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TECHNICAL INFORMATION

No : 2023-IMO-02
Date : 01st Sep, 2023

Subject : Guidelines on using Biofuel on ships

1. Background

Recently, MEPC.1/Circ.905, the interim guidance of the use of biofuels was approved during MEPC 80th session and interest in the utilization of biofuels for ships has grown. In light of this, technical information for the sharing of knowledge regarding the usage of such fuels is being issued to shipowners, manufacturers, inspectors, and other relevant entities. Please refer to this information for your work.

2. Content(s)

(1) Criteria for using Biofuel : In accordance with MEPC.1/Circ.795/Rev.8, Criteria shall be applied below;

1) **A fuel oil which is a blend of not more than 30% by volume of biofuel**

(a) Meeting the requirements of Regulation 18.3.1 of Annex VI of MARPOL

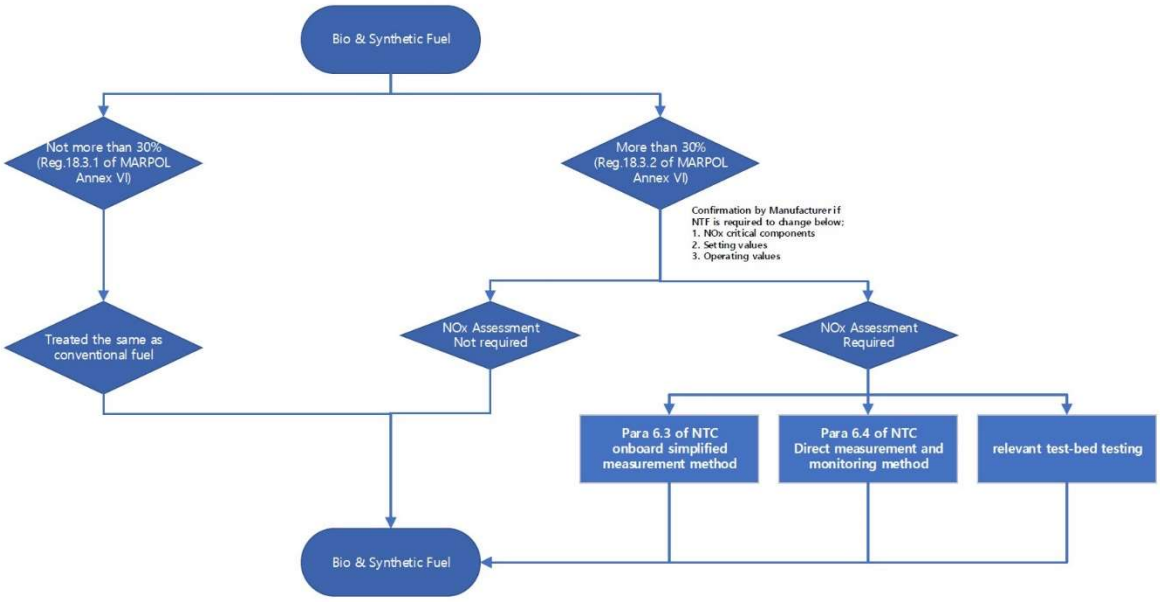
(b) Pursuant to paragraph 13.1 of MEPC.1/Circ.795/Rev.8, verification of NOx emission is not required.

2) **A fuel oil which is a blend of more than 30% by volume of biofuel and 100% biofuel**

(a) Classified as follows in accordance with paragraph 13.2 of MEPC.1/Circ.795/Rev.8

- Engines that have been approved in accordance with Reg.13 of MARPOL Annex VI are not required to be verified with NOx emission if confirmation is provided by manufacturer that biofuel can be used without changes to its NOx critical components or settings/operating values outside those as given by that engine's approved technical file.
- If verification is required, the assessment in accordance with Reg.18.3.2.2 of MARPOL Annex VI shall be undertaken and the overall NOx emissions performance has been verified to not

cause the specified engine to exceed the applicable NOx emissions limit when burning said fuels using the onboard simplified measurement method in accordance with 6.3 of the NOx Technical Code 2008, or the direct measurement and monitoring method in accordance with 6.4 of the NOx Technical Code 2008, or by reference to relevant test-bed testing.



<Biofuel utilization Flow Chart>

(2) IMO DCS and CII

1) IMO DCS and CII

(a) IMO DCS : In accordance with Regulation 27 of MARPOL Annex VI, From calendar year 2019, each ship of 5,000 gross tonnage and above shall collect the data specified in appendix IX(Information to be submitted to the IMO Ship Fuel Oil Consumption Database) to this Annex. Within three months after the end of each calendar year, the ship shall report to its Administration or any organization duly authorized by it, the aggregated value for each datum specified in appendix IX to this Annex, via electronic communication and using a standardized format.

(b) CII : From year 2024, each vessel will be given a CII rating (A,B,C,D or E) based on the reported IMO DCS data for year 2023. If a ship s CII rating is an one E rating or D rating for three consecutive years, the revised SEEMP Part III including the plan of corrective acti ons to achieve the required CII should be re developed and approved by Administration or RO.

2) MEPC.1/Circ.905

(a) In accordance with Res.MEPC.352(78), "2022 GUIDELINES ON OPERATIONAL CARBON INTENSITY INDICATORS AND THE CALCULATION METHODS (CII GUIDELINES, G1)", the type of the fuel oil not covered by the guidelines may have the carbon dioxide emission conversion factor (C_F) applied to their CO2 emissions. The conversion factor should be obtained from the fuel oil supplier supported by documentary evidence.

(b) Pending the development of the comprehensive method to account for well-to-wake GHG emissions and removals based on the IMO LCA Guidelines, biofuels that have been certified by an international certification scheme, meeting its sustainability criteria, and that provide a well-to-wake GHG emissions reduction of at least 65% compared to the well-to-wake emissions of fossil MGO of 94 gCO2eq/MJ (i.e. achieving an emissions intensity not exceeding 33 gCO2eq/MJ) according to that certification, may be assigned a Cf equal to the value of the well-to-wake GHG emissions of the fuel according to the certificate (expressed in gCO2eq/MJ) multiplied by its lower calorific value (LCV, expressed in MJ/g) for the purpose of regulations 26, 27 and 28 of MARPOL Annex VI for the corresponding amount of fuels consumed by the ship.

(c) In any case, the C_F value of a biofuel cannot be less than 0. For blends, the C_F should be based on the weighted average of the C_F for the respective amount of fuels by energy. A Proof of Sustainability or similar documentation from a recognized scheme should be provided along with the Bunker Delivery Note, to facilitate the verification of the reported biofuel consumption. For biofuels not certified as "sustainable" or not fulfilling the well-to-wake emission factor criterion above should be assigned a C_F equal to the C_F of the equivalent fossil fuel type.

(d) For blends, the C_F should be based on the weighted average of the C_F for the respective amount of fuels by energy.

(e) This Interim Guidance will be rescinded immediately upon operationalization of a well-to-wake GHG methodology through the LCA Guidelines.

3) Documentation to be submitted for IMO DCS and CII in relation to Biofuel usage

(a) Sustainability certification and verification of Well to Wake GHG intensity values

- Proof of Sustainability issued by 3rd party accreditation bodies (ISCC, RSB and etc).
- Other equivalent documents.

(b) Verification of delivered amount

- BDN which contains amount of delivered Biofuel.

- Matching of sustainability certificates with fuel names, recipients, and other details.
- Other equivalent documents.

(c) Confirmation of Lower Calorific Value (LCV, MJ/g)

- Test result issued by trustworthy laboratory which can confirm LCV of 100% biofuel
- Other equivalent documents.

(d) Verification of biofuel consumption calculation

- Submission of the latest KR GEARs template or a self-developed calculation sheet

※ *Example for calculation of the carbon factor (C_F) for biofuel*

- WtW GHG Intensity: 24.6 gCO2eq/MJ
- LCV: 40.35 MJ/kg

⇨ 24.6 gCO2eq/MJ x 40.35 MJ/kg = 0.993 gCO2eq/g

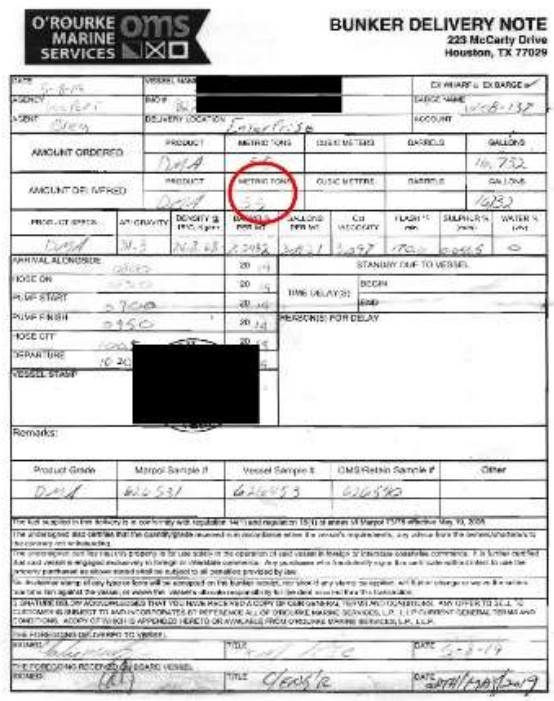
※ *Example for calculation of the carbon factor (C_F) for biofuel blend(30%)*

	Blend(%)	**C_F(gCO2eq/g)**	**Cons(ton)**	**LCV(MJ/kg)**	**Energy(MJ)**
VLSFO	70%	3.151	9128	41.2	376073600
BioFuel	30%	0.993	3912	37.5	146700000

* VLSFO LCV : Based on the LCV value of LFO in Res.MEPC.308(73)
* Bio Fuel LCV : Based on the LCV value in Annex III of EU RED II

$$\therefore B30\ C_F = \frac{LCV_{VLSFO} \times Cons_{VLSFO} \times C_{F\,VLSFO} + LCV_{Bio} \times Cons_{Bio} \times C_{F\,Bio}}{Energy_{VLSFO} + Energy_{Bio}}$$

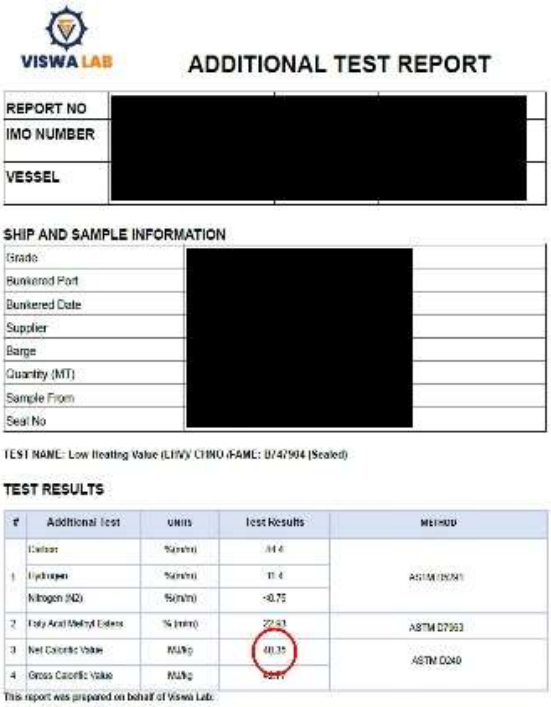
$$= \frac{Energy_{VLSFO} \times C_{F\,VLSFO} + Energy_{Bio} \times C_{F\,Bio}}{Energy_{VLSFO} + Energy_{Bio}} = 2.545\ gCO2eq/g$$



BUNKER DELIVERY NOTE

O'ROURKE MARINE SERVICES

223 McCarty Drive
Houston, TX 77029



VISWA LAB

ADDITIONAL TEST REPORT

REPORT NO	[redacted]
IMO NUMBER	
VESSEL	

SHIP AND SAMPLE INFORMATION

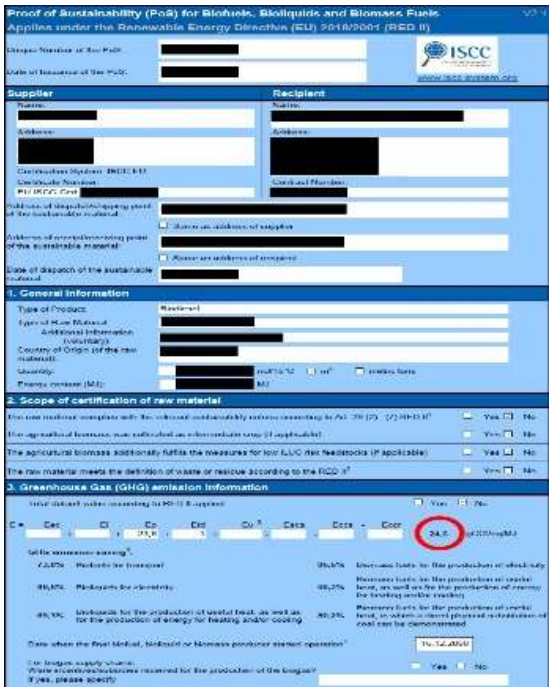
Grade	[redacted]
Bunkered Port	
Bunkered Date	
Supplier	
Barge	
Quantity (MT)	
Sample From	
Seal No	

TEST NAME: Low Heating Value (LHV) CIMO (FAME: B7 4794 (Sealed)

TEST RESULTS

#	Additional Test	Units	Test Results	Method
	Carbon	%(m/m)	77.4	
1	Hydrogen	%(m/m)	11.4	ASTM D5291
	Nitrogen (N2)	%(m/m)	<0.75	
2	Fatty Acid Methyl Esters	% (m/m)	97.61	ASTM D7963
3	Net Calorific Value	MJ/kg	40.35	ASTM D240
4	Gross Calorific Value	MJ/kg	42.77	

This report was prepared on behalf of Viswa Lab



Proof of Sustainability (PoS) for Biofuels, Bioliquids and Biomass Fuels

Applies under the Renewable Energy Directive (EU) 2018/2001 (RED II)

ISCC

Supplier

Recipient

1. General information

2. Scope of certification of raw material

3. Greenhouse Gas (GHG) emission information

<Example of Documentation for verification of delivered amount, LCV, Sustainability and WtW GHG Intensity>

(e) Example(simulation) of Carbon Intensity Indicator (CII) grades when using biofuels

- Ship type : Bulk Carrier
- Deadweight : 207,000 M/T
- Gross Tonnage : 107,500 M/T
- Distance travelled : 80,450 Nautical Mile

- Fuel consumption : Applying fuel consumption for each case based on HFO 13040 M/T and MGO 480 M/T (fixed) reference

Rating Year		2023	2024	2025	2026
CII Rating	Case A	D	D	E	E
	Case B	D	D	D	D
	Case C	C	C	D	D
	Case D	B	C	C	C

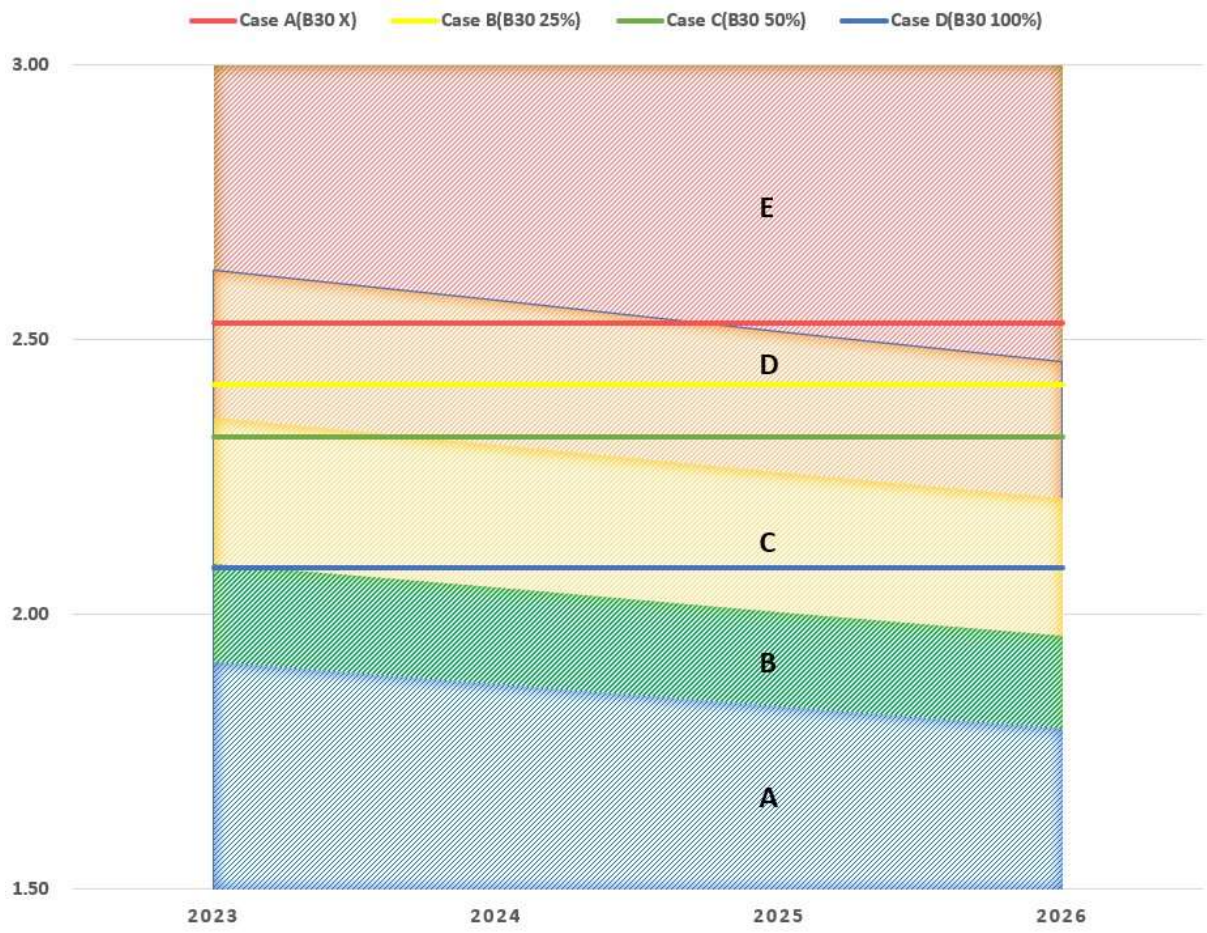
Attained CII app. 5% down

Attained CII app. 11% down

Attained CII app. 23% down

※ Case A : B30 Not-used, Case B : B30 25% Used, Case C : B30 50% Used, Case D : B30 100% Used

※ The above calculation results are based on virtual ship simulation calculations, and there may be differences from actual calculated values.



<Table and Graph of Carbon Intensity Indicator (CII) Grades when Using Biofuels>

If you have any questions regarding paragraph 2.3) "Documentation to be submitted for IMO DCS and CII in relation to Biofuel usage", please contact Green ship technology team(krgst@krs.co.kr)

Attachment

1. MEPC.1/Circ.795/rev.8 : UNIFIED INTERPRETATIONS TO MARPOL ANNEX VI
2. MEPC.1/Circ.905 : INTERIM GUIDANCE ON THE USE OF BIOFUELS UNDER REGULATIONS 26, 27 AND 28 OF MARPOL ANNEX VI (DCS AND CII)
3. Res.MEPC.352(78) : 2022 GUIDELINES ON OPERATIONAL CARBON INTENSITY INDICATORS AND THE CALCULATION METHODS (CII GUIDELINES, G1).
4. Res.MEPC.308(73) : 2018 GUIDELINES ON THE METHOD OF CALCULATION OF THE ATTAINED ENERGY EFFICIENCY DESIGN INDEX (EEDI) FOR NEW SHIPS

Distributions : KR surveyors, Ship owners, Manufacturers, Other relevant parties