

Annex A

European MRV Regulation

Guidance for ships over 5000GT which carry passengers or cargo to, from or between EU/EEA ports, regardless of Flag

Executive Summary

The European MRV Regulation entered into force in 2015, the first reporting period starts 1 January 2018. Companies operating ships of over 5000GT which carry passengers or cargo for commercial purposes to or from European ports, regardless of the flag they fly, must submit their monitoring plans to an accredited verifier by 31 August 2017. This guidance is intended to raise awareness of the requirements of the Regulation and to remind members of some of the key requirements. The guidance includes a link to the European Commission website where a range of further guidance and links to the regulatory documents and FAQs can be found.

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1. Introduction

The European Union (EU) MRV Regulation (Regulation (EU) 2015/757 on the monitoring, reporting and verification of carbon dioxide emissions from maritime transport, and amending Directive 2009/16/EC) entered into force on 1 July 2015.

The regulation applies to any ships within its defined scope regardless of the Flag they fly. All companies with ships carrying passengers or cargo to/from European ports must comply with the MRV Regulation and are required to submit their monitoring plans to an accredited verifier by 31 August 2017.

The MRV Regulation provides requirements for the monitoring, reporting and verification of carbon dioxide (CO₂) from ships arriving at, within or departing from EU ports and/or European Economic Area ports. The MRV Regulation forms part of Europe's efforts to combat greenhouse gas emissions and applies to ships above 5000GT, regardless of flag. This guidance is intended to provide information to members on the scope and application of the MRV Regulation.

The following delegated and implementing regulations have been enacted to support the MRV Regulation:

- Implementing Regulation (EU) 2016/1927 on templates for monitoring plan, emissions reports and document of compliance
- Implementing Regulation (EU) 2016/1928 on determination of cargo carried
- Delegated Regulation (EU) 2016/2071 on methods for monitoring carbon dioxide emissions
- Delegated Regulation (EU) 2016/2072 on accreditation of verifiers

Although the MRV Regulation and the IMO data collection scheme (DCS) established under Regulation 22A of MARPOL VI are both intended to capture fuel use data in order to quantify carbon emissions from shipping they are significantly different, with the unfortunate result that ship operators will have to manage two separate reporting schemes for the fuel they use.

This guidance is intended to raise awareness, section 13 provides a link to a European Commission website where a wealth of further guidance and resources can be found. Members are encouraged to make use of these resources and to familiarise themselves with the guidance produced by the European Commission. Much of the guidance provided by the European Commission was developed by the European Sustainable Shipping Forum (ESSF) sub-group on shipping MRV.

2. Timeline and key dates

- 31 August 2017 - monitoring plans must be assessed by an accredited verifier
- 1 January 2018 to 31 December 2018 - first monitoring period
- 30 April 2019 - emissions reports for each ship must be verified by an accredited verifier
- 30 June of each year after the reporting period - the Document of Compliance issued by the verifier is to be on-board

The most urgent deadline is 31 August 2017, all members are advised to bring to the attention of member companies the importance of submitting their monitoring plans to accredited verifiers by this date for their ships which are or will be covered by the scope of the MRV regulation as detailed in section 3 below.

3. Scope

The MRV Regulation applies to ships above 5 000 gross tonnage. Ships will have to record the fuel used on voyages:

- from their last port of call to a port of call under the jurisdiction of a Member State;
- from a port of call under the jurisdiction of a Member State to their next port of call, and;
- within ports of call under the jurisdiction of a Member State.

Ports of call under the jurisdiction of an EU member state means ports within member states, plus Iceland and Norway (except Svalbard). Overseas and dependent territories of EU member states are generally excluded, ports within the following territories are not considered to be *Ports of call under the jurisdiction of an EU member*.

Greenland and the Faroe Islands, French Polynesia, Mayotte, New Caledonia, Saint-Barthélemy, Saint Pierre and Miquelon, Wallis and Futuna, Aruba, Bonaire, Saba, Sint Eustatius, Curaçao, Sint Maarten, Anguilla, Bermuda, British Antarctic Territory, British Indian Ocean Territory, British Virgin Islands, Cayman Islands, Falkland Islands, Bailiwick of Guernsey, Isle of Man, Jersey, Montserrat, Pitcairn, Henderson, Ducie and Oeno Islands, Saint Helena, Ascension and Tristan da Cunha, South Georgia and the South Sandwich Islands, Turks and Caico Islands, Akrotiri and Dhekelia.

The following ports are, however, considered to be *Ports of call under the jurisdiction of an EU member*.

Açores, Madeira, Canarias, Guadeloupe, French Guyana, Martinique, Mayotte, Saint Martin and Reunion.

A voyage starts at berth and ends at berth. Manoeuvring under pilotage and/or anchoring are considered to form part of the voyage, however, the time spent at sea is based on port departure and arrival data and excludes anchoring.

A port of call is a port where a ship loads or unloads cargo, or embarks or disembarks passengers. If the ship calls into a port for the sole purposes of refuelling, obtaining supplies, relieving the crew, dry-docking or repairs, because it is in need of assistance or in distress then it is not considered to be a port of call for the purpose of the MRV Regulation. Ship-to-ship transfers carried out outside ports, and stops for the sole purpose of taking shelter from adverse weather or rendered necessary by search and rescue activities are also excluded from the scope of the MRV Regulation.

The MRV Regulation is not applicable to voyages and activities for purposes other than transporting cargo or passengers for commercial purposes, such as dredging, ice-breaking, pipe laying and offshore installation and construction.

The MRV regulation does not apply to warships, naval auxiliaries, fish-catching or fish-processing ships, wooden ships of a primitive build, ships not propelled by mechanical means, or government ships used for non-commercial purposes.

4. Monitoring & Reporting

Companies have to monitor and report fuel use for all voyages within the scope of the MRV Regulation from 1 January 2018. The company is responsible for developing its monitoring plan. The MRV Regulation defines the company as:

‘company’ means the shipowner or any other organisation or person, such as the manager or the bareboat charterer, which has assumed the responsibility for the operation of the ship from the shipowner

This is generally similar to the definition of company provided in 1.1.2 of the ISM Code:

Company means the Owner of the ship or any other organization or person such as the Manager, or the bareboat Charterer, who has assumed the responsibility for operation of the ship from the Shipowner and who on assuming such responsibility has agreed to take over all the duties and responsibility imposed by the Code.

Companies can report on a per voyage basis, or, if all of a ships voyages during the reporting period are between ports under the jurisdiction of a member state and the ship performs more than 300 voyages during the reporting period then they can report annually. Monitoring is to include emissions. Companies are to avoid data gaps within the reporting period and ensure that data is accurate, this includes identifying and reporting any inaccuracies in the data. Data should be transparent and allow an external verifier to reproduce the CO2 emissions figure.

If there is a change of company for a ship during the reporting period (e.g. a change of ownership) then the new company will be responsible for making sure that the ship complies with the requirements of the MRV Regulation for the entire reporting period.

The MRV Regulation includes concepts which may not be familiar to companies and seafarers, at least in the way they are used in the MRV Regulation. One of these concepts is “uncertainty”, the regulation defines uncertainty as:

‘uncertainty’ means a parameter, associated with the result of the determination of a quantity, that characterises the dispersion of the values that could reasonably be attributed to the particular quantity, including the effects of systematic as well as of random factors, expressed as a percentage, and describes a confidence interval around the mean value comprising 95 % of inferred values taking into account any asymmetry of the distribution of values

Basically, uncertainty is merely a recognition that a measured value if measuring a parameter such as fuel used is unlikely to be 100% accurate. Especially when multiple means of measurement and calculation are used (e.g. Fuel flow meters, density determination, tank levels) each stage will have some degree of uncertainty. The overall uncertainty is derived from the product of each of these uncertainties and can be calculated as the square root of the summation of the square of each uncertainty contributing to the total. Alternatively, the guidance produced by the ESSF proposes an overall maximum uncertainty level of +/-10% for methods A, B & C for fuel monitoring (see Sections 6 & 13).

Verifiers are to apply a standard of “reasonable assurance” when verifying emissions reports. Reasonable assurance sounds rather vague and ill-defined, but in this context it is used in the way the phrase is used in auditing. In auditing, assurance may be either reasonable or limited. To provide reasonable assurance an auditor considers sampled evidence and source data. To provide limited assurance an auditor will consider aggregated data. In the case of MRV, source data includes BDNs, so if part of the monitoring plan the BDNs would need to be sampled in order to provide reasonable assurance. Far from being a soft process, verifying data to provide reasonable assurance applies a rigorous standard.

Another term used in the MRV Regulation which may not be familiar is “material misstatement”. Misstatement effectively means that a report or statement does not provide true and fair view of whatever is under consideration. Material misstatement in this context means that reported data deviates by more than 5% from the correct calculation.

4.1. Per Voyage Reporting

Companies are to monitor:

- port of departure and port of arrival
- the date and hour of departure and arrival;
- quantity of fuel used, each type of fuel used and emission factor for each type of fuel;
- CO2 emitted;
- distance travelled;
- time spent at sea;
- cargo carried;

- transport work;
- information relating to the ship's ice class and to navigation through ice, where applicable.

4.2. Annual Reporting

Companies reporting on an annual basis are to monitor:

- Quantity of fuel used, each type of fuel used and emission factor for each type of fuel;
- total aggregated CO₂ emitted within the scope of this Regulation;
- aggregated CO₂ emissions from all voyages between ports under a Member State's jurisdiction;
- aggregated CO₂ emissions from all voyages to or from ports under a Member State's jurisdiction;
- CO₂ emissions which occurred within ports under a Member State's jurisdiction at berth;
- total distance travelled;
- total time spent at sea;
- total transport work;
- average energy efficiency.
- information relating to the ship's ice class and to navigation through ice, where applicable.

5. Distance Travelled, Cargo & Transport Work

The MRV Regulation uses transport work as the efficiency metric. This is worked out by multiplying the distance travelled with the amount of cargo carried for the voyage.

The MRV Regulation offers two alternatives, distance travelled may either be the distance of the most direct route between the ports of departure and arrival, or the actual distance travelled, expressed in nautical miles. If the most direct route option is used then the regulation states that a conservative correction factor should be taken into account to prevent significantly underestimating the distance travelled. The method used for the distance calculation and the correction factor (where applicable) is to be included in the monitoring plan. Mariners will understand that the distance travelled by a ship is not quite as simple as it might appear, for example is it distance through water or distance over ground? The IMO DCS uses distance over ground and the ESSF sub-group recommended that this is used for the MRV Regulation (see Section 13).

The MRV Regulation provides a range of cargo definitions, depending on ship type. For passenger ships, the number of passengers is used to express cargo carried. For all other categories of ships, the amount of cargo carried is to be expressed either as metric tonnes or as standard cubic metres of cargo, as appropriate.

For ro-ro ships, cargo carried is the number of cargo units (trucks, cars, etc.) or lane-metres multiplied by default values for their weight. Alternatively, Annex B to the CEN standard EN 16258 (2012), 'Methodology for calculation and declaration of energy consumption and GHG emissions of transport services (freight and passengers)', may be used for ro-ro ships.

For container ships, the total weight in metric tonnes of the cargo carried or, alternatively, the number of 20-foot equivalent units (TEU) multiplied by default values for their weight, is used. If the cargo carried is defined in accordance with applicable IMO Guidelines or instruments pursuant to the SOLAS Convention then that definition will be considered as complying with the MRV Regulation.

For categories of ships other than passenger ships, ro-ro ships and container ships including tankers, bulk carriers, general cargo ships, refrigerated cargo ships, vehicle carriers and combination carriers, cargo carried is to be determined using the weight and volume of cargo carried and the number of passengers carried (as applicable).

The ESSF sub-group on shipping MRV monitoring has produced more detailed guidance on determination of cargo carried (see Section 13).

6. Monitoring Plan

The monitoring plan explains how CO₂ will be monitored for each ship and is to be submitted to an accredited verifier by 31 August 2017. If a ship only falls within the scope of the MRV Regulation after 31 August 2017 the company is to submit a monitoring plan to the verifier without undue delay and **within two months of the ships first call in a port under the jurisdiction of a Member State**. The monitoring plan should include:

- the name of the ship, its IMO identification number, its port of registry or home port, and the name of the shipowner;
- the name and address of the company, including telephone and e-mail details of a contact person;
- the CO₂ emission sources on board, including main engines, auxiliary engines, gas turbines, boilers and inert gas generators along with the fuel types used;
- a description of the procedures, systems and responsibilities used to update the list of CO₂ emission sources over the reporting period;
- a description of the procedures used to monitor the completeness of the list of voyages;
- a description of the procedures for monitoring the fuel consumption of the ship, including the method used to calculate the fuel consumption of each CO₂ emission, the procedures for the measurement of fuel loaded tank contents, a description of the measuring equipment used and the method used to determine density, where applicable. There should be a procedure to ensure that the total uncertainty of fuel measurements is consistent with the requirements of the MRV Regulation;

- emission factors used for each fuel type, or the methodologies for determining the emission factors for alternative fuels, including details of sampling, methods, fuel analysis and the laboratories used along with the ISO 17025 accreditation of those laboratories, if any;
- a description of the procedures used for determining activity data per voyage, including the procedures to determine and record distance travelled, formulae and data sources to determine and record cargo carried and the number of passengers carried, the time spent at sea between the port of departure and the port of arrival;
- a description of the method to be used to determine surrogate data for closing data gaps;
- a revision record sheet to record all the details of the revision history.

Companies should use standard monitoring plan templates based on one of four monitoring methods:

- **Method A: Bunker Fuel Delivery Note (BDN) and periodic stock takes of fuel tanks.**

This method uses the quantity and type of fuel stated in the BDN along with periodic fuel inventory stocktakes obtained from fuel tank contents readings. The fuel used is calculated from fuel on-board at the beginning of the period, plus deliveries, minus fuel available at the end of the period and de-bunkered fuel between the beginning of the period and the end of the period. This method can only be used if all necessary BDNs are available on-board and is not suitable if the ship uses cargo as fuel, such as LNG cargo boil-off.

- **Method B: Bunker fuel tank monitoring on board.**

This method uses fuel tank readings, based on daily tank readings at sea and whenever the ship bunkers or de-bunkers. The cumulative variations of the fuel tank level between two readings constitute the fuel consumed over the period. Soundings are to be done using appropriate methods such as automated systems, soundings and dip tapes which are to be specified in the monitoring plan.

- **Method C: Flow meters for applicable combustion processes.**

This method measures fuel flows on-board using flow meters. The data from all flow meters measuring fuel to consumers forming part of the monitoring plan are combined to establish the total quantity of fuel consumed in the period.

- **Method D: Direct CO₂ emission measurements.**

Direct measurement of CO₂ emissions may be used for voyages and for CO₂ emissions occurring in ports. The fuel consumption is to be calculated using the measured CO₂ emissions and the applicable fuel emission factors.

Effective data flow is essential for monitoring and reporting. For the purposes of the MRV Regulation, a very basic data flow might be:

1. Chief Engineer measures fuel and reports figures to the ships Master for inclusion in the noon report

2. The Master sends the noon report to the company office
3. Data is processed by the company's IT system and analysed by the appropriate person responsible for data analysis
4. Annual emissions report is produced

Companies should be encouraged to develop flow charts and graphical representations of the monitoring plan to illustrate their own data flow systems. A monitoring plan and its associated data flow which can be used by all those responsible for implementing it will generally suffer fewer errors, misreporting and problems which may be identified at the verification stage.

The period for monitoring purposes is the time between two port calls or time within a port. Where fuel volume is measured, the volume is to be converted into mass units using the actual fuel density values. This can be done using either on-board measurement systems or the density recorded on the fuel invoice or BDN, if actual density values are not available, a standard density factor for the relevant fuel type may be applied once assessed by the verifier. For each of the four methods the monitoring plan is to provide details for uncertainty and instrument calibration methods.

A combination of the above methods may be used. The ESSF sub-group on shipping MRV monitoring (see Section 13) has produced more detailed guidance on fuel measurement and monitoring, including the suggested frequency of fuel tank stock taking, fuel volume and density. This guidance includes providing a calculation for the density of co-mingled bunkers and blended fuels.

As noted above, Method A cannot be used for LNG cargo boil off fuel where no BDN is available. Again, the ESSF sub-group has provided detailed guidance on LNG boil off gas monitoring and the MRV Regulation (see Section 13).

7. Emissions Report

CO₂ emissions from the combustion of fuels both at sea and at berth need to be reported, and companies are to prevent data gaps within the reporting period and ensure that reported data is accurate. For example, if a flow meter fails, then this should be noticed by the Chief Engineer on-board and an alternative means of collecting data, such as tank soundings, needs to be speedily implemented to avoid opening a data gap and the company informed. Should the fuel meter failure go unnoticed then it a data gap will be opened which will need to be closed by the company using formulae and historical data and trends.

The data collected should be transparent and allow an external verifier to reproduce the CO₂ emissions figure.

The reporting period is a calendar year, 1 January – 31 December. Where a voyage begins and ends in a different year the data is to be reported for the first calendar year.

8. Verification and verifiers

The monitoring plan and emissions reports are to be submitted to a verifier, the verifier is to be independent of the company or ship operator, is required to act in the public interest and is not to have relationships with the company that could affect its independence and impartiality. Verifiers have to be accredited by a national accreditation body in accordance with Regulation (EC) No 765/2008. A verifier must be accredited by the time it issues its conclusions on monitoring plans or on emissions reports.

The verifier assesses the conformity of the monitoring plan, if they identify non-conformities the company will need to revise the monitoring plan and submit the revised plan back to the verifier for assessment before the reporting period starts.

Once the emissions report is completed the verifier who will assess it for conformity with the monitoring plan. If this assessment determines with reasonable assurance that the emissions report is free from material misstatements, a verification report stating that the emissions report has been verified as satisfactory will be issued by the verifier. If the assessment finds any misstatements or non-conformities then they will inform the company, the company will need to correct these misstatements or non-conformities and submit the corrections to the verifier as a revised emissions report. The verifier will then determine whether the misstatements or non-conformities have been corrected. If the misstatements or non-conformities are not corrected and, individually or combined, lead to material misstatements, the verifier will issue a verification report stating that the emissions report does not comply with the MRV Regulation.

Verifiers have to assess the reliability, credibility and accuracy of the monitoring systems and of the reported data, in particular the:

- attribution of fuel consumption to voyages;
- reported fuel consumption data and related measurements and calculations;
- choice and employment of emission factors;
- CO₂ emissions calculations;
- energy efficiency calculations.

Verifiers need to satisfy themselves, with reasonable assurance, that:

- reported data correlates with estimated data based on ship tracking data and characteristics such as the installed engine power;
- reported data is free of inconsistencies, in particular when comparing the total volume of fuel purchased annually by each ship and the aggregate fuel consumption during voyages;
- data has been collected in accordance with applicable rules; and
- relevant records are complete and consistent.

The verifier may request a site visit, they should inform the company of any site visits, activities and estimated time required to complete these visits. These site visits may include ship visits. Companies should ensure that they are prepared for

these site visits, in particular making sure that the necessary documentation is available and that any housekeeping arrangements required for the visit are in place.

Verifiers may issue recommendations for improvement. These are suggested improvements based on the verifiers assessment work, the verifier should not however offer solutions along with any recommendations for improvement they raise. To do so would compromise their independence and impartiality as they would in effect be acting in a consulting capacity.

9. Document of Compliance

If the emissions report satisfies the requirements of the MRV Regulation then the verifier will issue a document of compliance. The document of compliance will include the following information:

- identity of the ship (name, IMO identification number and port of registry or home port);
- name, address and principal place of business of the shipowner;
- identity of the verifier;
- date of issue, period of validity and the reporting period of the document.

The document of compliance is valid for a period of 18 months after the end of the reporting period. The verifier will inform the European Commission and the ships Flag Administration that the document of compliance has been issued.

EU Member States are required to take all the measures necessary to ensure ships flying their flag comply with the MRV Regulation and that each ship has a valid document of compliance. They are also required to include checking whether ships calling at their ports have a valid document of compliance as part of their port state control inspection regimes.

10. Penalties

The MRV Regulation requires that Member States establish and enforce a system of penalties for failure to comply with the regulation, these penalties should be *effective, proportionate and dissuasive*. If a Member State imposes a penalty against a ship for failure to comply with the regulation, the European Commission, the European Maritime Safety Agency (EMSA), other Member States and to the ships Flag Administration are all to be notified by the State which has issued the penalty.

If a ship fails to comply for two or more consecutive reporting periods and fails to respond to other enforcement measures then a Member State may issue an expulsion order. This expulsion order is to be notified to the European Commission, EMSA, other Member States and the ships Flag Administration. The expulsion order will be applied by all EU Member States until the ship fulfils its obligations under the MRV Regulation and notifies the Member State which issued the expulsion order that it has been issued with a valid document of compliance.

11. Publication of Data

The European Commission will make the data collected under the MRV Regulation publicly available by June 30th of each year, including the:

- identity of the ship (name, IMO identification number and port of registry or home port);
- ship efficiency (EEDI or EIV, where applicable);
- annual CO2 emissions;
- annual fuel consumption for voyages;
- annual average fuel consumption and CO2 emissions per distance travelled of voyages;
- annual average fuel consumption and CO2 emissions per distance travelled and cargo carried on voyages;
- annual total time spent at sea in voyages;
- method applied for monitoring;
- date of issue and the expiry date of the document of compliance;
- identity of the verifier that assessed the emissions report;

Any other information monitored and reported on a voluntary basis will also be made public.

A different aggregation of data may be used where it can be shown that this is necessary for reasons of commercial sensitivity, if an alternative form of aggregation cannot be developed then the affected data will not be made publicly available.

The European Commission will publish an annual report on CO2 emissions, including aggregated and explained results, to inform the public and facilitate an assessment of the CO2 emissions and energy efficiency of shipping. The European Commission will assess the impact of shipping on the global climate every two years.

12. MRV Regulation and IMO Data Collection Scheme (DCS)

The MRV Regulation and the IMO DCS are both intended to quantify CO2 emissions from shipping. Unfortunately the two systems are fundamentally different in six key respects:

1. Data reported under the MRV Regulation will be publicised with ships identified along with their data. Data reported under the IMO DCS will be anonymised before it is made public by IMO.
2. The MRV regulation requires reporting of actual cargo carried, whereas the IMO DCS uses ship DWT as a proxy for cargo.
3. The MRV Regulation requires that data is verified by an EU accredited verifier, not by the ships Flag Administration. This verifier which is EU accredited by a national body (which may also be a class society, or may be another verification body with the appropriate accreditation). The IMO DCS requires that data is verified by the Flag Administration or one of their Recognised Organisations.

4. The MRV Regulation applies to voyages to, within and from a port of call under the jurisdiction of an EU Member State, the IMO DCS is applicable to all voyages.
5. The MRV Regulation provides requirements for monitoring plans including their format, the IMO DCS requires that this forms Part II of the SEEMP, named Ship Fuel Oil Consumption Data Collection Plan with its own format.
6. The MRV Regulation applies to ships carrying passengers or cargo for commercial purposes and excludes several voyage categories, such as those undertaken by offshore vessels and dredgers. The IMO DCS does not offer these exclusions and all vessels have to report their fuel use.

There are further detailed differences and differences in implementation dates. The European Commission is currently reviewing the MRV Regulation with a view to considering potential alignment with the IMO DCS however it is uncertain what the outcome will be and the two schemes will exist with very different requirements for at least some time.

13. Further Reading and Resources

A range of documents and resources are available to download, free of charge, from the European Commission website at:

https://ec.europa.eu/clima/policies/transport/shipping_en

Under the documentation tab of the above page can be found links to the regulations and guidance documents and FAQs, including:

- Preparation of monitoring plans by companies
- Monitoring and reporting of fuel consumption, CO2 emissions and other relevant parameters
- Assessment of monitoring plans by verifiers
- Backward assessment of monitoring plans
- Use of external ship tracking data by verifiers
- Materiality and sampling
- Verification of emissions reports by verifiers
- Recommendations for improvements issued by verifiers
- Assessment of verifiers by National Accreditation Bodies in order to issue an accreditation certificate
- Dealing with situations where the accreditation is suspended or withdrawn close to the planned issuing date of the Document of Compliance (DOC) by the verifier.