

Frequently Asked Questions about the Use of MFM Systems for Bunkering Operations

Effective January 1, 2026, the use of a Mass Flow Meter (MFM) system on board bunker vessels will be mandatory for the delivery of residual distillates (fuel oil and diesel) and biofuels in the ports of Rotterdam and Antwerp-Bruges. This applies to bunker vessels with a loading capacity of more than 300 tonnes (see also the answer to question 5).

Background

Why this measure?

The Port Authorities of Rotterdam and Antwerp-Bruges have noticed frequent problems with the delivery of bunker fuels. Research by, among others, [CE Delft](#) has confirmed that there are structural quantity issues in the bunkering market. Therefore, the use of an MFM system on board bunker vessels is being made mandatory. The aim is to make the bunkering market in both ports more reliable, efficient, and transparent.

General Questions about the MFM System

Why can only a Coriolis MFM system be used?

A Coriolis MFM system is the most accurate measuring system available for the transfer of bunkers from one owner to another (also known as 'custody transfer'). The Coriolis MFM system is already widely used in industries such as oil and gas, chemicals, and food and beverage.

How does a Coriolis MFM system work?

A Coriolis MFM is a measuring instrument consisting of two tubes through which the liquid to be measured (in this case fuel) flows. These tubes are set into vibration by a drive coil, which is controlled so that the tubes vibrate at their natural frequency. This natural frequency is then measured by a left and a right sensor. When no liquid flows through the MFM, the phase of these two tubes is equal. As soon as liquid flows through the MFM, a Coriolis force occurs that causes the tubes to twist. This creates a phase difference between the signals from the sensors. Each flow meter is individually calibrated at the factory, determining the 'flow call factor', which is unique for each MFM. When this unique flow call factor is multiplied by the phase difference occurring at that moment between the two vibrating tubes in the flow meter, the mass flow can be calculated.

Scope of Application

Where is the use of an MFM system on board a bunker vessel mandatory?

In the ports of Rotterdam, Schiedam, Vlaardingen, Dordrecht, Papendrecht, Zwijndrecht, and in the port of Antwerp-Bruges.

For which vessels is the use of an MFM system mandatory? Are there exceptions?

The use of an MFM system is mandatory for bunker vessels performing bunkering operations to seagoing vessels in the ports of Rotterdam and Antwerp-Bruges, except for bunker vessels with a loading capacity up to 300 tonnes. This concerns tankers of the N-open type that are built and equipped for the transport and delivery of marine fuels to other vessels as referred to in Article 1.2.1 of the ADN (European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways).

For which bunkering operations is the use of an MFM system mandatory? And when is it not mandatory?

The use of an MFM system is mandatory on a bunker vessel delivering bunkers to a seagoing vessel. The MFM system must be suitable for the type of fuel and the quantity delivered.

An MFM system is therefore not mandatory for stationary bunkering stations, nor is it mandatory to use on board the bunker vessel when loading at a terminal.

However, an MFM system can be used bi-directionally, so that when bunkers are delivered to the bunker vessel, the quantity received can also be measured using the MFM system.

For which bunker fuels is the use of an MFM system mandatory?

An MFM system is mandatory for the delivery of residual distillates (fuel oil and diesel) and biofuels (biodiesel).

Other (alternative) fuels are not covered by the scope of this permit. The relevant permit for these other fuels will indicate the extent to which the use of an MFM system is mandatory.

Operational Conditions for Using the MFM System

What requirements apply to MFM systems?

For installation, an MFM must comply with the European Measuring Instruments Directive (MID) and associated OIML R117. This is similar to the requirements set out in ISO 22192, as both are based on OIML R117. This allows the ports of Rotterdam and Antwerp-Bruges to guarantee the same reliability as other ports that only implement ISO 22192.

The aim remains the same: in these ports, an MFM system is mandatory, just as in the port of Singapore. The systems used in Singapore are also mandatory in Rotterdam and Antwerp-Bruges.

The fuel delivery permit also states that the general rules and procedures during

bunkering (where the MFM system is used) are the same as in the ISO standard. There is no difference compared to other ports where an ISO 22192-based MFM system is mandatory.

What additional requirements must a bunker vessel meet?

In addition to using the MFM, both ports impose additional conditions in the permit. These, unlike the MFM section, are not identical and differ per port. These include conditions relating to safety and environmental protection.

How can a customer know which vessel is certified? Is there a list available?

In accordance with privacy regulations, we cannot publish vessel names without the owner's consent. Some owners have indicated that their vessel name must not be disclosed. To avoid confusion, it has been decided not to publish any list at all. If there is doubt whether a bunker vessel has a permit, contact the Port Coordination Center in Rotterdam at +31 10 252 1000. They can confirm whether a bunker vessel in the port of Rotterdam has a permit.

Who may reapply seals if a seal is broken?

Port of Rotterdam:

To comply with legal requirements in the Netherlands, after a repair or change to the MFM system that may affect its measuring function, an inspection under part a. of Article 7 of the Metrology Act must be carried out. Such an inspection may only be performed by a recognized inspector or a designated body (nobo). This applies if a seal is broken to perform an action such as zero-point verification or calibration. Examples of designated bodies include MFM system manufacturers and ODS (see also NMI | Recognized Inspector). Seals applied after the MFM may be applied by an accredited party. If such a seal is broken, a surveyor may apply a new operational seal, record this in the seal report, and notify the harbour master or captain.

Questions about Using the MFM System

Why is there a difference between the measurement with the MFM system and measurements on board the receiving vessel?

A Coriolis MFM system directly measures the mass of the fuel flowing through the system.

On board the receiving vessel, bunker tank levels are often measured using various types of measuring systems (such as ultrasonic, radar, or hydrostatic systems), but can also be measured manually. Bunker tanks are often not rectangular and often have pipes running through them. Using the tank levels and tank conversion tables, the volume of bunkered fuel on board the receiving vessel can be determined. To convert the volume of bunkered fuel to mass, the density of the fuel is needed. Density depends not only on the type of fuel but also on its temperature. Since the

temperature may not be uniform throughout the tanks, it must be measured at different levels. Using the average temperature, the density of the fuel in the bunker tanks can be determined. Density can also be determined from samples. Using the volume and density, the mass of the fuel can then be calculated. There are therefore multiple steps in converting tank level to fuel mass in the receiving vessel's bunker tanks. This method is never as accurate as using a Coriolis MFM system. Therefore, there will always be differences between measurements with the MFM system on board the bunker vessel and measurements on board the receiving vessel.

Why is there no obligation for terminals to deliver fuel to bunker vessels using an MFM system?

The ports are not in a position to require terminals to use an MFM system when delivering fuel to bunker vessels.

Why do incorrect bunkering operations sometimes occur? And how do the ports deal with this?

An incorrect bunkering operation can occur in the case of excessive air ingress, also known as 'aeration'. The MFM system will then indicate a 'fail'. Excessive air ingress is often caused by incorrect bunkering and stripping of tanks. Bunker vessel crews will need to learn to carry out bunkering operations without excessive air ingress. The ports understand that this is a learning process.

Under the permit, the crew of the bunker vessel must have sufficient knowledge to properly carry out bunkering operations using an MFM system. If the port authorities learn that incorrect bunkering operations occur repeatedly on the same bunker vessels, enforcement action will be taken.

May the bunker surveyor and crew on board the receiving vessel (e.g., the chief engineer) inspect the certificates on board the bunker vessel before the bunkering operation?

The port authorities check whether the certificates regarding the MFM systems meet the requirements set out in the permit. The port authorities impose no restrictions on the bunker vessel crew sharing certificates with or allowing inspection by the bunker surveyor and the receiving vessel's crew.

To what extent are the port authorities involved in a commercial dispute?

The port authorities are not a party to a commercial dispute, as they are not part of the private law agreement between the supplier and the receiver of the bunkers.

The term 'final and binding'

The term "final and binding" is often mentioned. The port authorities play no role between seller and buyer in determining the correct and accepted quantity that will ultimately be stated on the Bunker Delivery Note (BDN). In the event of a dispute about the correct quantity, it can only be established whether the MFM

shows no significant deviations based on the bunkering profile and whether the MFM was used correctly. Beyond that, it is up to the parties and depends on agreements and delivery terms what is considered the correct quantity.

Deliveries below the Minimum Measured Quantity (MMQ)

If a receiving vessel wishes to take a smaller quantity than the MFM's minimum quantity, another bunker vessel with a lower minimum quantity must be used. This is not a valid reason to avoid using an MFM.

Instructions (placards) for using the MFM system and what to do in case of disputes

The port authorities have created a [placard \(instructions\)](#) clearly indicating the procedures for using the MFM. A guide has also been created on what to do in case of disputes.

Role of Bunker Surveyors

How does the role of bunker surveyors change?

Bunker surveyors play an important role in the bunkering process. When using an MFM system, the role of the bunker surveyor remains important but will change in content. Whereas bunker surveyors previously played a key role in verifying the quantity of fuel, they will now play an increasingly important role in ensuring compliance with the MFM requirement and accuracy and efficiency during bunkering operations. It is therefore important that the bunker surveyor is aware of developments regarding the MFM system. The International Bunker Industry Association (IBIA) provides training on the MFM system in Rotterdam and Antwerp. If a bunker surveyor is engaged, the ports recommend hiring a well-trained bunker surveyor. The bunker master must also facilitate the bunker surveyor and provide access to certificates to enable proper measurement, review piping plans, and take any additional measures such as applying operational seals.

Is there a list of approved/qualified bunker surveyors?

The ports expect to publish a list shortly of bunker surveyors who have completed training with IBIA or other authoritative bodies. The port authorities do not themselves qualify bunker surveyors.

Inspection Procedure

How often must an MFM system be inspected? And can this inspection be carried out within a certain time period?

Once an MFM system has been installed and commissioned, it must be inspected annually.

Enforcement

How will the ports enforce compliance?

The bunkering permit, including the MFM requirement from January 1, 2026, is not optional. The regulations must be complied with. Inspectors will monitor compliance on board bunker vessels randomly and based on market signals, and enforcement action will be taken if necessary.

What are the consequences if bunker vessels do not comply with the permit conditions?

Both ports aim for maximum implementation of the permit conditions to prevent parties from gaining economic advantage by not complying. In this respect, in the case of serious breaches or repeated minor breaches, a permit may be revoked. In that case, bunkering in the port where the permit is revoked is prohibited. When minor breaches are identified, this may result in fines under applicable legislation in both countries. The severity of the breach and the intent of the offender will always be considered when determining penalties. Intentional breaches will weigh more heavily than, for example, actions due to carelessness. Likewise, breaches that affect meter results will be penalized more severely than administrative tasks that were not handled correctly.

How can complaints be submitted to the Port Authority? And what happens to these complaints?

Port of Rotterdam:

Complaints can be reported via the [Bunker Incident Form](#). Complaints will be reviewed. If complaints concern non-compliance or incorrect compliance with the bunkering permit requirements, the ports will take these signals into account in inspections carried out on bunker vessels. If bunker vessels do not comply with the permit requirements, enforcement action will be taken.

Port of Antwerp-Bruges:

Complaints regarding bunkering can always be reported via <mailto:bunkering@portofantwerpbruges.com>. If complaints concern non-compliance or incorrect compliance with the bunkering permit requirements, the ports will take these signals into account in inspections carried out on bunker vessels. If bunker vessels do not comply with the permit requirements, enforcement action will be taken.

Alignment between MFM Requirement PoR/PoA and ISO 22192:2021

Why does the MFM requirement in PoR and PoA not fully align with ISO 22192:2021 and the MFM requirement in Singapore?

MFM systems on board bunker vessels intended for commercial purposes in the Port of Rotterdam and the Port of Antwerp-Bruges must at least comply with:

- The Dutch or Belgian implementation of the European Measuring Instruments Directive MID (2014/32/EU);
- The requirements imposed by Dutch or Belgian legislation on MFM systems once they are used for commercial purposes.

Within MID (2014/32/EU), MFM systems fall under MI-005, which provides specific requirements applicable to measuring installations for the continuous and dynamic measurement of quantities of liquids other than water. OIML R117 is the associated normative document.

In addition to European directives and national legislation, there is also an international standard for bunkering marine fuels using the Coriolis mass flow meter system, ISO 22192:2021. It is not legally mandatory to comply with this international standard. For the MFM requirement in the Port of Rotterdam and the Port of Antwerp-Bruges, ISO 22192:2021 has been used, where possible, to align with and connect to MFM requirements elsewhere in the world, particularly the port of Singapore.