

**Draft Merchant Shipping Notice No. xx of 2023**

**[Use of Bio-fuel and its blends on Indian Ships]**

**[For stakeholder comments to Vikrant.rai@gov.in by 15<sup>th</sup> September, 2023]**

**Background**

1. The Directorate has issued DGS Circular 18 of 2022 allowing usage of biofuel and its blends by Indian ships.
2. The above circular permitted biofuel component of fuel to be assigned a carbon factor of zero subject to availability of a proof of sustainability.
3. However, at MEPC 80 concluded in July 2023, IMO adopted MEPC.1/Circ. 905 [Interim Guidance on the use of biofuels under Regulations 26, 27 & 28 of MARPOL Annex VI (DCS & CII)] detailing the methodology for addressing the Cf to be assigned to biofuel used as fuel oil.
4. Further the said DGS Circular 18 of 2022 did not address NOx certification of engines using fuel oil which is a blend of more than 30% by volume of biofuel and which require changes to its NOx affecting components or settings/operating values outside those as given by that engine's approved technical file.
5. The aim of this MS Notice to permit Indian ships use biofuel and its blends as drop-in fuels, and therefore, this MSN prescribes requirements for only the liquid drop-in biofuels that are most likely to be compatible with distillate and residual marine fuels such as marine gas oil (MGO), Light Diesel Oil (LDO, DMB) and heavy fuel oil (HFO) and addressed all new requirement adopted at MEPC 80 and the identified short comings as stated above.
6. This MSN supersedes the DGS Circular 18 of 2022.

**Application**

7. This MSN is applicable to:
  - i. All sea going Indian Ships registered under MS Act1958, irrespective of whether on coastal or international trade or certified under RSV (Ref. DGS Order No.18 of 2013) or ICV (Ref. DGS Order No.1 of 2014) and intending to use biofuel or its blends as fuel.

- ii. All bunker suppliers registered with Government of India in accordance with Annex VI, Regulation 18 of MARPOL and intending to supply biofuels or its blends to Indian ships or foreign ships in Indian waters.

### **Definition of Biofuel**

8. In accordance with MEPC.1/Circ.795/Rev.6 [Unified Interpretation TO MARPOL Annex VI], for the purpose of this MSN: A biofuel is a fuel oil which is derived from biomass and hence includes, but is not limited to, processed used cooking oils, fatty-acid-methyl-esters (FAME) or fatty-acid-ethyl-esters (FAEE), straight vegetable oils (SVO), hydro-treated vegetable oils (HVO), glycerol or other biomass to liquid (BTL) type products.

### **Requirements biofuel and its blends supplied to Ships**

9. As with conventional fuel oils, the biofuel specification remains a commercial agreement between purchaser and supplier. The specification is required to be compatible with the machinery and equipment, and compliant with the applicable statutory requirements. In all cases, the biofuel should be free of deleterious materials.
10. Following is recommended:
  - i. The biofuel to meet a declared standard and that the technical and operational parameters of the biofuel or biofuel blend as supplied comply with the ISO 8217 Petroleum products – Fuels (class F) – Specifications of marine fuels standard as far as possible, and that the deviations are known, understood and part of the agreed specification between purchaser and supplier.
  - ii. For FAME biofuels and biofuel blends it is recommended that the FAME feedstock is compliant with the EN 14214 Liquid petroleum products – Fatty acid methyl esters (FAME) for use in diesel engines and heating applications – Requirements and test methods or ASTM D6751 Standard Specification for Biodiesel Fuel Blend Stock (B100) for Middle Distillate Fuels standards. If or when FAME is introduced in a new version of ISO 8217, the new version of the standard is to be followed.
  - iii. For HVO biofuels and biofuel blends it is recommended that the fuel is compliant with the EN 15940 Automotive fuels – Paraffinic diesel from synthesis or hydro-treatment – Requirements and test methods standard.

- iv. Any other biofuel, i.e. other than FAME or HVO, supplied as 100 per cent or as a blend component should meet a recognised standard, as far as possible, and should be agreed for inclusion prior to supply. It is important to know which kind of biofuel is offered and supplied. If this is not clear the supplier should be asked.
11. Fuel properties critical to safe operation and long-term reliability, such as lubricity, cold flow properties, acid number and oxidation stability, etc. should be within the limits recommended by the equipment OEMs, as applicable.

### **Requirements of BDN and Test Results and Other Certification to be given to Ships**

12. The Product Name, as entered onto the bunker delivery note, should be of sufficient detail to identify whether, and to what extent, a biofuel is blended into the product as supplied.

#### **13. Flash Point:**

- i. Liquid biofuels, or biofuel blends, intended as “drop-in” fuels to replace conventional residual or distillate fuel oils are to meet the SOLAS requirement for a flashpoint of not less than 60°C.
- ii. The flash point to be determined as determined by a closed cup test in accordance with ISO 2719 Determination of flash point – Pensky- Martens closed cup method.
- iii. The BDN should state the flash point of biofuel used and the blend separately.

#### **14. Sustainability Certification**

- i. No biofuels shall be supplied to ships in unblended or blended form without having been certified by an international certification scheme, meeting its sustainability criteria. The Sustainability Schemes are International Sustainability and Carbon Certification (ISCC) and Roundtable on Sustainable Biomaterials (RSB) and equivalent.
  - ii. A Proof of Sustainability or similar documentation mentioned above should be provided along with the Bunker Delivery Note, to facilitate the verification of the reported biofuel consumption.
15. No bio fuel or its blends shall be supplied without detailing the following test results of the final fuel according to a full ISO 8217 analysis, which includes, but not limited to below characteristics
- i. Kinematic viscosity
  - ii. Cold-flow properties

- iii. water content
- iv. Ash content
- v. Chemical elements
- vi. Acid number
- vii. Lubricity

16.If the biofuel blend or B100 has crossed 6months (since it is manufactured or blended) but within its shelf life, additional following testsreport to be supplied to the ship:

- i. %FAMEbyFame-Scan
- ii. Copper strip corrosion (e.g. ASTM D130) to gauge the corrosiveness of the fuel due to high FAME content
- iii. Steel strip corrosion(e.g. ASTM D665a) to gauge the corrosiveness of the fuel due to high FAME content
- iv. Sediment Wax Precipitation Point.

**17.Interpretation of MEPC.1/Circ.905 [Interim Guidance on the use of Biofuels under Regulations 26, 27, 28 of MARPOL Annex VI]:** The Carbon factor shall be calculated using the following methodology

- i. Biofuels certified to provide a well-to-wake GHG emissions reduction of at least 65% compared to the well-to-wake emissions of fossil MGO of 94 gCO<sub>2e</sub>/MJ (i.e. achieving an emissions intensity not exceeding 33 gCO<sub>2e</sub>/MJ) according to that certification shall be assigned a C<sub>f</sub> equal to the value of well-to-wake GHG emissions of the fuel according to the certificate (expressed in gCO<sub>2e</sub>/MJ) multiplied by its lower calorific value (LCV, expressed in MJ/g). For blends, the C<sub>f</sub> should be based on the weighted average of the C<sub>f</sub> for the respective amount of fuels by energy.
- ii. Biofuel not fulfilling the well-to-wake emission factor criterion above are assigned a C<sub>f</sub> equal to the C<sub>f</sub> of the equivalent fossil fuel type.
- iii. Due to the significant oxygen content of FAME and its blends, the Lower Calorific Value (or Net Specific Energy Value) cannot be calculated using the formulae as given in the Annex H to ISO 8217 but must instead be determined by testing – i.e., ASTM D240. However, for those biofuels such as HVO which are compositionally indistinguishable from high grade petroleum fuels the distillate formula as given in ISO 8217 can be used.

### **Approval of Bunker Suppliers**

18. Existing approved Bunker supplier can supply bio fuel so rits blends to ships subject to implementation of quality control procedures in its quality manual and informing IRS the intention to supply biofuel and its blends meeting the requirement of this MSN.
19. The IRS shall verify the procedures of such supply and its effective implementation in the next Annual audit and recommend to Competent Authority in the Directorate for re-issuance of Bunker Supplier Registration Certificate.

### **Risk Assessment by Ship Owner/Manager for using Biofuel or its blends as Fuel**

20. A Vessel Specific Risk Analysis are to be carried out for use of bio-fuel blend. Any redundancy requirements on board as per risk analysis are to be taken care for the operational safety and emergency contingency measures:

- i. **Storage and Use:** The significant presence of FAME requires additional fuel management focus on addressing the propensity of FAME to retain water, and accelerate oxidation, microbial growth, filtration problems. To minimize the above stated risks long term storage should be avoided. Settling and service tanks should be regularly drained of water. Tank and fuel system materials (any tank coatings used that may not be compatible to such as FAME) should be assessed for suitability of storage and handling of this fuel. It is advisable to ensure the tanks to be loaded with the Bio-diesel are emptied, and cleaned of any excess sludge.
  - ii. **Purifiers and Filters:** When first put in to use the purifiers and filters are monitored as to any degree if initial sludge deposits from the cleaning effect of the fuel.
  - iii. **Oily Water Separators and Oil Content Meters:** The OEM shall be consulted and confirmation sought with regards to the compatibility of Oily filtering Equipment including the 15ppm bilge alarm (MARPOL Annex 1 Reg.14) for handling Bio fuel/Bio fuel blends as an interim measure till IMO establishes requirement for approval of oily water filtering equipment and oil content meter alarm for use with bio fuel blend.
  - iv. Manufacturers of engines and fuel oil handling equipment e.g. purifiers are to be consulted for suitability of use and specific recommendation if any is to be followed. Bio fuel blend may degrade hoses, gaskets, seals, elastomers, glues and plastics after prolonged exposure and may affect storage tank materials. All such materials/equipment used in the fuel system shall be identified in consultation with OEM and are inspected at intervals specified by OEM and renewed as recommended by OEM.

## **Approval by Recognized Organization**

21. All the Recognized Organizations can recommend certification of a ship to operate on biofuels subject to compliance to this MSN.
22. A ship-owner/manager intending to use biofuel or its blends shall submit to RO the following documents:
  - i. Details and particulars of the ship(s) on which the biofuel(s) will be used, including intended IC engines and machinery; No Bio fuel blend is to be used for emergency equipment like lifeboat engine, emergency generator engine, and emergency fire pump engine
  - ii. Specifications, MSDS and analyses of the proposed range of biofuel(s) or blends;
  - iii. Fuel specification and procurement methodology.
  - iv. Risk Assessment as detailed in Para 20 above along with details and particulars of any proposed modifications to fuel storage arrangements, fuel systems and equipment, IC engines; boilers, gas turbines and associated machinery;
  - v. Arrangement of the fuel service tanks to meet SOLAS Regulation II- 1/26.11;
  - vi. Fuel system material and coating specifications;
  - vii. Copies of any ~~OEM~~ biofuel specifications, agreements and communications with the OEMs;
  - viii. **Shipboard operational procedure** is to be provided which may be part of the SMS manual and shall include procedure for procurement, availability test result, storage of bio fuel blend, frequency of cleaning of fuel filters, inspection of storage tanks, monitoring of transfer lines and associated piping & fittings and any other requirements specified by the manufacturers of engines/equipment. The procedure shall also include logging/monitoring of all relevant engine parameters, maintenance, and checks in consultation with equipment manufacturer. It has to include list of operational biofuel compatibility and stability checks, as applicable to the range of fuels used on board, together with detailed fuel changeover procedures appropriate for all the installed machinery and equipment that may use biofuels and any specific instructions for Master, Chief Engineer, or crew.

## **The NOx Certification**

23. **Fuel oil which is a blend of not more than 30% by volume of bio-fuel** and which do not require changes to its NOx critical components or settings/operating

values outside those as given by that engine's approved Technical File, will be considered falling under regulation 18.3.1 of MARPOL Annex VI and there is no change in IAPP certificate or supplement necessary.

24. **Fuel oil which is a blend of more than 30% by volume of biofuel** and which does not require changes to its NOx affecting components or settings/operating values outside those as given by that engine's approved technical file, such blends may be allowed to be used onboard without having to undertake the assessment as given in the Regulation 18.3.2.2.

25. **Fuel oil which is a blend of more than 30% by volume of biofuel and which require changes to its NOx affecting components or settings/operating values outside** those as given by that engine's approved technical file:

- i. The NOx assessment required by 18.3.2.2 may be undertaken using the on-board simplified measurement method in accordance with 6.3 of the NTC or using the direct measurement and monitoring method in accordance with 6.4 of the NTC.
- ii. RO shall verify the proposal for NOx measurement procedures and issue a short-term IAPP certificate with validity commensurate with the trial period but not exceeding 3 months, with an annotation stating that it has been issued for conducting trials in accordance with regulation 3.2 of MARPOL Annex VI.
- iii. Upon satisfactory trials amended NOx technical file is to be approved and corresponding EIAPP certificate to be placed on board. Subsequent full term IAPP certificate shall be issued by RO, harmonizing validity with other statutory certificates.

26. Based on the review of above submissions and an inspection as considered fit, the RO may issue a Certificate to the ships in the format attached as an annexure to this MSN and forward a copy of same to Competent Authority in Directorate for records.

27. The RO to verify the annual fuel consumption and CII based on the BDN copies and Proof of Sustainability of the biofuel as submitted by the Ship owner/manager. Collection and reporting of fuel oil data is to be done as per Merchant Shipping Notice 07 of 2021. However, blend ratio of the biofuel blend is to be included in the report.

Sd/-  
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**Annexure to MS Notice No. XX of 2023**

**[Permission to use Sustainable Biofuels and Its Blends Fuel Oil]**

**Issued under authority of Government of India by -----**

**Name of Ship**

**Gross Tonnage**

**IMO Number**

**Date of Build**

**Port of Registry**

**Official Number**

**Details of Engines Certified to use Biofuel**

<b>Engine</b>	<b>Manufacturer</b>	<b>Type</b>	<b>Serial Number</b>
Main Engine			
Auxiliary Engine 1			
Auxiliary Engine 2			
Auxiliary Engine 3			
Auxiliary Boiler			

The ship has been allowed to use following bio-fuel blend under the provisions of Regulation 18 of MARPOL Annex VI.

<b>Feed stock</b>	<b>Percentage of blend</b>	<b>Manufacturing method</b>	<b>Limitations/Control</b>