

RESOLUTION MEPC.394(82) (adopted on 4 October 2024)
GUIDELINES ON RECOMMENDATORY BLACK CARBON EMISSION MEASUREMENT,
MONITORING AND REPORTING

ANNEX 3

**RESOLUTION MEPC.394(82)
(adopted on 4 October 2024)**

**GUIDELINES ON RECOMMENDATORY BLACK CARBON EMISSION MEASUREMENT,
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THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

RECALLING Article 38(a) of the Convention on the International Maritime Organization concerning the functions of the Marine Environment Protection Committee conferred upon it by international conventions for the prevention and control of marine pollution from ships,

RECALLING ALSO that, at its sixty-second session, it agreed to a work plan, including to consider measurement methods for Black Carbon and to identify the most appropriate method for measuring Black Carbon emissions,

RECALLING FURTHER that, at its seventy-seventh session, it approved the updated terms of reference for further work on the reduction of the impact on the Arctic of Black Carbon emissions, including the development of a standardized sampling, conditioning and measurement protocol, including a traceable reference method and an uncertainty analysis to make accurate and traceable (comparable) measurements of Black Carbon emissions,

RECALLING that, at its seventy-seventh session, it also adopted resolution MEPC.342(77) on *Protecting the Arctic from shipping Black Carbon emissions* urging Member States and ship operators to voluntarily use distillate or other cleaner alternative fuels or methods of propulsion that are safe for ships and could contribute to the reduction of Black Carbon emissions from ships when operating in or near the Arctic,

ENCOURAGING Member States to continue addressing the threat to the Arctic from Black Carbon emissions, to engage with Arctic Indigenous Peoples with a view to including Indigenous knowledge in research, monitoring and determining mitigation measures, and to report on measures and best practices to reduce Black Carbon emissions from shipping,

NOTING that, at its eighty-second session, it adopted, by resolution MEPC.393(82), *Guidance on best practice on recommendatory goal-based control measures to reduce the impact on the Arctic of Black Carbon emissions from international shipping*,

HAVING CONSIDERED, at its eighty-second session, draft guidelines on recommendatory Black Carbon emission measurement, monitoring and reporting, developed by the Sub-Committee on Pollution Prevention and Response,

1 ADOPTS the *Guidelines on recommendatory Black Carbon emission measurement, monitoring and reporting*, as set out in the annex to the present resolution;

2 INVITES Member States to encourage shipping operators to voluntarily apply these Guidelines when undertaking Black Carbon-related measurements from marine diesel engines on board any ship operating in or near the Arctic;

3 ALSO INVITES Member States to provide Black Carbon emission data to the Organization using the measurement reporting protocol set out in the appendix of these Guidelines and report to the Committee on any experience gained in their implementation;

4 AGREES to keep these Guidelines under review in light of the experience gained.

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Introduction

1 The purpose of these Guidelines, hereinafter referred to as "the Guidelines", and Black Carbon referred to as "BC", is to specify the recommendations for the measurement, monitoring and reporting of BC emissions data from marine diesel engines or exhaust gas treatment systems, in combination or individually, in order to enhance development of recommendations and regulations to reduce the impact on the Arctic of BC emissions. Future reviews of these Guidelines, with a view to their continued enhancement, should take into account the latest information and best practices in the field.

Application

2 These Guidelines apply to marine diesel engines with a power output of more than 130 kW or other methods of propulsion. These can include an exhaust gas treatment system or the use of other cleaner alternative fuels, on board any ship operating in or near the Arctic.

3 Administrations should encourage shipowners and operators to collect relevant data. To this end, shipowners and operators are invited to measure and report BC emissions data.

Recommended procedure for BC measurements

4 BC measurements should be undertaken at least once for each period with a total duration of seven days, while operating in or near the Arctic, at the running load of the marine diesel engine in question and the result recorded in accordance with the annex to these Guidelines.

5 BC emissions should be sampled in accordance with ISO 8178 from a suitable connection downstream of any influencing devices or arrangements. The probe shall be installed in the exhaust gas pipe in a way that a representative sampling is possible.

- .1 It should be ensured that there is no open supply connection of air or other such material which would have the effect of diluting the exhaust gas stream at the sampling point. This does not apply to any material consistently introduced into the exhaust gas stream as part of other emission control arrangements such as Selective Catalytic Reduction (SCR) or Exhaust Gas Cleaning System (EGCS). Sampling should not be undertaken during or shortly after cleaning events which could affect the exhaust gas stream such as turbocharger washing or soot blowing of exhaust gas heat exchangers.
- .2 BC emission measurements in terms of Filter Smoke Number (FSN) should be carried out according to ISO 10054 and ISO 8178-3. BC emissions should be measured in accordance with the device manufacturers' recommendations at a time when the engine is operating under stable conditions.

- .3 Three appropriate measurement methods have been recognized by the Organization: FSN, Laser Induced Incandescence (LII) and Photoacoustic Spectroscopy (PAS). In case an alternative to a recognized measurement method is used, an established correlation between that instrument should be provided against the equivalent BC concentrations reported by FSN instruments. These alternative devices should be operated in accordance with the device manufacturers' recommendations including sample conditioning and processing.
- .4 The BC measurement instruments are to be maintained and calibrated/checked in accordance with manufacturer recommendations.

Reporting of BC emissions

6 Reporting of BC emissions by the shipowner to their Administration should be done on a yearly basis in accordance with the measurement reporting protocol given in the appendix. The Administrations should report to the Organization with a view to gathering expertise and for publication.

APPENDIX

MEASUREMENT REPORTING PROTOCOL FOR BLACK CARBON DETERMINATION

BC data and information to be reported:

BC emission reduction plan including technology, fuels and/or operations to be implemented

Voluntary BC emission reduction goal: in FSN, g/kWh, or g/kg fuel, or % reduction

A Ship

Name

IMO number

Flag

B Engine – for each engine over 130 kW in use in or near the Arctic

Manufacturer

Model / type / rating designation

Serial number

Rated power (kW) and speed (rpm)

Date of installation

Details of any specially considered sampling position

Details of any documented emissions control arrangement fitted/applied

C BC data, if applicable – at each measurement occasion

Date and time UTC

Ship's position

BC measurement method (FSN, PAS, LII or alternative method)

FSN or BC mass concentration

Exhaust gas temperature at sample extraction point

Engine load and speed

Fuel type in use*

* Fuel grade type and designation and BDN sulphur content.

Emission control devices or arrangements in use at time of sampling (including devices for other than BC emission control including but not limited to SCR, Exhaust Gas Recirculation (EGR) or EGCS)

Further relevant information, as applicable and available

Specific fuel oil consumption

Brake power

Specific lube oil consumption

Hydrogen to carbon (H/C) ratio of the fuel in use

Fuel data from the Bunker Delivery Note (BDN), such as viscosity and density.

Date of latest engine maintenance on BC-related engine parts (e.g. injection equipment, turbocharger and air filter, as well as piston rings / liner overhaul)

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