not allow for uniform expansion and contraction as is the case for upright cylindrical tanks.

In accordance with the guidance set out in the API/EI standard Member Companies strongly recommend adherence to this guidance, not to apply a thermal expansion factor [CTSh] to tanks on marine vessels.

Despite the guidance to industry within the Standard, there are marine vessels carrying Bitumen / Asphalt that are routinely presenting thermal expansion tables as part of the calibration tables. This causes both confusion and potentially paper differences in figures due to different practices being used at the load and discharge ports.

### **Conclusion**

The TIC Council members confirm that best practice is set out in the API / EI documents and that no thermal correction factor should be applied to marine vessels, even if the vessel produces thermal correction tables as part of the calibration tables, as this will not be in line with the API/EI standard. In Inspection of cargoes that come under the jurisdiction of the US Customs and Border Protection must follow API and ASTM standards.

#### Revisions/Reaffirmations

Rev 0 March 2020

In addition, and following the standard's logic to ensure consistency, any differences due to the application of CTSh thermal expansion tables on the vessel should be accounted for within the Vessel Experience Factor between the shore and ship at load port and ship and shore at disport.

**TIC Council Petroleum and Petrochemical Committee**  
Rue du Commerce 20-22 B-1000 Brussels Belgium  
Tel: +32 2880 21 38  
[secretariat@tic-council.org](mailto:secretariat@tic-council.org)  
[www.tic-council.org](http://www.tic-council.org)