Implementation of Shipping MRV Regulation

Third Working Paper on determination of cargo carried

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Content

1. Introduction

1.1. Regulatory background

The EU Regulation on the monitoring, reporting and verification of emissions of carbon dioxide (CO_2), from maritime transport (2015/757) lays down rules for the accurate monitoring, reporting and verification of CO_2 emissions and other relevant information from ships calling at EU ports. The other relevant information includes voyage information; distance travelled; time spent at sea; cargo carried; and transport work. This concept paper concerns the monitoring of cargo carried.

Annex II of the Regulation specifies how the amount of cargo carried shall be monitored for three ship types:

1. For passenger ships, the number of passengers shall be used to express cargo carried.
2. For ro-ro ships, cargo carried shall be defined as the number of cargo units (trucks, cars, etc.) or lane-meters multiplied by default values for their weight. Where cargo carried by ro-ro ships has been defined based on Annex B to CEN 16258 (2012), covering "Methodology for calculation and declaration of energy consumption and GHG emissions of transport services (freight and passengers)", this definition shall be deemed to comply with the Regulation.
3. For container vessels, cargo carried shall be defined as the total weight in tons of the cargo or, failing that, the amount of TEUs multiplied by default values for their weight. Where cargo carried by a container vessel is defined in accordance with applicable IMO Guidelines or instruments pursuant to the SOLAS Convention, this definition shall be deemed to comply with the Regulation.

For all other ship types, the Commission shall adopt, by means of implementing acts, technical rules specifying the applicable parameters.

For each ship type, one – or if justified more than one – parameter(s) to express cargo carried need(s) to be determined. According to Annex II part A, point 1, letter g) to the MRV Regulation, these parameters should consider, where applicable, the weight and volume of cargo carried and the number of passengers carried. This concept paper first discusses the ship types for which the amount of cargo carried has to be defined (Section 0). Section 0 describes, based on the Regulation, the requirements for a definition of the amount of cargo. Section 0 and its subsections describe the possible options for monitoring the amount of cargo carried for all the ship types identified in Section 0. Section 0 concludes with a summary of the main discussion items.

1.2. Purpose of this paper

This paper is based on a working paper published in September 2015 (the 'first Working Paper'), a Second Working Paper published in January 2016, a discussion of that paper in the ESSF subgroup on MRV on 19 January 2016 and written comments from Member States and stakeholder organisations. The first Working Paper presented a list of options for measuring cargo carried for each of the ship types identified, based on a review of industry practices, international rules and standards, studies and other relevant documents, an initial discussion in the ESSF, and a first round of comments. The second Working Paper proposes a revised list of the options including evaluations. This third paper proposes to conclude the discussion by providing recommendations on the parameters for cargo carried for a number of ship types while limiting the options for other ship types. Its aim is to facilitate the discussions and the development of recommendations for cargo parameters for the different ship types by the Shipping MRV subgroup of experts on shipping MRV monitoring established under the European Sustainable Shipping Forum (ESSF) in view of the preparation of the above mentioned implementing act.

Disclaimer

The information and views set out in this paper are those of the author(s) and do not necessarily reflect the official opinion of the Commission.

2. Ship types

Annex II of the Regulation specifies how cargo carried shall be monitored for passenger ships, Ro-Ro and container ships. For other ship types definitions have to be developed.

Annex II already provides a non-exclusive list of ship types to be addressed:

- tankers,
- gas carriers
- bulk carriers,
- general cargo ships,
- refrigerated cargo ships,
- vehicle carriers,
- combination carriers

As an additional basis, the ship types used in the IMO's Energy Efficiency Regulatory Framework should be used. This would also ensure consistency with the definitions for passenger ships, Ro-Ro and container ships in Annex II as these definitions are based on the EEDI Regulations. MARPOL Annex VI, Chapter 1, Regulation 2 provides following definitions:

- "Bulk carrier" means a ship which is intended primarily to carry dry cargo in bulk, including such types as ore carriers as defined in SOLAS chapter XII, regulation 1, but excluding combination carriers.
- "Gas carrier" means a cargo ship constructed or adapted and used for the carriage in bulk of any liquefied gas.
- "Tanker" in relation to chapter 4 means an oil tanker as defined in MARPOL Annex I, regulation 1 or a chemical tanker or an NLS tanker as defined in MARPOL Annex II, regulation 1.
- "General cargo ship" means a ship with a multi-deck or single deck hull designed primarily for the carriage of general cargo. This definition excludes specialized dry cargo ships, which are not included in the calculation of reference lines for general cargo ships, namely livestock carrier, barge carrier, heavy load carrier, yacht carrier, nuclear fuel carrier.
- "Refrigerated cargo carrier" means a ship designed exclusively for the carriage of refrigerated cargoes in holds.
- "Combination carrier" means a ship designed to load 100% deadweight with both liquid and dry cargo in bulk.
- "Ro-ro cargo ship (vehicle carrier)" means a multi deck roll-on-roll-off cargo ship designed for the carriage of empty cars and trucks.
- "Ro-ro cargo ship" means a ship designed for the carriage of roll-on-roll-off cargo transportation units.
- "Ro-ro passenger ship" means a passenger ship with roll-on-roll-off cargo space.

Note that the cargo parameters for Passenger ships, Ro-ro ships and Container ships are defined in Annex II of the Regulation.

A third basis for the proposal was a discussion on distinct operational profiles of ship types. This resulted in a distinction between:

- Oil and product tankers on the one hand and chemical tankers on the other;
- LNG carriers and other gas carriers;
- Ro-ro/cargo; Ro-ro/passenger; Passenger ships and Vehicle carriers. Note that Annex II contains rules on passenger ships and Ro-Ro/cargo ships.

As additional source for the definition of ship types the StatCode system as developed by IHS Fairplay could be used. The current version, 5 .1081 categorises ships in 5 levels of detail. For the 5-digit level, definitions of ship types are available.

In the following it is proposed to define the ship types listed in the Regulation and the other ship types using the StatCode definition. Since a definition of cargo carried is only relevant for cargo ships, we limit the analysis to this category of ships.[1]

The ship types mentioned in Annex II can be defined as follows:

- Passenger ships, defined as ships that exclusively carry passengers, have StatCode A37. This definition means that ships designed to carry both passengers and cargo (e.g. passenger/ro-ro ships or general cargo/passenger ships) will not belong to this category. Annex A provides the definitions and the Level 5 StatCode for these ship types.

- Ro-Ro ships can be either Ro-Ro cargo ships (StatCode A35) or Passenger/Ro-Ro cargo ship (StatCode A36). Both ships have distinct operational profiles. Therefore, further analyses are required for Ro-ro Passenger ships if the use of the same cargo parameter as Ro-Ro cargo ships would be appropriate. Note that StatCode A35 includes Container/Ro-Ro Cargo Ships (StatCode A35C), which are defined as 'A hybrid of a container ship and a ro-ro cargo ship in independent sections'. For these ships, the cargo definition is discussed in Section 4.11. Annex A provides the definitions and the Level 5 StatCode for these ship types.

- Container ships have StatCode A33. Some other ship types may have the ability to carry containers as well (e.g. an open hatch cargo ship, which is defined as 'A large single deck cargo vessel with full width hatches and boxed holds for the carriage of unitised dry cargo such as forest products and containers.'). For these ships, the monitoring of container transport is discussed in the subsections of Section 0.

In order to reduce the number of ship types for which rules need to be laid down, it makes sense to use the highest possible StatCode level.

Furthermore, there might be a need to introduce a category 'other ship types' as it is likely that the proposed list and definitions would not cover all ships within the scope of the Shipping MRV Regulation.

Annex II mentions a number of ship types specifically: tankers, bulk carriers, general cargo ships, refrigerated cargo ships, vehicle carriers and combination carriers. Based on the above considerations and using the highest possible StatCode level for each of the ship types mentioned in Annex II, we come to the following ship types and their definitions according to MARPOL Annex VI:

Table 1 Ship type definitions

Ship type	Definition	Remarks
Oil Tanker	"Oil Tanker" means a ship constructed or adapted primarily to carry crude oil or petroleum products in bulk in its cargo spaces. Note that this definition does not include combination carriers, NLS tankers or gas tankers.	StatCode A13
Chemical tankers	"Chemical tanker" means a ship constructed or adapted for the carriage in bulk of any liquid product listed in chapter 17 of the International Bulk Chemical Code (a Chemical Tanker) or a ship constructed or adapted to carry a cargo of noxious liquid substances in bulk (an NLS Tanker)	StatCode A12, A14

[1] Other categories in StatCode are Non Merchant Ships, Non Propelled Ships, Non Ship Structures and Work Vessels.

Ship type	Definition	Remarks
LNG carrier	“LNG Carrier” means a tanker for the bulk carriage of Liquefied Natural Gas (primarily methane) in independent insulated tanks. Liquefaction is achieved at temperatures down to -163 deg C	StatCode A11A
Gas carriers	“Gas Carrier” means a tanker for the bulk carriage of liquefied gases other than LNG.	StatCode A11B, A11C
Bulk carrier	"Bulk carrier" means a ship which is intended primarily to carry dry cargo in bulk, including such types as ore carriers as defined in SOLAS chapter XII, regulation 1, but excluding combination carriers.	Covers Bulk Dry (StatCode A21); Self Discharging Bulk Dry (StatCode A23); and Other Bulk Dry (StatCode A24)
General cargo ship	"General cargo ship" means a ship with a multi-deck or single deck hull designed primarily for the carriage of general cargo. This definition excludes specialized dry cargo ships, which are not included in the calculation of reference lines for general cargo ships, namely livestock carrier, barge carrier, heavy load carrier, yacht carrier, nuclear fuel carrier.	Covers General Cargo (StatCode A31); and Passenger/General Cargo (StatCode A32)
Refrigerated cargo ship	"Refrigerated cargo carrier" means a ship designed exclusively for the carriage of refrigerated cargoes in holds.	StatCode A34
Vehicle carrier	"Vehicle carrier" means a multi deck roll-on-roll-off cargo ship designed for the carriage of empty cars and trucks.	StatCode A35B. Note that Bulk Carrier (with Vehicle Decks) (StatCode A21A2BV) would be included under bulk carriers, not under vehicle carriers.
Combination carrier	"Combination carrier" means a ship designed to load 100% deadweight with both liquid and dry cargo in bulk.	Covers Bulk Dry Liquid (StatCode A22); and Bulk Dry Oil (StatCode A22)
Ro-pax	"Ro-pax ship" means a passenger ship with roll-on-roll-off cargo space	StatCode A34
Container/ Ro-Ro cargo ship	"Container/ Ro-Ro cargo ship" means a hybrid of a container ship and a ro-ro cargo ship in independent sections	StatCode A35C2RC
Other ship types	"Other ship types" mean ships not covered by any of the above definitions, which fall under the scope of the regulation.	

Annex A provides the definitions and the Level 5 StatCode for these ship types.

3. Criteria for evaluation of cargo parameters

For each of the ship types defined in Section 2, options have to be developed for technical rules specifying the amount of cargo carried. According to Annex II to the Regulation, those rules *"...shall enable the taking into account, where applicable, of the weight and volume of cargo carried and the number of passengers carried.*" This requirement indicates a clear preference for the parameters to be used. However, if duly justified, other parameters to express 'cargo carried' could be assessed where relevant. Furthermore, where relevant and necessary for certain ship types, a combination of parameters to express 'cargo carried' could be used.

Furthermore, the options to be developed should meet the following criteria:

A. The technical rules should allow accurate monitoring of the amount of cargo carried;
B. The rules should result in monitoring that yields verifiable results;
C. The rules should be administratively efficient, which means that they are in line with industry standards and common practices;
D. The rules should result in robust information on energy efficiency that allows for fair comparison between ships.

4. Cargo parameter options

4.1. Cargo parameters for oil tankers

Note that this section relates to tankers that transport crude oil and oil products, and not to chemical tankers (which are covered in Section 4.2), LNG carriers (Section 4.3) or other gas carriers (Section 4.4).

4.1.1. Options

There are two qualities of cargo that can be measured for oil tankers: mass and volume of the liquid cargo.

- Mass: for tankers, mass is routinely recorded in commercial documents and in logs.
- Volume: Tankers that carry oil or oil products are required to have an Oil Record Book II under Marpol Annex I. In this Record book, the crew is required to log the volume of all loading and unloading of oil cargo in m^3, bbl or gallons. These entries can be used for monitoring the volume of the cargo transported.

4.1.2. Brief evaluation of the options

Both mass and volume would be in line with Annex II, article A.1. (g). The EEOI guidelines (MEPC.1/Circ.684) recommend using mass. The industry practice is to monitor cargo mass. The volume of a cargo depends on the temperature because the density changes with temperature. Therefore, it is susceptible to administrative errors as the crew needs to measure and re-measure the temperature of the bulk of the cargo for each tank separately, average it over for all the tanks, before calculating the density, every time cargo quantity report is required.

Mass satisfies the criteria A, B and C established in section 3 (results are robust, verifiable and have a low administrative burden). Volume scores worse on the first criteria as it is dependent on temperature (although the density may only change a few percent over common temperature ranges). In order to be verifiable, temperature would need to be monitored as well which introduces an additional administrative effort. Regarding the suitability to express energy efficiency, there are no significant differences between both parameters due to the homogeneity of cargo carried by this ship type.

The discussion at the first and second meeting of the ESSF MRV Subgroup and comments received from stakeholders all indicated a clear preference for cargo mass.

4.1.3. Conclusion

For tankers, cargo carried should be defined as the mass of the cargo on board.

4.2. Cargo parameters for chemical tankers

4.2.1. Options

There are two qualities of cargo that can be measured for chemical tankers: mass and volume of the liquid cargo.

- Mass: for tankers, mass is usually calculated by multiplying volume with density. Mass is also recorded in commercial documents and in logs.
- Volume: Chemical tankers are not obliged to keep records of the volume of the cargo transported as oil and product tankers do.

4.2.2. Brief evaluation of the options

Both mass and volume would be in line with Annex II, article A.1. (g). The EEOI guidelines (MEPC.1/Circ.684) recommend using mass. The industry practice is to monitor cargo mass.

Both mass and volume can be monitored accurately and verifiably (criteria A and B in section 3). Regarding the administrative efficiency (criteria C), mass as cargo parameter probably benefits from the common industry practise.

The density of cargoes of chemical tankers can vary widely. This will impact the results of efficiency parameters based on actual cargo carried (criteria D). Therefore, it is recommended to include a voluntary memo field in the reporting template that can be used to convey information that can be used to interpret the efficiency parameters. The memo item, which would require verification as all other reported information, could contain information about either:

- The average density of the cargoes transported in a reporting year. Density is commonly supplied by shippers at loading port. This is the, legally and commercially accepted, normal practice. Or
- the average share of available tank volume used in a reporting year.
- Any other information that is relevant to help understand the efficiency metrics.

The use of mass of cargo has been supported by most stakeholders at the second meeting of the ESSF MRV Subgroup Monitoring and by written comments received.

4.2.3. Conclusion

For chemical tankers, cargo carried should be defined as the mass of the cargo on board.

A memo field should be included in the reporting template to convey additional information on a voluntary basis. The memo field will need to be verified and its content will be published to help understand the efficiency metrics for the ship in question.

4.3. Cargo parameters for LNG Carriers

4.3.1. Options

There are two quantities of cargo that can be measured for LNG Carriers: mass and volume of the cargo.

- Mass: for LNG carriers, mass is usually calculated by multiplying volume with density.
- Volume: Measuring the volume of the cargo is not obligatory for gas carriers, however, the Custody Transfer Management System (CTMS) is commonly used to determine cargoes and it measures volume. This is also covered by ISO standard 10976:2015, Refrigerated light hydrocarbon fluids -- Measurement of cargoes on board LNG carriers.

Gas carriers, especially LNG carriers, often use boil off gas as a fuel. This means that the amount of cargo at the start of a voyage is more than the amount of cargo at the end of a voyage.

Liquefied gases are carried as boiling liquids in equilibrium with their vapours, contained within closed systems. In many trades, it is common practice for the gas carrier to retain onboard an amount of liquid heel to allow for either maintaining cargo tanks in a cold state and/or for fuel. In addition, some LNG carriers have reliquefaction plants on board that reliquefy boil-off. Reliquefaction plants can run on LNG.

Therefore, for the determination of cargo carried, amount of cargo should be monitored at the discharge terminal.

4.3.2. Brief evaluation of the options

Both mass and volume would be in line with Annex II, article A.1. (g). The EEOI guidelines (MEPC.1/Circ.684) recommend using mass. However, volume (m^3) is used to calculate the EEDI reference lines for LNG carriers.

In the LNG carrier trade, the Custody Transfer Management System (CTMS) employed for cargo measurement is highly accurate, and certified by independent surveyors. It provides volumetric quantities; densities are then applied ashore to calculate the total energy delivered to the discharge terminal. In principle, this system could be used to determine the amount of cargo carried accurately and verifiably (criteria A and B). Because the cargo parameter would be based on industry practice, it would be administratively efficient (criteria C).

Standard ISO 10976 – Refrigerated light hydrocarbon fuels – Measurement of cargoes on board LNG carriers has been developed to measure the volumes and densities of cargoes on board LNG carriers. This standard can be used directly to determine volume of cargo and indirectly to determine the mass of the cargo. However, the density of the cargo may change because of the boil-off and is only known to the ship at the point of loading, not normally at the point of discharge.

4.3.3. Conclusion

For LNG carriers, cargo carried should be defined as the volume of the cargo on discharge, or, if cargo is discharged at several locations, the sum of the cargo discharged and the cargo discharged at all subsequent locations up to the location where new cargo is loaded.

4.4. Cargo parameters for Gas Carriers

4.4.1. Options

There are two qualities of cargo that can be measured for Gas Carriers: mass and volume of the cargo.

- Mass: for gas carriers, mass is usually calculated by multiplying volume with density.
- Volume: Measuring the volume of the cargo is not obligatory for gas carriers and for tankers carrying liquefied gas may not be accurate as most of the cargo is transported as a liquid, but some is transported as a gas.

Liquefied gases are either carried as boiling liquids in equilibrium with their vapours, contained within closed systems or in pressurised holds. In many trades, it is common practice for the gas carrier to retain onboard an amount of liquid heel to allow for either maintaining cargo tanks in a cold state.

4.4.2. Brief evaluation of the options

Both mass and volume would be in line with Annex II, article A.1. (g). The EEOI guidelines (MEPC.1/Circ.684) recommend using mass. Mass can be measured verifiably (criteria B).

ISO 5024 – Petroleum liquids and liquefied petroleum gases – Measurement – Standard reference conditions defines standard reference conditions for volumetric measurements of LPG. This standard allows for accurate monitoring of the volume of cargo at the point of loading or at the point of discharge (criteria A) and would yield verifiable results (criteria B). The standard appears to be widely used in the industry, as a result of which the additional administrative requirements would be low (criteria C).

Bills of lading commonly express the quantity of cargo in mass units. This means that the additional administrative requirements would be low (criteria C).

Because density changes with temperature, volume may also change, whereas mass will not. This means that the accuracy of mass will be better than the accuracy of volume (criteria A).

4.4.3. Conclusion

For gas carriers, cargo carried should be defined as the mass of the cargo on board.

4.5. Cargo parameters for bulk carriers

4.5.1. Options

There are two qualities of cargo that can be measured for bulk carriers: mass and volume of the solid bulk cargo. Moreover, ships may have information on the displacement. This leads to five possible cargo parameters:

- Mass: Appendix 5 of the BLU code (Code of Practice for the Safe Loading and Unloading of Bulk Carriers) requires terminal operators to inform a ship's master in advance of loading cargo about the weight of the load. In addition, information on the cargo mass is included in commercial documents, documents required under SOLAS for carriage of dangerous cargoes, and, if the cargo is imported or exported into or from the EU, in the summary declarations required under the EU customs code.
- Volume: Volume of cargo does not appear to be routinely measured, but SOLAS documents include a stowage factor (density) which allows for calculating volume when mass is known.
- Mass in combination with correction factor. A correction factor could be calculated as follows: (1) Determine first the "nominal cargo density" for a ship by dividing the maximum cargo capacity (in tonnes) with the total volume (in m^3) of the cargo holds of the ship; (2) The correction factor can then be obtained by dividing the calculated "nominal cargo density" with the density of the actual cargo in question; (3) Finally, if the actual cargo density is less than the "nominal cargo density", the corrected cargo mass can be obtained by multiplying the actual cargo mass with the calculated correction factor. Otherwise, the factor is 1.
- Mass and volume: A combination of both parameters could be used to better reflect the different types of solid bulk cargo.
- Deadweight carried: some stakeholders have proposed to use displacement or deadweight carried, defined as displacement minus ship lightweight. This would recognize the fact that on laden voyages, low density cargoes require the ship to carry ballast water in order to keep the centre of gravity at a safe point. Displacement can be calculated from a ships draught, which is routinely monitored and logged.

4.5.2. Brief evaluation of the options

Both mass and volume would be in line with Annex II, article A.1. (g). The EEOI guidelines (MEPC.1/Circ.684) recommend using mass. The accuracy of monitoring will be better for mass than for volume, as the latter depends on the accuracy of the stowage factor as well as on the accuracy of the mass measurement (criteria A and B). Because volume would be monitored on the basis of mass, a combined measurement of mass and volume does not add information. Results are verifiable and in line with industry standards and common practices (criteria C).

The calculation of a correction factor introduces a new calculation and is therefore administratively more complex (criteria C). The accuracy and verifiability of the correction factor depends on the accuracy of the measurement of the cargo holds as well as the stowage factor and the mass measurement, thereby introducing new factors of uncertainty (criteria A and B). However, the corrected mass may yield more robust information on energy efficiency (criteria D).

Deadweight carried would satisfy criteria D better, as the fuel use of a ship depends, amongst others, on its draught which is not only determined by the mass of cargo but also by the mass of fuel, ballast water and supplies. However, – depending on how deadweight carried is determined – it might require additional measurements and might then have a higher administrative burden (criteria C).

Another way to account for different densities or stowage factors would be to include a voluntary memo field in the reporting template that can be used to convey information about the density of the cargo carried in the reporting period.

4.5.3. Conclusion

For bulk carriers, cargo carried should be defined as the mass of the cargo on board.

A memo field should be included in the reporting template to convey additional information on a voluntary basis. The memo field will need to be verified and its content will be published to help understand the efficiency metrics for the ship in question.

4.6. Cargo parameters for general cargo ships

4.6.1. Options

There are two qualities of cargo that can be measured for general cargo ships: mass and volume of the cargo.

- Mass: Solas Chapter VI, regulation 2, requires the shipper to inform the master about 'the gross mass of the cargo or of the cargo units', and 'prior to loading cargo units on board ships … ensure that the gross mass of such units is in accordance with the gross mass declared on the shipping documents'. In addition, information on the cargo mass is included in commercial documents, documents required under SOLAS for carriage of dangerous cargoes, and, if the cargo is imported or exported into or from the EU, in the summary declarations required under the EU customs code.
- Deadweight carried: some stakeholders have proposed to use displacement or deadweight carried, defined as displacement minus ship lightweight. This would recognize the fact that low density cargoes require the ship to carry ballast water in order to keep the centre of gravity at a safe point, displacement can be calculated from a ships draught, which is routinely monitored and logged. Deadweight carried would be calculated on the basis of displacement when the ships leaves the port.
- Volume: Volume of cargo does not appear to be routinely measured for general cargo ships.
- A combination of two parameters (mass and volume or mass and deadweight carried) could be used to better reflect the different types of cargo.

It is important to note that for general cargo ships, the type (and density) of cargo and the payload utilization varies enormously over time, e.g. a period of one year.

4.6.2. Brief evaluation of the options

Cargo mass would be in line with Annex II, article A.1 (g), whether this is also the case for deadweight is not directly clear, since ballast is strictly spoken not cargo, even though it is required to carry some cargoes. The EEOI guidelines (MEPC.1/Circ.684) recommend using mass. The accuracy of monitoring of both cargo mass and deadweight carried will be good (criteria A and B). Results are verifiable and in line with industry standards and common practices (criteria C), although a guidance for determining deadweight carried may be needed, for example on when the draught is to be measured (at departure, on sea, or at arrival), and which water density to use when calculating displacement.

On the ability to contribute to robust information on energy efficiency (criteria D), using cargo mass would disadvantage ships that carry light or voluminous cargoes in a reporting period, as their efficiency appears to be worse than similar ships that carry heavy cargoes. Using deadweight carried does not have this disadvantage and thus satisfies the fourth criteria better.

4.6.3. Preliminary selection of cargo parameters

Based on the evaluation above and discussions in the ESSF MRV Subgroup, the following three cargo parameters are selected for further analysis:

1. Deadweight carried,

2. Deadweight carried with the possibility to monitor & report the mass of cargo on a voluntary basis,

3. Mass of cargo with the possibility to monitor & report deadweight carried on a voluntary basis;

4.6.4. Further work

An ad-hoc task force has been formed to provide recommendations for a cargo parameter for general cargo vessels with the following Terms of Reference:

1. Recommend one (or two) parameter(s) to express cargo carried for general cargo vessels in the context of the MRV Regulation considering three options:

a) Deadweight carried,

b) Deadweight carried with the possibility to monitor & report the actual mass of cargo on a voluntary basis,

c) Actual mass of cargo with the possibility to monitor & report deadweight carried on a voluntary basis;

2. Consider the criteria for selection of cargo parameters as described in section 3 of the 'Working Paper on determination of cargo carried' of 5 January 2016, in particular the availability of data on board;

3. Take into account the earlier work done by the Dutch independent maritime research institute - MARIN- and the Royal Association of Netherlands Shipowners on 'deadweight carried' for general cargo vessels;

4. Propose a methodology to determine 'deadweight carried' including calculation formulae and data sources, which is least burdensome for ship-owners and verifiers;

5. Organize a physical meeting to advance the discussions in either KVNR's office (Rotterdam) or at the premises of the European Commission (Brussels) during the second week of March 2016;

6. Submit by 18 March 2016 a report on the findings of the work package in view of agreeing on parameters for cargo carried for general cargo ships at the ESSF MRV monitoring subgroup meeting in April 2016.

4.7. Cargo parameters for refrigerated cargo ships

4.7.1. Options

Refrigerated cargo ships carry cargo in temperature controlled holds and often containers on deck. Cargo in holds is often packaged in boxes, on pallets, et cetera. The containers on deck are often reefer containers.

Some refrigerated cargo ships have tanks for liquids. These ships typically carry fruit juices.

In principle, the following parameters could be used to monitor the amount of cargo carried:

- mass of the cargo, either measured directly or calculated from the number of packaged items and the mass per item
- mass of the cargo plus number of TEUs
- number of separate items
- volume of cargo.

4.7.2. Brief evaluation of the options

Commercial documents and shipboard documents used for loading, draught and stability calculations all use mass. Reefer operators usually know the gross mass of the reefer containers on board which they use for loading, draught and stability calculations. Commercial documents for reefer tankers may be in volume or in mass. If the documents are in volume, the density is often measured and documented.

The mass of cargo, either measured directly or calculated from the number of packaged items and the mass per item can be monitored accurately, can be verified and is in line with industry practices (criteria A, B and C).

The mass of cargo plus the number of TEUs can also be monitored accurately, verifiably and is in line with industry practices, but having two separate units to express cargo carried hampers the calculation of energy efficiency indicators and is therefore impractical.

The number of separate items can in many cases be monitored accurately, however for different cargoes the items may be very dissimilar, which means that it does not allow for a fair comparison between ships (criteria D).

The volume of the cargo can be monitored accurately but is not in line with industry practices (criteria C).

4.7.3. Preliminary selection of a cargo parameter

The mass of the cargo scores better than the other parameters on accuracy, verifiability and administrative efficiency. It can be monitored directly or calculated by multiplying the number of packaged items with the mass per item.

4.8. Cargo parameters for vehicle carriers

4.8.1. Options

Vehicle carriers are a special type of Ro-Ro carriers. Therefore, cargo could be monitored in the same way as for Ro-Ro ships, i.e. cargo carried shall be defined as the number of cargo units (trucks, cars, etc.) or occupied lane-meters multiplied by default values for their weight.

Alternatively, following parameters could in principle be used:

- mass of the cargo based on information on the actual cargo mass
- occupied lane meters
- number of car units
- deadweight carried (displacement of the ship at the port of departure minus lightweight of the ship)
- Mass with an option of indirect determination using percent occupied deck area (converted to actual “mass” by using design DWT).

4.8.2. Brief evaluation of the options

Using the same approach as defined in Annex II for ro-ro ships would ensure consistency between these similar ship types. Furthermore, consistency with applicable European standards (here: CEN 16258 (2012)) would be ensured as well.

The EEOI guidelines (MEPC.1/Circ.684) however are rather open and recommend either using mass or occupied lane meters or the number of car units. Mass is explicitly referred to in Annex II, article A.1. (g), whereas both, occupied lane meters and number of car units, could be interpreted as proxies for the cargo volume.

Trans-oceanic vehicle carriers do not use lane-meters or cargo mass as a measure of cargo. Hence, these options would require monitoring new parameters which would increase the administrative burden (criteria C). It is not clear at this point whether mass or lane meters could be measured accurately and verifiably (criteria A and B). Ships with moveable decks do not have a fixed amount of available lane metres or a fixed available deck area, which makes options using these parameters less suitable for these ships so accuracy, and verifiability may not be guaranteed and the administrative burden may be relatively high.

There are various standards in the industry, and whilst Pure Car Carriers (PCCs) and Pure Car and Truck Carriers (PCTCs) use standardised units to some extent, heavy vehicle carriers do not. These ships are volume based carriers and the unit most commonly used in the trade is the RT43 (standard vehicle unit)[2]. Heavy

[2] A unit of size in square metres designed to be the equivalent of 1 car including required stowage surrounding stowage space. One RT43 unit = 7.38975 m².

vehicle carriers are designed with additional movable decks and the ability to carry heavy vehicles as well as other static (non self-propelled) cargoes (such as yachts, train cars, steel coils, etc.).

Mass of the cargo is regularly recorded and is correlated with a ships draught which, in turn, correlates with its fuel consumption and thus would satisfy the four criteria. However, default values for the mass of a car or a RT43 unit do not appear to exist.

4.8.3. Further work

An ad-hoc task force has been formed with the following terms of reference:

1. Recommend one – or if justified more than one – parameter(s) to express cargo carried for vehicle carriers in the context of the MRV Regulation starting from three options:

    a) EEOI guidelines offering 3 parameters for choice by company: mass, occupied lane meters, number of car units,

    b) Deadweight carried,

    c) Mass with an option of indirect determination using percent occupied deck area (converted to actual "mass" by using design DWT);

2. Duly consider implications of hanging decks;

3. Consider the criteria for selection of cargo parameters as described in section 3 of the 'Working Paper on determination of cargo carried' of 5 January 2016, in particular the availability of data;

4. Due to the variety of cargo, consider the possibility to split the ship type vehicle carriers in further sub types (e.g. PCC; PCTC…);

5. Submit by 18 March 2016 a report on the findings of the work package in view of agreeing on parameter(s) for cargo carried for vehicle carriers at the ESSF MRV monitoring subgroup meeting in April 2016.

4.9. Cargo parameters for combination carriers

Combination carriers can carry both oil and dry bulk. Since the recommended cargo parameter for both ship types is mass of the cargo, this parameter can also be used for combination carriers.

4.9.1. Conclusion

For combination carriers, cargo carried should be defined as the mass of the cargo on board.

A memo field should be included in the reporting template to convey additional information on a voluntary basis. The memo field will need to be verified and its content will be published to help understand the efficiency metrics for the ship in question.

4.10. Cargo parameters for Ro-Ro passenger ships

4.10.1. Options

Ro-ro passenger ships carry both passengers and vehicles or Ro-ro cargo. They could be monitored separately or expressed as one parameter.

If cargo and passengers would be expressed in one parameter, mass equivalencies seem to be the most logical option.

If cargo and passengers would be reported separately, it makes sense to also split the fuel use and emissions of the vessel into a cargo and a passenger part. CEN 16258 (2012) provides a methodology to do so.

Passenger could be monitored in units as is required for passenger ships.

The Ro-Ro cargo could be monitored in the same way as for Ro-ro Cargo ships: the number of cargo units (trucks, cars, etc.) or lane-metres multiplied by default values for their weight.

4.10.2. Brief evaluation of the options

If passengers and cargo are expressed in the same parameter, e.g. mass, one would dominate the cargo parameter. Any attempts to balance the two would increase the complexity and administrative burden considerably. This option would not satisfy criteria D.

A split of the fuel and emissions between passengers and freight using the method defined in CEN 16258 can be done accurately and verifiably (criteria A and B), with a low additional administrative burden (criteria C).

SOLAS requires ships to keep records of the number of passengers on board. CEN standard EN 16258 (2012) sets a default value of 100 kg for a passenger, including luggage. This means that the number of passengers can be monitored accurately and verifiably (criteria A and B), that the additional administrative burden is low (criteria C).

It is common practice to monitor the number of cargo units or occupied lane metres because this is the basis for collecting revenues. So also for this item, the results are verifiable and the additional administrative burden is low (criteria B and C). The accuracy of monitoring cargo mass depends on the accuracy of the accuracy of the default unit mass (criteria A). Even though this may not be accurate in all cases, the lower accuracy should be weighed against the additional effort needed to determine cargo mass accurately, as in that case all units would need to be weighed.

Default values for the mass of occupied lane metres would need to be developed. CEN 16258 provides information on the tare mass, not on the total mass. Default values could be developed for units (cars, truck-trailers, etc.) and per lane metre.

4.10.3. Further work

An ad-hoc task force has been formed with the following terms of reference:

1. Recommend a methodology and default values for the calculation of the share on emissions to be allocated to passenger and cargo transport on an annual basis including the allocation of parts of the freight decks to the passenger area due to its use for passenger cars and the consideration of hanging decks;

2. Recommend sets of default values for the mass of cargo units to be applied to Ro-Ro passenger ships:

a) Mass of cargo units per unit,

b) Mass of cargo units per lane-meter;

3. The default values should reflect the typical mass of the respective units as carried by Ro-Ro passenger ships under the scope of the MRV Regulation (above 5000 GT, operating at least to some extent on routes from or to EU ports) including the typical share of laden and empty units;

4. Recommend similar sets of default values for the mass of cargo units to be applied to Ro-Ro cargo ships under the scope of the MRV Regulation;

5. Report on progress made at the ESSF MRV monitoring subgroup meeting on 11-12 April 2016;

6. Submit by 29 April 2016 a report on the findings of the work package in view of the ESSF MRV monitoring subgroup meeting in May 2016.

4.10.4. Conclusion

It is recommended that Ro-Ro passenger ships will report two cargo parameters:

1. The number of passengers on board
2. The mass of cargo on board.

The second cargo parameter can either be actual mass or be calculated as units or occupied lane meters multiplied by default mass per unit or per lane meter.

The fuel consumption should be split into fuel used to transport passengers and fuel used to transport cargo using CEN 16258. Further guidance on the use of this standard may be developed.

4.11. Cargo parameters for container/ Ro-Ro cargo ships

4.11.1. Options

Container/Ro-Ro Cargo Ships are designed to carry a wide variety of cargoes, including containers, vehicles and general cargo. As a result, their type of cargo and therefore their payload utilisation and cargo hold volume utilisation fluctuate enormously.

Container/Ro-Ro Cargo Ships usually monitor the number of containers on board, the number of cars, trailers and other standard units, and for non-standard units such as heavy machinery and non-rolling cargo, the number of units and their mass. The mass of cars, trailers, trucks, etc. is not monitored regularly.

The amount of cargo can be determined by volume or mass:

- Volume: the sum of:
  - for cars, trailers, trucks and other standard units a default area multiplied by the height of the deck (the distance between the floor and the structural beam);
  - for other ro-ro cargo: the number of occupied lane metres multiplied by the height of the deck
  - for containers: the number of TEUs multiplied by 38.3 m^3 (according to ISO 668:2013, ISO container type 1CC).
- Mass: either
  - the actual cargo mass; or
  - the volume calculated as above, divided by the net tonnage multiplied by the deadweight (i.e. the share of occupied cargo space times the deadweight); or
  - the amount of TEUs multiplied by default values for their mass plus the number of cargo units (trucks, cars, etc.) or lane-meters multiplied by default values for their mass.

4.11.2. Brief evaluation of the options

Container/Ro-Ro Cargo Ships make a loading plan before every departure listing the number of cars, trucks, containers, and other cargo items as well as their location in the ship. This can be used to accurately and verifiably determine the volume of the cargo as defined above (criteria A and B). The actual mass of cars, trailers, trucks, et cetera is not recorded so cannot be monitored accurately without making additional measurements. Provided that a default mass can be established, a nominal mass can be monitored as accurately and verifiably as volume.

Volume, as defined above, can be calculated on the basis of the loading plan and is therefore in line with industry practices (criteria C).

Using actual cargo mass would disadvantage ships that carry light or voluminous cargoes in a reporting period, as their efficiency appears to be worse than similar ships that carry heavy cargoes (criteria D).

4.11.3. Preliminary selection of a cargo parameter

On the basis of this evaluation, the volume of the cargo as defined in Section 4.11.1 satisfies the criteria set in Chapter 3 best.

4.12. Cargo parameters for other ship types

4.12.1. Options

The Ad Hoc Expert Working Group on ‘’Other Ship Types” concluded that there are no ship types that are not included in the definitions in Chapter 2 and that perform activities under the scope of the Regulation. This especially relates to work vessels (cable layers, dredgers, et cetera) and offshore vessels (offshore support vessels, anchor handling tug supply vessels, et cetera).

Nevertheless, it is conceivable that at some point in the future ships may call at an EU port that performs activities which fall under the scope of the Regulation, yet cannot be categorized using the definitions of Chapter 2. Those ships would need to monitor and report their cargo. This section defines a cargo parameter for them.

The most widely used cargo parameters for the ship types mentioned in Sections 4.1 through 4.11 are mass of the cargo and deadweight carried.

4.12.2. Conclusion

Ships that do not fall under any of the definitions listed in Chapter 2, Table 1, should determine their amount of cargo carried either by

1. Mass of the cargo; or by
2. Deadweight carried.

5. Overview of recommended parameters

Table 2 presents an overview of the recommended parameters for the definition of cargo carried for different ship types.

Table 2 Overview of parameters for the determination of cargo carried for different ship types

ship type	parameters for cargo parameters
Oil tankers	For tankers, cargo carried should be defined as the mass of the cargo on board.
chemical tankers	For chemical tankers, cargo carried should be defined as the mass of the cargo on board. A memo field should be included in the reporting template to convey additional information on a voluntary basis.
LNG carriers	For LNG carriers, cargo carried should be defined as the volume of the cargo on discharge, or, if cargo is discharged at several locations, the sum of the cargo discharged and the cargo discharged at all subsequent locations up to the location where new cargo is loaded.
gas carriers	For gas carriers, cargo carried should be defined as the mass of the cargo on board.
bulk carriers	For bulk carriers, cargo carried should be defined as the mass of the cargo on board. A memo field should be included in the reporting template to convey additional information on a voluntary basis. The memo field will need to be verified and its content will be published to help understand the efficiency metrics for the ship in question.
general cargo ships	For general cargo ships, the report of the ad-hoc task force will recommend cargo parameters.
refrigerated cargo carriers	For refrigerated cargo carriers, cargo carried should be defined as the mass of the cargo on board.
vehicle carriers	For vehicle carriers, the report of the ad-hoc task force will recommend cargo parameters.
combination carriers	For combination carriers, cargo carried should be defined as the mass of the cargo on board. A memo field should be included in the reporting template to convey additional information on a voluntary basis. The memo field will need to be verified and its content will be published to help understand the efficiency metrics for the ship in question.
Ro-ro passenger ships	Ro-Ro passenger ships will report two cargo parameters: 1. The number of passengers on board 2. The mass of cargo on board. The second cargo parameter can either be actual mass or be calculated as units or occupied lane meters multiplied by default mass per unit or per lane meter. The fuel consumption should be split into fuel used to transport passengers and fuel used to transport cargo using CEN 16258. Further guidance on the use of this standard may be developed.
container/ro-ro ships	For container/ro-ro ships, cargo carried should be defined as the volume of the cargo.
other ship types	Ships that do not fall under any of the definitions listed in Chapter 2, Table 1, should determine their amount of cargo carried either by 1. Mass of the cargo; or by 2. Deadweight carried.

A. Ship types

A.1.1. Passenger ships

Passenger ships have StatCode A37. This level excludes ships that are equipped to carry both cargo and passengers, such as RoPax ships, which have StatCode A36.

StatCode Level 3	Description	StatCode Level 5	Description	Definition
A37	Passenger	A37A2PC	Passenger/Cruise	A vessel certificated to carry more than 12 passengers, all of whom may be accommodated in cabins.
A37	Passenger	A37B2PS	Passenger Ship	A vessel certificated to carry more than 12 passengers, some of whom may be accommodated in cabins.

A.1.2. Ro-Ro/Cargo ships

Ro-Ro/Cargo ships have StatCode A35A or A35D.

StatCode Level 4	Description	StatCode Level 5	Description	Definition
A35A	Ro-Ro Cargo	A35A2RR	Ro-Ro Cargo Ship	A single or multi deck cargo ship for the carriage of laden vehicles which are loaded via ramps.
A35A	Ro-Ro Cargo	A35A2RT	Rail Vehicles Carrier	A single or multi deck cargo ship with rails for the carriage of rail vehicles which are loaded via ramps.
A35D	Ro-Ro Cargo	A35D2RL	Landing Craft	An open deck cargo vessel onto which cargo is loaded and unloaded over a bow door/ramp.

A.1.3. Ro-Ro/Passenger ships

Ro-Ro/Passenger ships have StatCode A36 (Passenger/Ro-Ro cargo).

StatCode Level 4	Description	StatCode Level 5	Description	Definition
A36A	Passenger/Ro-Ro Cargo	A36A2PR	Passenger/Ro-Ro Ship (Vehicles)	A ro-ro cargo ship with accommodation for more than 12 passengers.
A36A	Passenger/Ro-Ro Cargo	A36A2PT	Passenger/Ro-Ro Ship (Vehicles/Rail)	A ro-ro cargo ship for the additional carriage of rail-vehicles and with accommodation for more than 12 passengers.
A36B	Passenger/Ro-Ro Cargo	A36B2PL	Passenger/Landing Craft	A landing craft certificated to carry more than 12 passengers.

A.1.4. Container ships

Container ships have StatCode A33. Some other ship types may have the ability to carry containers as well (e.g. an open hatch cargo ship, which is defined as 'A large single deck cargo vessel with full width hatches and boxed holds for the carriage of unitised dry cargo such as forest products and containers'), but these are included under their main ship type (in this example, a dry bulk carrier).

StatCode Level 3	Description	StatCode Level 5	Description	Definition
A33	Container	A33A2CC	Container Ship (Fully Cellular)	A single deck cargo vessel with boxed holds fitted with fixed cellular guides for the carriage of containers.
A33	Container	A33A2CR	Container Ship (Fully Cellular with Ro-Ro Facility)	A container ship with the additional capability to be loaded and unloaded by ro-ro access to a limited portion of the cargo space.
A33	Container	A33B2CP	Passenger/Container Ship	A container ship with accommodation for the carriage of more than 12 passengers.

A.1.5. Tankers

Tankers StatCode A13.

StatCode Level 3	Description	StatCode Level 5	Description	Definition
A13	Tankers	A13A2TS	Shuttle Tanker	A tanker for the bulk carriage of crude oil specifically for operation between offshore terminals and refineries. Is typically fitted with bow loading facilities.
A13	Tankers	A13A2TV	Crude Oil Tanker	A tanker for the bulk carriage of crude oil.
A13	Tankers	A13A2TW	Crude/Oil Products Tanker	A tanker for the bulk carriage of crude oil but also for carriage of refined oil products.
A13	Tankers	A13B2TP	Products Tanker	A tanker for the bulk carriage of refined petroleum products, either clean or dirty.
A13	Tankers	A13B2TU	Tanker (unspecified)	A tanker whose cargo is unspecified.
A13	Tankers	A13C2LA	Asphalt/Bitumen Tanker	A tanker for the bulk carriage of asphalt/bitumen at temperatures between 150 and 200 deg C.
A13	Tankers	A13E2LD	Coal/Oil Mixture Tanker	A tanker for the bulk carriage of a cargo of coal and oil mixed as a liquid and maintained at high temperatures.

A.1.6. Chemical Tankers

Chemical tankers have StatCodes A12 and A14.

StatCode Level 3	Description	StatCode Level 5	Description	Definition
A12	Tankers	A12A2LP	Molten Sulphur Tanker	A tanker for the bulk carriage of molten sulphur in insulated tanks at a high temperature.
A12	Tankers	A12A2TC	Chemical Tanker	A tanker for the bulk carriage of chemical cargoes, lube oils, vegetable/animal oils and other chemicals as defined in the International Bulk Chemical Code. Tanks are coated with suitable materials which are inert

StatCode Level 3	Description	StatCode Level 5	Description	Definition
				to the cargo.
A12	Tankers	A12A2TL	Parcels Tanker	A chemical tanker with many segregated cargo tanks to carry multiple grades of chemicals as defined in the International Bulk Chemical Code. Typically these can have between 10 and 60 different tanks.
A12	Tankers	A12B2TR	Chemical/Products Tanker	A chemical tanker additionally capable of the carriage of clean petroleum products.
A12	Tankers	A12C2LW	Wine Tanker	A cargo ship designed for the bulk transport of wine in tanks. Tanks will be stainless steel or lined. New vessels will be classified as chemical carriers.
A12	Tankers	A12D2LV	Vegetable Oil Tanker	A cargo ship designed for the bulk transport of vegetable oils in tanks. Tanks will be stainless steel or lined. New vessels will be classified as chemical carriers.
A12	Tankers	A12E2LE	Edible Oil Tanker	A cargo ship designed for the bulk transport of edible oils in tanks. Tanks will be stainless steel or lined. New vessels will be classified as chemical carriers.
A12	Tankers	A12F2LB	Beer Tanker	A tanker for the bulk carriage of beer.
A12	Tankers	A12G2LT	Latex Tanker	A tanker for the bulk carriage of latex.
A14	Tankers	A14A2LO	Water Tanker	A tanker for the bulk carriage of water.
A14	Tankers	A14E2LJ	Fruit Juice Carrier, Refrigerated	A tanker for the bulk carriage of fruit juice concentrate in refrigerated tanks. May be arranged for the additional carriage of containers on deck.
A14	Tankers	A14F2LM	Molasses Tanker	A tanker for the bulk carriage of molasses.
A14	Tankers	A14G2LG	Glue Tanker	A tanker for the bulk carriage of glue.
A14	Tankers	A14H2LH	Alcohol Tanker	A tanker for the bulk carriage of alcohol.
A14	Tankers	A14N2LL	Caprolactam Tanker	A tanker for the bulk carriage of caprolactam, a chemical used in the plastics industry for the production of polyamides.

A.1.7. LNG Carriers

LNG carriers have level 4 StatCode A11A.

StatCode Level 4	Description	StatCode Level 5	Description	Definition
A11A	Tankers	A11A2TN	LNG Tanker	A tanker for the bulk carriage of Liquefied Natural Gas (primarily methane) in independent insulated tanks. Liquefaction is achieved at temperatures down to -163 deg C.
	Tankers	A11A2TQ	CNG Tanker	A tanker for the bulk carriage of Compressed Natural Gas. Cargo remains in gaseous state but is highly compressed.
	Tankers	A11A2TZ	Combination Gas Tanker (LNG/LPG)	A tanker for the bulk carriage of Liquefied Natural Gas (primarily methane) and/or Liquefied Petroleum Gas in independent insulated tanks.

A.1.8. Gas Carriers

Gas carriers have level 4 StatCodes A11B and A11C.

StatCode Level 4	Description	StatCode Level 5	Description	Definition
A11B	Tankers	A11B2TG	LPG Tanker	A tanker for the bulk carriage of Liquefied Petroleum Gas in insulated tanks, which may be independent or integral. The cargo is pressurised (smaller vessels), refrigerated (larger vessels) or both ('semi-pressurised') to achieve liquefaction.
	Tankers	A11B2TH	LPG/Chemical Tanker	An LPG tanker additionally capable of the carriage of chemical products as defined in the International Bulk Chemical Code.
A11C	Tankers	A11C2LC	CO2 Tanker	A tanker for the bulk carriage of liquefied carbon dioxide.

A.1.9. Bulk carriers

Bulk carriers, i.e. carriers that are designed only to carry dry bulk and are not combination carriers, have StatCodes A21, A23 and A24.

StatCode Level 3	Description	StatCode Level 5	Description	Definition
A21	Bulk Dry	A21A2BC	Bulk Carrier	A single deck cargo vessel with an arrangement of topside ballast tanks for the carriage of bulk dry cargo of a homogeneous nature.
A21	Bulk Dry	A21A2BG	Bulk Carrier, Laker Only	A single deck cargo vessel with dimensions suited to the limitations of Great Lakes of North America trade, unsuitable for open sea navigation. Hatches are more numerous than standard bulk carriers, and much wider than they are long.
A21	Bulk Dry	A21A2BV	Bulk Carrier (with Vehicle Decks)	A bulk carrier with movable decks for the additional carriage of new vehicles.
A21	Bulk Dry	A21B2BO	Ore Carrier	A single deck cargo ship fitted with two longitudinal bulkheads. Ore is carried in the centreline holds only.
A23	Self-Discharging Bulk Dry	A23A2BD	Bulk Carrier, Self-discharging	A bulk carrier fitted with self-trimming holds, a conveyor belt (or similar system) and a boom which can discharge cargo alongside or to shore without the assistance of any external equipment.
A23	Self-Discharging Bulk Dry	A23A2BK	Bulk Carrier, Self-discharging, Laker	A Great Lakes bulk carrier fitted with a conveyor belt (or similar system) and a boom which can discharge cargo alongside or to shore without the assistance of any external equipment.
A24	Other Bulk Dry	A24A2BT	Cement Carrier	A single deck cargo vessel fitted with pumping arrangements for the carriage of cement in bulk. There are no weather deck hatches. May be self-discharging.
A24	Other Bulk Dry	A24B2BW	Wood Chips Carrier	A single deck cargo vessel with high freeboard for the carriage of wood chips. May be self-discharging.

StatCode Level 3	Description	StatCode Level 5	Description	Definition
A24	Other Bulk Dry	A24C2BU	Urea Carrier	A single deck cargo vessel for the carriage of urea in bulk. May be self-discharging.
A24	Other Bulk Dry	A24D2BA	Aggregates Carrier	A single deck cargo vessel for the carriage of aggregates in bulk. Also known as a Sand Carrier. May be self-discharging.
A24	Other Bulk Dry	A24E2BL	Limestone Carrier	A single deck cargo vessel for the carriage of limestone in bulk. There are no weather deck hatches. May be self-discharging.
A24	Other Bulk Dry	A24G2BS	Refined Sugar Carrier	A single deck cargo vessel for the carriage of refined sugar. Sugar is loaded in bulk and bagged in transit (BIBO - Bulk In - Bag Out).

A.1.10. General cargo ship

General cargo ships have StatCode A31 or, when they are also able to carry passengers, A32. Note that this definition includes General Cargo Ship with a Ro-Ro facility, general cargo ships that are also equipped to carry liquids and general cargo/passenger ships.

StatCode Level 3	Description	StatCode Level 5	Description	Definition
A31	General Cargo	A31A2GA	General Cargo Ship (with Ro-Ro facility)	A general cargo ship with the additional capability to be loaded and unloaded by ro-ro access to a limited portion of the cargo space.
A31	General Cargo	A31A2GE	General Cargo Ship, Self-discharging	A cargo ship fitted with a conveyor belt (or similar system) and a boom which can discharge cargo alongside or to shore without the assistance of any external equipment. These ships do not comply with Bulk Carrier regulations.
A31	General Cargo	A31A2GO	Open Hatch Cargo Ship	A large single deck cargo vessel with full width hatches and boxed holds for the carriage of unitised dry cargo such as forest products and containers. Many are fitted with a gantry crane.
A31	General Cargo	A31A2GS	General Cargo/Tanker (Container/oil/bulk - COB ship)	A general cargo ship with reversible hatch covers; one side is flush and the other is fitted with baffles for use with liquid cargoes. Containers can be carried on the hatch covers in dry cargo mode.
A31	General Cargo	A31A2GT	General Cargo/Tanker	A general cargo ship fitted with tanks for the additional carriage of liquid cargo.
A31	General Cargo	A31A2GX	General Cargo Ship	A single or multi deck cargo vessel for the carriage of various types of dry cargo. Single deck vessels will typically have box shaped holds. Cargo is loaded and unloaded through weather deck hatches.
A31	General Cargo	A31B2GP	Palletised Cargo Ship	A single or multi deck cargo ship loaded and unloaded by way of pallets lift(s). There are no weather deck hatches.
A31	General Cargo	A31C2GD	Deck Cargo Ship	A vessel arranged for carrying unitised cargo on deck only. Access may be by use of a ro-ro ramp.
A32	Passenger/General Cargo	A32A2GF	General Cargo/Passenger Ship	A general cargo ship with accommodation for the carriage of more than 12 passengers.

A.1.11. Refrigerated cargo ships

Refrigerated cargo ships have StatCode A34.

StatCode Level 3	Description	StatCode Level 5	Description	Definition
A34	Refrigerated Cargo	A34A2GR	Refrigerated Cargo Ship	A multi deck cargo ship for the carriage of refrigerated cargo at various temperatures.

A.1.12. Vehicle carriers

Vehicles carriers have StatCode A35B. Note that Bulk Carrier (with Vehicle Decks) (StatCode A21A2BV) would be included under bulk carriers, not under vehicle carriers.

StatCode Level 4	Description	StatCode Level 5	Description	Definition
A35B	Ro-Ro Cargo	A35B2RV	Vehicles Carrier	A multi deck cargo ship for the carriage of new cars and trucks which are loaded via ramps.

A.1.13. Combination carriers

Combination carriers have StatCode A22.

StatCode Level 3	Description	StatCode Level 5	Description	Definition
A22	Bulk Dry/Liquid	A22A2BB	Bulk/Oil Carrier (OBO)	A bulk carrier arranged for the alternative (but not simultaneous) carriage of crude oil.
A22	Bulk Dry/Liquid	A22A2BN	Bulk/Caustic Soda Carrier (CABU)	A bulk carrier with certain holds arranged with tanks for the alternative (but not simultaneous) carriage of caustic soda.
A22	Bulk Dry/Oil	A22A2BP	Ore/Bulk/Products Carrier	A bulk carrier arranged for the alternative (but not simultaneous) carriage of oil products.
A22	Bulk Dry/Liquid	A22B2BR	Ore/Oil Carrier	An ore carrier arranged for the alternative (but not simultaneous) carriage of crude oil.

A.1.14. Container/Ro-Ro ships

Container/Ro-Ro ships have StatCode A35C.

StatCode Level 4	Description	StatCode Level 5	Description	Definition
A35C	Ro-Ro Cargo	A35C2RC	Container/Ro-Ro Cargo Ship	A hybrid of a container ship and a ro-ro cargo ship in independent sections.