

**European Sustainable Shipping Forum
Sub-group on Shipping MRV Monitoring**

Draft Guidance Document

The Shipping MRV Regulation – Determination of cargo carried

revised version of 19 May 2017

This document reflects the outcomes of deliberations of the Shipping MRV Monitoring sub-group of the European Sustainable Shipping Forum of which the European Commission is part. It is not an official document adopted by the European Commission.

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1 INTRODUCTION

From 1st January 2018 companies are required to collect and later report verified annual data on CO₂ emissions and other relevant information for ships over 5 000 gross tons on voyages from and to EU ports. Furthermore, by 30 August 2017, for the ships concerned, companies have to submit to an accredited MRV shipping verifier a monitoring plan, consisting of complete and transparent documentation of the monitoring method and procedures to be applied for each of the ships under its responsibilities.

The legal framework is set by Regulation 2015/757 on monitoring, reporting and verification of carbon dioxide emissions from maritime transport and amending Directive 2009/16/EC ("the shipping MRV Regulation")¹.

Further technical legislation has been adopted by the European Commission to implement the MRV requirements. This includes:

- Commission Delegated Regulation (EU) 2016/2071 of 22 September 2016 on amending Regulation 2015/757 as regards the methods for monitoring CO₂ emissions and the rules for monitoring other relevant information²
- Commission Implementing Regulation (EU) 2016/1928 of 4 November 2016 on determination of cargo carried for categories of ship others than passengers ro-ro and container ships pursuant to Regulation (EU) 2015/757³
- Commission Implementing Regulation (EU) 2016/1927 of 4 November 2016 setting templates for monitoring plans, emissions reports and documents of compliance pursuant to Regulation (EU) 2015/757⁴

The present guidance document aims at explaining the legal requirements as regards the monitoring and reporting of cargo carried and at providing additional information to companies and verifiers regarding the application of the rules.

2 PARAMETERS FOR CARGO CARRIED

Parameters for 'cargo carried' are specified for 14 ship types and a category 'others' (in Annex II to the Shipping MRV Regulation, as amended, and in Commission Implementing Regulation (EU) 2016/1928). Furthermore, the emissions report template as specified by Commission Implementing Regulation (EU) 2016/1927 allows for the reporting of additional parameters on a voluntary basis.

The following table provides an overview of the ship categories, their definitions and the applicable cargo parameters:

¹ http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2015.123.01.0055.01.ENG

² http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2016.320.01.0001.01.ENG

³ http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2016.299.01.0022.01.ENG

⁴ http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2016.299.01.0001.01.ENG

Table 1: Overview on ship types and their definitions

Ship type	Definition in the context of the Shipping MRV Regulation	Cargo parameter	Remarks
Passenger ship	-	Number of passengers	To be understood as ship with a passenger capacity above 12 persons but not carrying cargo.
Ro-ro ship	A ship designed for the carriage of roll-on-roll-off cargo transportation units or with roll-on-roll-off cargo spaces.	Mass of the cargo on board, determined as <ul style="list-style-type: none"> • the actual mass <i>or</i> • as the number of cargo units (trucks, cars, etc.) multiplied by default values for their weight⁵ <i>or</i> • occupied lane meters multiplied by default values for their weight 	To be understood as ro-ro cargo ships.
Container ship	A ship designed exclusively for the carriage of containers in holds and on deck.	<ul style="list-style-type: none"> • Total weight in metric tonnes of the cargo or, failing that, • the amount of 20-foot equivalent units (TEU) multiplied by default values for their weight. <p>Where cargo carried by a container ship is defined in accordance with applicable IMO Guidelines or instruments pursuant to the Convention for the Safety of Life at Sea (SOLAS Convention), that definition shall be deemed to comply with this Regulation.</p>	
Oil Tanker	A ship constructed or adapted primarily to carry crude oil or petroleum products in bulk in its cargo spaces, other than combination carriers, noxious liquid substances (NLS) tankers or gas tankers.	Mass of the cargo on board	

⁵ 'Weight' and 'mass' are to be considered as synonyms in the context of the Shipping MRV Regulation and in this document.

Ship type	Definition in the context of the Shipping MRV Regulation	Cargo parameter	Remarks
Chemical tanker	A ship constructed or adapted for the carriage in bulk of any liquid product listed in Chapter 17 of the International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk or a ship constructed or adapted to carry a cargo of NLS in bulk.	Mass of the cargo on board	In addition to the monitoring and Additional voluntary reporting of annual average density of the cargoes transported
LNG carrier	A tanker for the bulk carriage of liquefied natural gas (LNG) (primarily methane) in independent insulated tanks.	Volume of the cargo on discharge, or if cargo is discharged at several occasions during a voyage, the sum of the cargo discharged during a voyage and the cargo discharged at all subsequent ports of call until new cargo is loaded.	
Gas carrier	A tanker for the bulk carriage of liquefied gases other than LNG.	Mass of the cargo on board	
Bulk carrier	A ship which is intended primarily to carry dry cargo in bulk, including types such as ore carriers as defined in Regulation 1 of Chapter XII of the 1998 International Convention for the Safety of Life at Sea (the SOLAS Convention), but excluding combination carriers.	Mass of the cargo on board	Additional voluntary reporting of annual average density of the cargoes transported
General cargo ship	A ship with a multi-deck or single-deck hull designed primarily for the carriage of general cargo excluding specialised 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.	Deadweight carried for laden voyages and zero for ballast voyages	Mass of the cargo on board as additional voluntary parameter
Refrigerated cargo ship	A ship designed exclusively for the carriage of refrigerated cargoes in holds.	Mass of the cargo on board	

Ship type	Definition in the context of the Shipping MRV Regulation	Cargo parameter	Remarks
Vehicle carrier	A multi-deck roll-on-roll-off cargo ship designed for the carriage of empty cars and trucks.	Mass of the cargo on board, determined as <ul style="list-style-type: none"> the actual mass <i>or</i> as the number of cargo units multiplied by default values for their weight <i>or</i> occupied lane meters multiplied by default values for their weight 	Deadweight carried as additional voluntary parameter
Combination carrier	A ship designed to load 100 % deadweight with both liquid and dry cargo in bulk.	Mass of the cargo on board	Additional voluntary reporting of annual average density of the cargoes transported
Ro-pax ship	A ship, which carries more than 12 passengers and which has roll-on/roll-off cargo space on board.	<ul style="list-style-type: none"> Number of passengers on board <i>and</i> Mass of cargo on board, determined as <ul style="list-style-type: none"> the actual mass or the number of cargo units (trucks, cars, etc.) multiplied by default values for their weight <i>or</i> occupied lane meters multiplied by default values for their weight 	
Container/ Ro-Ro cargo ship	A hybrid of a container ship and a ro-ro cargo ship in independent sections.	Volume of the cargo on board, determined as the <i>sum</i> <ul style="list-style-type: none"> of the number of cargo units (cars, trailers, trucks and other standard units) multiplied by a default area and by the height of the deck (the distance between the floor and the structural beam) <i>and</i> of the number of occupied lane-metres multiplied by the height of the deck (for other ro-ro cargo) <i>and</i> of the number of TEUs multiplied by 38,3 m³ 	
Other ship types	-	<ul style="list-style-type: none"> Mass of the cargo on board <i>or</i> Deadweight carried for laden voyages and zero for ballast voyages 	Other ship types not falling under any of the above categories

3 GUIDANCE ON APPLICATION OF PARAMETERS FOR CARGO CARRIED

This section provides further guidance for some ship types to which more complex rules apply.

3.1 Determination of cargo carried for ro-ro ships

For ro-ro (cargo) ships, the company must specify in the monitoring plan (Table C.5.) which of the following options will be used for determining cargo carried:

1. Actual cargo weight
2. Actual loaded lanemeters multiplied with the default weight per lanemeter
3. Number and types of units multiplied by default weight per unit

Where options 2 or 3 are applied, the company must list in the monitoring plan (Table C.5.) the relevant default values to be used. These default values have to be representative for the trade in which the vessel is intended to trade and the so applied default value(s) have to be substantiated by the company to the satisfaction of the verifier. Such substantiation can be:

- past performance,
- on the performance of a vessel serving the same trade,
- based on the company's estimated use for the coming period,
- based on another method that satisfies the verifier.

The so declared default weights have to remain unchanged for the reporting period unless the monitoring plan is revised in accordance with Article 7 of the Shipping MRV Regulation to reflect a fundamental change to the average weights per lanemeter or per unit during a reporting period.

3.2 Determination of cargo carried for ro-ro passenger (ro-pax) ships

For ro-pax ships, the company must specify in the monitoring plan (Table C.5.) which of the following options will be used for determining cargo carried:

1. Actual cargo weight
2. Actual loaded lanemeters multiplied with the default weight per lanemeter
3. Number and types of units multiplied by default weight per unit

Where options 2 or 3 are applied, the company must list in the monitoring plan (Table C.5.) the relevant default values to be used. These default values have to be representative for the trade in which the vessel is intended to trade and the so applied default value(s) have to be substantiated by the company to the satisfaction of the verifier. Such substantiation can be:

- past performance,
- on the performance of a vessel serving the same trade,
- based on the company's estimated use for the coming period,
- based on another method that satisfies the verifier.

The so declared default weights have to remain unchanged for the reporting period unless the monitoring plan is revised in accordance with Article 7 of the Shipping MRV Regulation to reflect a fundamental change to the average weights per lanemeter or per unit during a reporting period.

The passenger vehicle units loaded in the area allocated to passenger vehicles (which is included in the area allocated to the passenger area), must not be included in the calculation of cargo mass.

3.3 Determination of cargo carried for vehicle carriers

For vehicle carriers, the company must specify in the monitoring plan (Table C.5.) which of the following options will be used for determining cargo carried:

1. Actual cargo weight
2. Actual loaded lanemeters multiplied with the default weight per lanemeter
3. Number and types of units multiplied by default weight per unit

Where options 2 or 3 are applied, the company must list in the monitoring plan (Table C.5.) the relevant default values to be used. These default values have to be representative for the trade in which the vessel is intended to trade and the so applied default value(s) have to be substantiated by the company to the satisfaction of the verifier. Such substantiation can be:

- past performance,
- on the performance of a vessel serving the same trade,
- based on the company's estimated use for the coming period,
- based on another method that satisfies the verifier.

The so declared default weights have to remain unchanged for the reporting period unless the monitoring plan is revised in accordance with Article 7 of the Shipping MRV Regulation to reflect a fundamental change to the average weights per lanemeter or per unit during a reporting period.

In addition, on a voluntary basis, for vehicle carriers, cargo carried may also be determined as deadweight carried for laden voyages (and zero for ballast voyages).

3.4 Determination of cargo carried for general cargo ships

Commission Implementing Regulation (EU) 2016/1928 specifies the parameter for cargo carried to be applied for general cargo ships as "*deadweight carried for laden voyages and zero for ballast voyages*".

For laden voyages, deadweight carried is calculated as follows:

$DWT\ carried = volume\ displacement \times water\ density - ship's\ lightweight - fuel\ weight$

- DWT carried: expressed in metric tonnes
- Volume displacement: measured volume displacement of a ship at a load draught condition, determined as the volume of the moulded displacement of the ship, excluding appendages, in a ship with a metal shell, and means the volume of displacement to the outer surface of the hull in a ship with a shell of any other material, expressed in cubic metres
- Water density: relative water density at departure of the laden voyage concerned, expressed in metric tonnes per cubic metre
- Ship's lightweight: the actual weight of the ship with no fuel, passengers, cargo, water and other consumables on board, expressed in metric tonnes
- Fuel weight: weight of the fuel on board determined at the departure of the laden voyage concerned, expressed in metric tonnes

For the determination of the above parameters, following methods and sources should be used:

- Visual readings of the draught can be used to calculate the volume displacement with the help of a certified draft measurement scale. Digital readings could be used to validate the visual readings. For the ship's crew it will not be that burdensome, as the crew at almost all times already do visual reading. Draught measurements should be done just before departure/beginning of the voyage.
- The ship's lightweight should be taken from the stability booklet approved by the Administration or an organization recognized by it.
- To calculate the amount of fuel (by weight) the same three proposed monitoring methods (A, B and C) as for the fuel consumption should be used.

The methods applied to determine the volume displacement, the water density and the fuel weight have to be consistently applied during the entire reporting period and have to be specified in the monitoring plan (Table C.5.).

In addition, on a voluntary basis, for general cargo ships, cargo carried may also be determined as mass of the cargo on board.

3.5 Determination of cargo carried for container ships

The Shipping MRV Regulation foresees two options to determine the amount for cargo carried which is expressed as mass of the cargo on board:

1. Actual cargo weight
2. Number of 20-foot equivalent units (TEU) multiplied by default values for their weight

The selected option has to be specified in the monitoring plan (Table C.5.) and applied consistently for the entire reporting period.

For option 1, the actual cargo weight should be determined using the verified gross mass information used under the new SOLAS regulations applicable to packed containers (reference is made to MSC.1/Circ.1475).

Where option 2 is applied, the company must list in the monitoring plan (Table C.5.) the relevant default values to be used. The use of a single default value of 12 tonnes per TEU is recommended as well as the use of a single default value of 2 tonnes per empty TEU.

It should be noted that the container industry uses a variety of standard container sizes, but standard default weights (consistent with the 12 tonne default figure per TEU and 2 tonnes per empty TEU) are easily calculated. The use of following standard conversion factors and default weights as noted in Table 2 is recommended:

Table 2: TEU Conversion factors and default weights

Container Size	TEU Conversion factor (TEU equivalents)	Default weight empty containers (in tonnes)	Default container weights (in tonnes)
20' ST TEU 8'6" plus 20' High Cube (HC)	1.0	2	12
40' ST FFE 8' 6" (forty-foot equivalent unit)	2.0	4	24
40' High Cube (FFE 9'6") plus 45' and 48'	2.25	4.5	27

ST - Standard, TEU - twenty-foot equivalent unit, FFE – forty-foot equivalent, HC – high cube

3.6 Determination of cargo carried for LNG carriers

Cargo carried for LNG carriers is determined as volume. LNG carriers often use boil off gas as a fuel. This means that the amount of LNG on board at the start of a voyage is larger than the amount of LNG discharged as cargo at the end of a voyage. Moreover, they often keep a small amount of LNG in the tank to maintain a low temperature. Therefore, for the determination of cargo carried, the amount of cargo is monitored at the discharge terminal.

The discharged volume of LNG is equal to the amount of cargo carried in case of discharge of the total amount at one single location. In case of discharge at several locations in a port of call, the discharged volumes have to be aggregated. In case of further discharges in other ports of call (in other words: during the subsequent voyages), the volumes discharges in these ports have to be added to the discharged volume, until new cargo is loaded.

For example, if an LNG carrier loads LNG at port A, then sails to port B where it discharges $X \text{ m}^3$ and onwards to port C where it discharges $Y \text{ m}^3$, and finally returns to port A where it does not discharge any LNG, the amount of cargo on the voyage from A to B amounts to $X+Y \text{ m}^3$, the amount of cargo on the voyage from B to C amounts to $Y \text{ m}^3$, and the amount of cargo on the voyage from C to A is zero". This example also shows how to calculate the amount of cargo on voyages where no cargo is discharged.

To obtain information about discharged volumes of cargo, the Custody Transfer Management System (CTMS) should be used.

3.7 Determination of cargo carried for chemical tankers, bulk carriers and combination carriers

In addition to the monitoring and reporting of the amount of cargo carried, on a voluntary basis, the average density of the cargoes transported in the reporting period could be monitored and reported for chemical tankers, bulk carriers and combination carriers.

For that purpose, information about the methodology and procedures applied should be specified in the monitoring plan (Table C.5.) and applied consistently for the entire reporting period.

3.8 Determination of cargo carried for other ship types

For all other ships not covered by the definitions of one of the 14 categories, the company selects one of the two parameters:

- Mass of the cargo on board
- Deadweight carried for laden voyages and zero for ballast voyages

This choice is to be specified in the monitoring plan (Table C.5.) and applied consistently for the entire reporting period.
