Factsheet

What are Bunkers?

Bunkers refer to marine fuel oil, marine diesel oil or marine gas oil supplied to vessels for their own use. It is also a general name for fuel consumed by vessels.

What is Bunkering?

Bunkering refers to the supply of bunker fuels to ships. The service is similar to what a petrol station does for cars.

The Bunkering Process (currently)*

Pre-delivery conference → Pre-delivery sounding → During delivery → Post-delivery sounding → documentations

Manual sounding via sounding pipes onboard bunker tanker to calculate starting volume of bunkers onboard.
(Typically 1 hr process)

Manual sounding via sounding pipes onboard bunker tanker to calculate remaining volume of bunkers onboard.
(Typically 1hr process)

Manual calculation for volume of bunkers transferred with sounding tables and conversion from volume to mass.
(Typically 1hr process)

Estimated time required for a 2,000mt delivery (via sounding): 12hrs

The Bunkering Process (with the use of Mass Flow Meters)*

Pre-delivery conference → Pre-delivery totaliser witnessing → During delivery → Post-delivery totaliser witnessing → documentations

Witnessing of un-resettable totaliser & all tamper-evident seals to ensure integrity of MFM system
(Typically 15mins process)

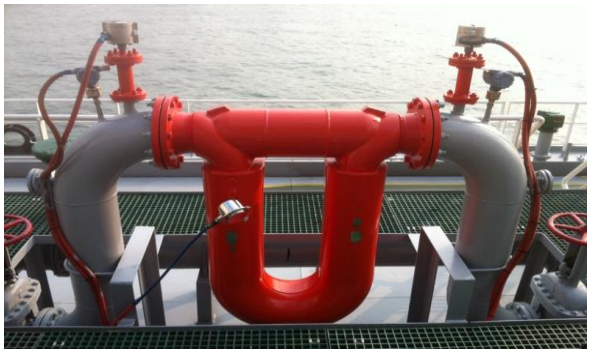
MFM system displays and records critical parameters in real time to allow user to address abnormality on-site

Witnessing of un-resettable totaliser & all tamper-evident seals to ensure integrity of MFM system
(Typically 15mins process)

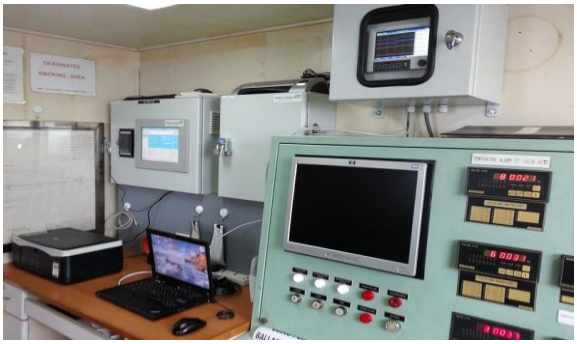
Auto-tabulation of delivered bunker in mass by MFM system
(Typically 15mins process)

Estimated time required for a 2,000mt delivery (via Mass Flow Meter): 9hrs

*The information is intended to highlight changes to the bunkering process with the introduction of Mass Flow Meters. Please refer to Singapore Standards (SS600:2008) & tanker specific MFM delivery procedure for the complete bunkering process.



Emerson's HC3 Coriolis Mass Flow Meter



Endress+Hauser's Bunker Metering Computer

What is a Mass Flow Meter?

(Source: Singapore Nautilus Issue 27)

A mass flow meter, also known as a Coriolis flow meter, or an inertial flow meter, is able to make fluid measurements based on mass, and not volume.

As fluid enters the device in a dual curved-tube meter, the flow is evenly divided into two parallel tubes. The measuring tubes are made to oscillate, thus balancing each other. When no fluid is flowing through, the two tubes oscillate evenly in phase with each other. But when fluid is flowing, the Coriolis effect cause the tubes to twist and the resulting oscillation in the two tubes to be out of phase.

Special sensors pick up this phase difference, and use this to determine the mass flow rate. From this, mass quantity that has flowed through the instrument during a particular time interval, like a bunkering operation, can be calculated.

Benefits of Mass Flow Meter System

Enhanced transparency, greater efficiency and higher productivity

a) *Enhances transparency of the bunkering process and reduces the chances of bunker malpractices and disputes*

The MFM system will display and record critical parameters such as pressure, temperature and flow rate in real time. Such features allow users to address abnormality immediately on-site and reduce the chances of bunker malpractices and disputes. The automated tabulation of actual amount of bunkers delivered also increases transparency and integrity, thus reducing the possibility of any human error in calculation.

b) Achieves greater efficiency in bunker operations with time savings

Compared to the conventional sounding method, using the MFM system for bunker delivery allows ships to enjoy up to 3 hours or 25% time savings per bunker delivery. With greater efficiency in bunkering operations, the bunker craft operators can optimise the turnaround time of their bunker tankers to bunker more vessels.

c) Increases productivity for bunker industry leading to a higher port capacity to bunker more vessels

The time-savings will enhance productivity for the bunker industry. With the adoption of MFM system, it leads to quick turnaround and bunker more vessels without the need to expand the port capacity physically.

d) Minimises risk of illegal bunkering

Illegal bunkering practices such as tampering of sounding tapes, falsification of temperature or density reading to reflect an inaccurate figure will be mitigated. Such fraudulent practices which might lead to an under-declaration of bunker being delivered to the ship will be minimised.

Benefits for Bunker Buyers	Benefits for Bunker Suppliers
Accurate measurement of bunker received	Accurate measurement of bunker loaded and delivered
Enhanced transparency of bunkering process with minimum human intervention	Faster and smoother delivery with minimum human intervention
Real time display of critical delivery parameters such as flow rate, pressure allow any potential abnormality to be addressed on-site	Automated measurements of bunker delivered in metric tons
Increase in efficiency of the receiving vessel	Increase in efficiency of the bunker tanker
Peace of mind and assurance	Increase in productivity of bunker tanker optimising its turnaround time
Getting what they pay for	Increase in customer satisfaction