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ANNEX

ANNEX

to the

**Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE
COUNCIL**

**amending Regulations (EU) 2015/757 and (EU) 2023/1805 to simplify and streamline
monitoring, reporting and verification and to align with revisions of the EU Emissions
Trading System**

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ANNEX

Annex I to Regulation (EU) 2015/757 is amended as follows:

(1) the title of Annex I is replaced by the following:

‘Methods for monitoring greenhouse gas emissions and energy used’;

(2) Part A is amended as follows:

(a) the heading of Part A is replaced by the following:

**‘CALCULATION OF GREENHOUSE GAS EMISSIONS AND ENERGY USED
(ARTICLE 9)’;**

(b) point 1 is replaced by the following:

‘1. Formulae for the calculation of greenhouse gas emissions

For the purposes of calculating greenhouse gas emissions, companies shall apply the following formula:

$$GHG_{MRV} = GHG_{WtT_{MRV}} + GHG_{TtW_{MRV}}$$

Where $GHG_{WtT_{MRV}} =$

$$\sum_i^{n_{fuel}} M_i \times CO_{2eq\ WtT,i} \times LCV_i + \sum_k^c E_k \times CO_{2eq\ electricity,k}$$

And $GHG_{TtW_{MRV}} =$

$$\sum_i^{n_{fuel}} \sum_j^m M_{i,j} \times \left[\left(1 - \frac{1}{100} C_{slip\ j} \right) \times (CO_{2eq,TtW,i,j}) + \left(\frac{1}{100} C_{slip\ j} \times CO_{2eq\ TtW,slip,i,j} \right) \right]$$

Fuel consumption shall be calculated separately for emissions from voyages between ports under a Member State’s jurisdiction, from voyages which departed from ports under a Member State’s jurisdiction, from voyages to ports under a Member State’s jurisdiction, and for emissions within ports under the jurisdiction of a Member State. Fuel consumption within ports under the jurisdiction of a Member State at berth shall be calculated separately.

Term	Explanation
GHG_{MRV}	Greenhouse gas emissions to be reported under this Regulation, expressed in tonnes CO ₂ equivalent, where ‘CO ₂ equivalent’ means the metric measure used to compute the emissions from CO ₂ , CH ₄ and N ₂ O on the basis of their global warming potential, by converting amounts of CH ₄ and N ₂ O to the equivalent amount of carbon dioxide with the same global warming potential.
$GHG_{WtT_{MRV}}$	Well-to-Tank Greenhouse gas emissions to be reported under this Regulation, expressed in tonnes CO ₂ equivalent, where ‘CO ₂ equivalent’ means the metric measure used to compute the emissions from CO ₂ , CH ₄ and N ₂ O on the basis of their global warming potential, by converting amounts of CH ₄ and N ₂ O to the equivalent amount of carbon dioxide with the same global warming potential.

GHG TtW _{MRV}	Tank-to-Wake Greenhouse gas emissions to be reported under this Regulation, expressed in tonnes CO ₂ equivalent, where ‘CO ₂ equivalent’ means the metric measure used to compute the emissions from CO ₂ , CH ₄ and N ₂ O on the basis of their global warming potential, by converting amounts of CH ₄ and N ₂ O to the equivalent amount of carbon dioxide with the same global warming potential.
CO _{2eq} WtT,i	WtT GHG emission factor of fuel i [gCO _{2eq} /MJ]
GWP_{CH_4}	Global warming potential of CH ₄ over 100 years as referred to in the Annex to Delegated Regulation (EU) 2020/1044 ⁽¹⁾ .
GWP_{N_2O}	Global warming potential of N ₂ O over 100 years as referred to in the Annex to Commission Delegated Regulation (EU) 2020/1044.
GWP_{CO_2}	Global warming potential of CO ₂ over 100 years as referred to in the Annex to Commission Delegated Regulation (EU) 2020/1044
i	Index corresponding to the fuels used on board the ship in the reporting period.
j	Index corresponding to emission sources and fuel consumers on board the ship.
k	Index corresponding to substitute sources of energy and OPS connection points
n	Total number of fuel types delivered to the ship in the reporting period
c	Total number of OPS connection points
m	Total number of emission source units and fuel consumers
E _k	Electricity delivered to the ship per OPS connection, or energy from substitute sources of energy per point k [MJ]
W	Energy use from wind-assisted propulsion systems installed on board
CO _{2eq} WtT,i	WtT GHG emission factor of fuel i [gCO _{2eq} /MJ]
$CO_{2eq\ electricity,k}$	WtT GHG emission factor associated with the electricity delivered to the ship at berth per OPS connection point k [gCO _{2eq} /MJ]
LCV _i	Lower calorific value of fuel i [MJ/gFuel]
M _{i,j}	Fuel consumption, as mass of the specific fuel i used in the emission source or fuel consumer j.
C _{slipj}	Tank to Wake emission factor of slipped fuel (slippage coefficient) as a percentage of the mass of the fuel i used by the emission source or fuel consumer j [%].

	C_{slipj} includes fugitive and slipped emissions. Fugitive and slipped emissions are emissions caused by the amount of fuel that does not reach the combustion chamber of the emission source or fuel consumer or that is not consumed by the emission source or fuel consumer because they are un-combusted, vented, or leaked from the system.
$C_{fCO_2i,j}$	Tank to Wake CO ₂ emission factor by fuel i, as defined in column 6 in the table under point 2 of this Part towards emission source and fuel consumer j.
$C_{fCH_4i,j}$	Tank to Wake CH ₄ emission factor by fuel i, as defined in column 7 in the table under point 2 of this Part towards emission source and fuel consumer j.
$C_{fN_2O,i,j}$	Tank to Wake N ₂ O emission factor by fuel i, as defined in column 8 in the table under point 2 of this Part towards emission source and fuel consumer j.
$C_{sfCO_2i,j}, C_{sfCH_4i,j}, C_{sfN_2O,i,j}$	TtW GHG emission factors by slipped fuel i towards emission source and fuel consumer j [gGHG/gFuel]
$CO_{2eq,TtWslipi,j}$	TtW CO₂ equivalent emissions of slipped fuel i towards emission source and fuel consumer j [gCO₂eq/gFuel] $CO_{2eq,TtWslipi,j} = \left(C_{sfCO_2j} \times GWP_{CO_2} + C_{sfCH_4j} \times GWP_{CH_4} + C_{sfN_2O,j} \times GWP_{N_2O} \right)_i$ Where: C_{sfCO_2}, and C_{sfN_2O}, = 0. $C_{sfCH_4j} = 1$.
$CO_{2eq,TtWi,j}$	TtW CO₂ equivalent emissions factor of combusted fuel i in emission source j [gCO₂eq/gFuel] $CO_{2eq,TtWi,j} = \left(C_{fCO_2j} \times GWP_{CO_2} + C_{fCH_4j} \times GWP_{CH_4} + C_{fN_2O,j} \times GWP_{N_2O} \right)_i$
(¹) Commission Delegated Regulation (EU) 2020/1044 of 8 May 2020 supplementing Regulation (EU) 2018/1999 of the European Parliament and of the Council with regard to values for global warming potentials and the inventory guidelines and with regard to the Union inventory system and repealing Commission Delegated Regulation (EU) No 666/2014 (OJ L 230, 17.7.2020, p. 1).	

’;

(c) the following point 1a is inserted:

‘1a. Formula for the calculation of energy used

For the purposes of calculating the energy used under the scope of this Regulation, companies shall consider the fuel consumption from all fuel consumers and the energy used from all substitute sources of energy on board during the period. To that end, companies shall apply the following formula:

$$Energy = \sum_i^{n\ fuel} Mi \times LCV_i + \sum_k^c E_k + W$$

For the purpose of determining the mass of fuel (M_i), companies shall apply the methodologies defined in Section B of this Annex.

When determining the amount of energy used from substitute sources of energy ($\sum_k^c E_k$), companies shall rely on the information contained in the Electricity Delivery Note, as referred in Annex I to Regulation (EU) 2023/1805 for the electricity from OPS, and on onboard metering for other forms of renewable electricity produced onboard.

For the purpose of determining the amount of energy used from wind power (W), companies shall apply the international standards and certification references specified in the implementing acts referred to in Article 5(4) of this Regulation. Pending the entry into force of the relevant implementing acts, the term W shall be set to zero.

Energy use shall be calculated separately for voyages between ports under a Member State’s jurisdiction, for voyages which departed from ports under a Member State’s jurisdiction, for voyages to ports under a Member State’s jurisdiction, and for the activities within ports under the jurisdiction of a Member State. Energy use within ports under the jurisdiction of a Member State at berth shall be calculated separately.’;

(d) point 2 is replaced by the following:

‘2. In the following table:

- TBM stands for ‘to be measured’;
- N/A stands for ‘not available’;
- The dash means ‘not applicable’;

E is established in accordance with the methodologies laid down in Directive (EU) 2018/2001, Part C of Annex V and Part B of Annex VI, Regulation (EU) 2023/1185 and Regulation (EU) 2025/2359. For renewable and low carbon fuels the default Well-to-Tank values should be calculated using the values in the Proof of Sustainability, as defined under Directive (EU) 2018/2001 and Directive (EU) 2024/1788. The Well-to-Tank (WTT) emissions factor is determined by deducting the emissions from fuel use (E_u ¹) from the fuel’s total life-cycle emissions (E).

The default values, as contained in the table below, for emission factors for fuels emission sources, and fuel consumers used on board the ship shall be applied for the purpose of this Regulation.

Where a cell indicates either TBM or N/A, the highest default value of the fuel class in the same column shall be used. Where, for a particular fuel class, all cells in the same column indicate either TBM or N/A, default value of the least favourable fossil fuel type shall be used. This rule does not apply to column 9 where TBM or N/A refers to non available values for the emissions source. In the case of no default value for Cslip, a certified value in

¹ E_u identifies emissions from fuel use as defined under Directive (EU) 2018/2001.

accordance with Article 10(6) of Regulation (EU) 2023/1805 of the European Parliament and of the Council* shall be used.

Companies may diverge from the default values for the emission factors listed in the table below, following, as applicable, the application of the conditions and restrictions provided in Article 10(5) and (6) of Regulation (EU) 2023/1805.

Where there is fuel blending, each fuel shall be considered separately.

1	2	3	4	5	6	7	8	9
			WtT	TtW				
Fuel Class	Pathway name	LCV $\left[\frac{MJ}{g}\right]$	CO_{2eq} WtT $\left[\frac{gCO_2eq}{MJ}\right]$	Fuel Consumer Unit Class	C_{fCO_2} $\left[\frac{gCO_2}{gFuel}\right]$	C_{fCH_4} $\left[\frac{gCH_4}{gFuel}\right]$	C_{fN_2O} $\left[\frac{gN_2O}{gFuel}\right]$	C_{slip} As % of the mass of the fuel used by the engine
Fossil	HFO ISO 8217:2024 Grades RME to RMK and fossil component of RF80 to RF500	0,0405	13,5	ALL	3,114	0,00005	0,00018	-
	LFO ISO 8217:2024 Grades RMA and fossil component of RF20	0,041	13,2	ALL	3,151	0,00005	0,00018	-
	MDO MGO ISO 8217:2024 Grades DMX to DMB and fossil component of DFA, DFZ and DFB	0,0427	14,4	ALL	3,206	0,00005	0,00018	-

Fossil	LNG	0,0491	18,5	LNG Otto (dual fuel medium speed)	2,750	0	0,0001 1	3,1
				LNG Otto (dual fuel slow speed)				1,7
				LNG Diesel (dual fuel slow speed)				0,2
				LBSI				2,6
	LPG	0,046	7,8	ALL Butane Propane	3,030	TBM	TBM	N/A
	H2 (natural gas)	0,12	132	Fuel Cells	0	0	-	-
				ICE	0	0	TBM	-
	NH3 (natural gas)	0,0186	121	Fuel Cells	0	N/A	TBM	N/A
				ICE	0	N/A	TBM	N/A
	Methanol (natural gas)	0,0199	31,3	ALL ICEs	1,375	TBM	TBM	-
	Ethane	0,0471	18,5	ALL	2,927	TBM	TBM	N/A
Biofuels	Ethanol Production Pathways Directive 2018/2001	Value as offset out in (EU) Annex III of Directive (EU) 2018/2001 ¹ of (EU) Directive 2018/2001	$E - \frac{C_{fCO_2}}{LCV}$	ALL	1,913	TBM	TBM	-
	Bio-diesel Production Pathways Directive 2018/2001			ALL	2,834	TBM	TBM	-
	Hydrotreated Vegetable Oil			ALL	3,115	0,0000	0,0001	-

	(HVO) Production Pathways of Directive (EU) 2018/2001					5	8	
	Bio-methanol Production Pathways of Directive (EU) 2018/2001			ALL	1,375	TBM	TBM	-
	Other Production Pathways of Directive (EU) 2018/2001			ALL	3,115	0,00005	0,00018	-
	Liquefied Bio-methane as transport fuel (Bio-LNG) Production Pathways of Directive (EU) 2018/2001		$E - \frac{C_{fCO_2}}{LCV}$	LNG Otto (dual fuel medium speed)	2,750	0	0,00011	3,1
				LNG Otto (dual fuel slow speed)				1,7
				LNG Diesel (dual fuels)				0,2
				LBSI				2,6
	Bio-H2 Production Pathways of Directive (EU) 2018/2001	Value as set out in Annex III of Directive (EU) 2018/2001	N/A	Fuel Cells	0	0	0	-
				ICE	0	0	TBM	
Renewable Fuels of	e-diesel	0,0427	E-E _u	ALL	3,206	0,00005	0,00018	-

Non-Biological Origin (RFNBO) - e-Fuels	e-methanol	0,0199	E-E _u	ALL	1,375	TBM	TBM	-
	e-LNG	0,0491	E-E _u	LNG Otto (dual fuel medium speed)	2,750	0	0,00011	3,1
				LNG Otto (dual fuel slow speed)				1,7
				LNG Diesel (dual fuels)				0,2
				LBSI				2,6
	e-H2	0,12	E-E _u	Fuel Cells	0	0	0	-
				ICE	0	0	TBM	
	e-NH3	0,0186	N/A	Fuel Cells	0	N/A	TBM	N/A
				ICE	0	N/A	TBM	N/A
	e-LPG	N/A	N/A		N/A	N/A	N/A	N/A
	e-DME	N/A	N/A		N/A	N/A	N/A	-
Others	Electricity	-	NATIONAL ENERGY MIX	On-shore power supply (OPS)	-	-	-	-

Column 1 identifies the class of the fuels, namely fossils fuels, biofuels, biogas and e-fuels.

Column 2 identifies the name or the pathways of the relevant fuels within the class.

Column 3 contains the lower calorific value of the fuels in [MJ/g]. For biofuels, values of energy content by weight (lower calorific value, MJ/kg) as set out in Annex III to Directive (EU) 2018/2001 shall be converted in [MJ/g] and used.

Column 4 contains the WtT GHG emission factors in [gCO_{2eq}/MJ]:

(a) For biofuels, the default values shall be calculated by using the values of E established in accordance with the methodologies laid down in Directive (EU) 2018/2001, Part C of Annex V to that Directive for all biofuels, Part B of Annex VI to that Directive for biogas, and on the basis of default values related to the particular biofuel used as a transport fuel and its production pathway, laid down in that Directive, Parts D and E of Annex V to that Directive for all biofuels and in Part D of Annex VI to that Directive for biogas. However, the values of

E need to be adjusted by subtracting the ratio of the values contained in column 6 (C_f _CO₂) and column 3 (LCV). This is required under this Regulation, which separates the WtT and the TtW calculations, to avoid double counting of emissions;

(b) For RFNBO and other fuels not referred to in point (a) to be taken into account for the purpose referred to in Article 4(1) of Regulation (EU) 2023/1805, values are to be either calculated by using the methodology of the delegated act referred to in Article 28(5) of Directive (EU) 2018/2001, or, if applicable, a similar methodology if defined under a Union legal act concerning the internal markets in renewable and natural gases and in hydrogen, pursuant to Article 10(1) and (2) of Regulation (EU) 2023/1805.

Column 5 identifies the main types/classes of fuel consumer units such as 2 and 4 strokes Internal Combustion Engines (ICE) Diesel or Otto cycle, Lean-Burn Spark-Ignited (LBSI) engines, fuel cells, etc. Column 6 contains the emission factor C_f for CO₂ in [gCO₂/gfuel].

Column 7 contains the emission factor C_f for methane in [gCH₄/gfuel]. For LNG fuels, C_f for methane are set to zero.

Column 8 contains the emission factor C_f for nitrous oxide in [gN₂O/gfuel].

Column 9 identifies the part of fuel lost as fugitive and slipped emissions (C_{slip}) measured as % of the mass of fuel used by the specific fuel consumer unit. For fuels such as LNG for which the fugitive and slipped emissions exist, the amount of fugitive and slipped emissions as presented in the table is expressed in % of the mass of fuel used (Column 9). The values of C_{slip} in the table are calculated at 50 % of the full engine load.’;

(3) Part AA is deleted;

(4) Part B is amended as follows:

(a) the heading of Part B is replaced by the following:

‘B. MONITORING METHODS FOR DETERMINING GREENHOUSE GAS EMISSIONS AND ENERGY USED’;

(b) the first sentence is replaced by following:

‘The company shall indicate in the monitoring plan which monitoring method is to be used to determine the greenhouse gas emissions and energy used for each ship under its responsibility and ensure that once a method has been chosen, it is consistently applied.’;

(c) the third sentence is replaced by the following:

‘Under the calculation approach (methods A, B and C), emissions and energy used shall be calculated using the formulae set out in Part A. For that purpose, the actual fuel consumption for each voyage shall be determined using any of methods A, B or C described hereinafter and used for the purpose of the calculation. Sources of uncertainty and associated levels of uncertainty shall be considered when selecting any of the methods A, B or C.’;

(d) in point 3, the first sentence is replaced by the following:

‘This method is based on measured fuel flows on board. The data from all flow meters linked to relevant greenhouse gas emission sources and fuel consumers shall be combined to determine all fuel consumption for a specific period.’.