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Service update: Mandatory use of Mass Flow Meter (MFM) in Singapore from 1st January 2017

Applicability: Ship Owners, Operators and Fuel Purchasers

From 1st January 2017, it will become mandatory for all Marine Fuel Oil (MFO) bunker deliveries in the Port of Singapore to be made using Mass Flow Meter (MFM). The aim of MFM is to achieve zero bunkering quantity disputes and increase the overall efficiency in bunker delivery. No barge tank measurements for reference will be allowed unless it is contractually agreed between buyers and sellers. All other procedures for Safety, Sampling, Vessel Measurements, and Bunker Claims remain unchanged.

Currently there are only 2 meter vendors approved in Singapore. Both types of MFM report their readings in metric tonnes in air:

Endress and Hauser

Emerson

A detailed technical reference for bunkering by MFM referred to as TR 48:2015 has been set as guidelines for all industry players which was launched on 16th February 2016. It was jointly developed by the Singapore Shipping Association (SSA), International Bunker Industry Association (IBIA), bunker suppliers, bunker craft operators, bunker surveying firms, meter vendors, National Metrology Centre, SPRING Singapore's Weights and Measures Office and the Maritime and Port Authority of Singapore (MPA).

MFM Working Principle:

The MFM operates on the Coriolis principle which measures the oscillation frequency (ie: twisting) of the measuring tubes inside the meter. The sensors at the MFM inlet and outlet register the resultant phase shift in the tube's oscillation geometry, convert them in to a sine wave reading and compute the rate of mass flow. It does not have mechanical or moving parts and is equipped with uninterrupted power source that is able to run the system in the event of a power failure. MFM's are calibrated through recognised ISO 17025 accredited test labs.

During a no flow condition, there is no Coriolis Effect and the sine waves are in phase with each other. When fluid is moving through the sensor's tubes, Coriolis forces are induced causing the flow tubes to twist in opposition to each other. The time difference between the sine waves is measured and is called Delta-T, which is directly proportional to the mass flow rate. The meter calibration factor, multiplied by a given Delta-T, yields the mass flow rate.

Operational Summary:

Operational Documents to be prepared as follows:

- MFM Bunker Requisition Form to be signed prior to bunkering
- MFM System Seals Checklist to be signed before and after bunkering
- Meter Reading Record Form to be signed before and after bunkering
- Bunker Metering Ticket to be signed after bunkering

Meter Failure:

Should there be a meter failure in the process of bunkering, the operation must be stopped and the Meter Totaliser Readings recorded. The meter failure must be reported to the implementing authority immediately and the meter delivered figures calculated. Physical measurements should then be used for the balance of the stem quantity. The barge should then issue two separate BDNs based on MFM figures and physical measured figures.

Dispute Resolution:

As receiving vessel tanks still apply physical measurements, quantity disputes cases are still anticipated upon completion of bunker supply. In time of quantity dispute, the metered figures are final and binding and cannot be adjusted on the BDN on site for commercial settlements, as this will upset the Meter Totaliser Logs for inventory control. Commercial settlements have to be dealt with separately between buyers and sellers. Upon coming to terms, a new BDN will be raised separately by the supplier, which will be filed together with the originally issued BDN for reference purpose. Surveyors will be trained in solving problems in case of quantity disputes.

Quantity Claims:

Below is the recommended list of documents to be produced in the event of a quantity claim arising from the use of MFM:

- System Seals Checklist
- Meter Calibration and Zero Verification Validity Report
- Meter Totaliser Log
- Metering Profile
- Raw Data
- Letter of Protest
- Bunker Delivery Note

Conclusion:

The roles of surveyors are changing to face new challenges by combining physical measurements on board the vessels and applying MFM operational procedures on board the bunker barges. The MPA has engaged vendors to conduct courses on Technical Reference (TR48:2015) which is on-going for surveyors and to be current with MFM transfer.

Once MFM becomes mandatory in Singapore next January, engaging a Bunker Quantity Surveyor to verify the delivered quantity will be more important than ever. Vessel's received quantities will still be finalised by manual measuring methods and compared with the MFM delivered quantity from the bunker barge. Relying on MFM alone does not guarantee that there will be no discrepancies. The Surveyor needs to ensure that the MFM system is verified and maintained on a continuous basis to ensure ongoing integrity of the system. There are many other instances where the services of a surveyor will be required, not least in time of dispute where surveyors will still be required to investigate and report their independent findings.

The Technical Reference, TR48:2005 can be purchased by contacting Toppan Leefung Pte Ltd via email singaporestandardseshop@toppanleefung.com

A more detailed document detailing the workings and implications of MFM is available. Should you wish to be forwarded a copy or if you need further clarification, please contact us at fobasbqs@lr.org.