MAN Energy Solutions
Future in the making

資料３１－３

CIMAC WG 5 Autumn Meeting 2018
20 November 2018 in Frankfurt / Main

4-Stroke

Marine IMO

Ralf Oldenburg

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16 November 2018

Timetable
CIMAC WG 5

- IMO 3rd Intersessional WG on GHG-Emissions — 3 - 6 April 2018
- IMO MEPC 72 — 9 - 13 April 2018
- 5th ICCT Workshop on Marine Black Carbon — 19 - 20 September 2018
- IMO 4th Intersessional WG on GHG-Emissions — 15 - 19 October 2018
- IMO MEPC 73 — 22 - 26 October 2018
- CIMAC WG 5 Meeting in Frankfurt / Main — 20 November 2018
- IMO PPR 6 — 18 - 22 February 2019
- IMO 5th Intersessional WG on GHG-Emissions — 7 - 10 May 2019
- IMO MEPC 74 — 13 - 17 May 2019

Abstract
CIMAC WG 5

1	**IMO GHG Strategy**
2	**IMO Black Carbon Correspondence Group and ICCT Workshop**
3	**Use of Multiple Engine Operational Profiles**
4	**Amendments to Mandatory Instruments**
5	**Other Relevant Topics at MEPC 73**
6	**IACS Unified Interpretation MPC 51**
7	**Requirements to Analyzers for Onboard Confirmation Tests**

IMO GHG Strategy
CIMAC WG 5

1	**IMO GHG Strategy**
2	IMO Black Carbon Correspondence Group and ICCT Workshop
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IMO GHG Strategy
CIMAC WG 5

Input to MEPC 72

- Three IMO Intersessional WGs on GHG-Emissions have been working on a vision and a strategy which move between a GHG neutral maritime transport and a more realistic GHG reduction target and the date until such target can be achieved

- A proposal for a vision and a draft initial IMO GHG strategy developed in the 3rd Intersessional Working Group on GHG as basis for the discussion at MEPC 72

- In all ongoing discussions methane emissions from engines, bunkering, loading operations and emergency situations are within scope

- Black Carbon could be considered as GHG

IMO GHG Strategy
CIMAC WG 5

Outcome of MEPC 72 (1/2)

- Initial IMO GHG strategy has been adopted with considerable opposition of major industrial and shipping Member States
- 4^{th} Intersessional Working Group on GHG has been convened with input to MEPC 73
- Vision: Phase out GHG emissions as soon as possible in this century
- Levels of ambition:
  - Carbon intensity of shipping to decline by improving energy efficiency of ships (further development of EEDI)
  - To reduce CO2 emissions per transport work as an average by at least 40% by 2030, pursuing efforts towards 70% by 2050, compared to 2008
  - To peak GHG emissions of shipping as soon as possible and to reduce total annual GHG emissions by at least 50% by 2050 compared to 2008 whilst pursuing efforts for phasing them out

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Outcome of MEPC 72 (2/2)

- Candidate measures in short-term (to be agreed between 2018 – 2023), in mid-term (to be agreed between 2023 – 2030) and in long-term (to be agreed beyond 2030)
- Short-term and medium-term: EEDI and SEEMP with technology development related to energy efficiency, speed-optimization and -reduction, control of methane and VOC, shoreside/onshore power supply, low-carbon and zero-carbon fuels, (excerpt)
- Long-term: low-carbon and zero-carbon fuels, new and innovative emission reduction mechanisms, (excerpt)
- Impact on States to be considered, such as to economy, competitiveness, supply security, dependency on transport, remote location, managing of catastrophes
- Review of the strategy in spring 2023

IMO GHG Strategy
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3rd IMO Greenhouse Gas Study 2014

Climate Carbon Feedback (CCFB) has been included in IMO GHG studies

Only well mixed gases CO_2, N_2O and CH_4 have been considered

None of the near term climate forcers CO, VOC, and NOx and

none of the aerosol precursors NH_3, SOx, Black Carbon, and Organic Carbon have been considered

Time horizon of 100 years was considered

Detailed GWP values are not reported, calculations are given in absolute tons

IMO GHG Strategy
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Outcome of MEPC 73

4th IMO Greenhouse Gas Study to be provided until autumn 2020 (Draft ToR)

1. Inventory of GHG emissions from international shipping 2012 – 2018
   - 6 gases included: CO_2, CH_4, N_2O, HFCs, PFCs, SF_6
   - Other possibly relevant substances NO_x, NMVOC, CO, PM, SO_x
   - Emission factors methodology in section 2.2.7 of the 3rd IMO GHG Study 2014 to be applied
   - Total annual GHG emission series from 2012 to 2018

2. Scenarios for future shipping emissions 2018 – 2050

An Expert Workshop for the preparation of the 4th IMO GHG study including the refinement of the ToRs will be conducted.

IMO GHG Strategy

CIMAC WG 5

MEPC 73/7/2 submitted by CESA and EUROMOT (1/2)

Implementation programme for effective uptake of alternative low-carbon/zero-carbon/fossil-free fuels

Fossil free fuel means a synthetic fuel (energy carrier) which is produced from other non-fossil sources using renewable energy sources, including biomass to liquid fuels (BtL) or power to liquid (PtL) / power to gas (PtG) fuels. Typical feedstock for such fuels are CO2 from biomass or extracted from atmosphere. Fuel type candidates in this respect are, for example, methanol, synthetic methane (liquefied for storage purposes) and Fischer-Tropsch diesel not excluding other types of energy carriers.

Low-carbon fuel means a fuel which uses CO2 from industrial processes or other fossil CO2 point sources as feedstock for a synthetic fuel with less GHG intensity.

GHG intensity (CO2-eq. emissions/MJ Fuel) means a measure to define the total emission of greenhouse gases, in CO2 equivalent, from production of the corresponding fuel and subsequent full conversion of the fuel's carbon content to CO2 during combustion. The co-sponsors are of the opinion that the development of guidelines of GHG intensity of fuels is of upmost importance. A principle exercise has already been performed under the EU-funded JOULES project and corresponding information has been provided in document ISWG-GHG 3/INF.2 (CESA).

IMO GHG Strategy
CIMAC WG 5

MEPC 73/7/2 submitted by CESA and EUROMOT (2/2)

Implementation programme for effective uptake of alternative low-carbon/zero-carbon/fossil-free fuels

Submitted by CESA and EUROMOT

Energy carriers *for use in the shipping industry* means all types of fuels, batteries or any other energy storing device to provide secondary energy for further conversion on board to mechanical, electrical and thermal energy.

Zero-carbon fuel means an energy carrier that does not contain any carbon, hence does not release any CO2 when being used in internal combustion engines, gas turbines, fuel cells or any other energy converting device. Such fuels are for example hydrogen or ammonia. These fuels typically carry a CO2-backpack from production (well to tank) which must be considered when assessing CO2 emissions from well to propeller. In addition, electrical energy from renewable sources stored in batteries can be regarded as a zero-carbon fuel (or energy carrier). In this case, the emissions from well to propeller depend on the production pathway (well to tank) of the electrical energy.

This submission and others were noted in plenary. However, they are not forwarded to MEPC 74 or to a PPR-session. New submissions are required!

IMO GHG Strategy
CIMAC WG 5

3rd IMO Greenhouse Gas Study 2014: Emission factors in top down for CO2e

Table 34 – *Emissions factors for top-down emissions from combustion of fuels*

Emissions substance	Marine HFO emissions factor (g/g fuel)	Marine MDO emissions factor (g/g fuel)	Marine LNG emissions factor (g/g fuel)
CO_2	3.11400	3.20600	2.75000
CH_4	0.00006	0.00006	0.05120
N_2O	0.00016	0.00015	0.00011
NO_x	0.09300	0.08725	0.00783
CO	0.00277	0.00277	0.00783
NMVOC	0.00308	0.00308	0.00301

Table 35 – *Year-specific emissions factors for sulphur-dependent emissions (SO_x and PM)*

% Sulphur content averages – wt IMO[1]						
Fuel type	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Average non-ECA HFO S%	2.42	2.37	2.6	2.61	2.65	2.51
SO_x EF (g/g fuel)						
Marine fuel oil (HFO)	0.04749	0.04644	0.05066	0.05119	0.05171	0.04908
Marine gas oil (MDO)	0.00264	0.00264	0.00264	0.00264	0.00264	0.00264
Natural gas (LNG)	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002
PM EF (g/g fuel)						
Marine fuel oil (HFO)	0.00684	0.00677	0.00713	0.00713	0.00721	0.00699
Marine gas oil (MDO)	0.00102	0.00102	0.00102	0.00102	0.00102	0.00102
Natural gas (LNG)	0.00018	0.00018	0.00018	0.00018	0.00018	0.00018

[1] Source: MEPC annual reports on Sulphur Monitoring Programme.

IMO GHG Strategy
CIMAC WG 5

IPCC Consideration of Climate Carbon Feedback (CCFB)

- Feedback is already included for CO_2 but CCFB is not included for non-CO_2
- Relative metrics, for non-CO_2 are inconsistently calculated
- IPCC include CCFB metrics in a consistent manner, based on Collins (2013) in 2014

Table 8.7 | GWP and GTP with and without inclusion of climate–carbon feedbacks (cc fb) in response to emissions of the indicated non-CO_2 gases (climate-carbon feedbacks in response to the reference gas CO_2 are always included).

	Lifetime (years)		GWP_{20}	GWP_{100}	GTP_{20}	GTP_{100}
CH_4[b]	12.4[a]	No cc fb	84	28	67	4
		With cc fb	86	34	70	11
HFC-134a	13.4	No cc fb	3710	1300	3050	201
		With cc fb	3790	1550	3170	530
CFC-11	45.0	No cc fb	6900	4660	6890	2340
		With cc fb	7020	5350	7080	3490
N_2O	121.0[a]	No cc fb	264	265	277	234
		With cc fb	268	298	284	297
CF_4	50,000.0	No cc fb	4880	6630	5270	8040
		With cc fb	4950	7350	5400	9560

Notes:
Uncertainties related to the climate–carbon feedback are large, comparable in magnitude to the strength of the feedback for a single gas.
[a] Perturbation lifetime is used in the calculation of metrics.
[b] These values do not include CO_2 from methane oxidation. Values for fossil methane are higher by 1 and 2 for the 20 and 100 year metrics, respectively (Table 8.A.1).

IMO GHG Strategy

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GWP 2017 updated by CCFB <u>due to by T. Gasser (2017)</u>

	GWP			GTP		
Time horizon (in years)	20	50	100	20	50	100
			CH_4^a			
AR5 (default)[b]	84	48	28	67	14	4
AR5 + Collins[b]	*85*	52	34	70	20	11
AR5 + OSCAR	86	52	31	70	18	5
AR5 + OSCAR + climate IRF update	86	51	31	60	14	7
AR5 + OSCAR + IRF and REs updates	96	57	34	67	16	7
All OSCAR	96	57	34	66	18	9
All OSCAR (no CC-fdbk)	96	57	34	65	16	8
			N_2O			
AR5 (default)[b]	*263*	275	*264*	*276*	*281*	234
AR5 + Collins[b]	*267*	290	*297*	*283*	311	297
AR5 + OSCAR	269	289	283	285	304	258
AR5 + OSCAR + climate IRF update	270	288	281	294	300	253
AR5 + OSCAR + IRF and REs updates	256	274	267	279	285	240
All OSCAR	255	273	267	279	283	241
All OSCAR (no CC-fdbk)	257	275	269	282	286	244
			BC^c			
AR5 (default)[b]	1560	736	426	451	71	58
AR5 + Collins[b]	1620	818	519	528	172	165
AR5 + OSCAR	1630	794	465	525	110	69
AR5 + OSCAR + climate IRF update	1630	787	460	210	116	90
AR5 + OSCAR + IRF and REs updates	1600	772	451	206	114	88
All OSCAR	1590	769	450	213	147	105
All OSCAR (no CC-fdbk)	1570	760	448	165	128	101
			SO_2^c			
AR5 (default)[b]	−140	−66	−38	−40	−6	−5
AR5 + Collins[b]	−145	−73	−47	−47	−15	−15
AR5 + OSCAR	−146	−71	−42	−47	−10	−6
AR5 + OSCAR + climate IRF update	−146	−71	−41	−19	−10	−8
AR5 + OSCAR + IRF and REs updates	−143	−69	−41	−18	−10	−8
All OSCAR	−143	−69	−40	−19	−13	−9
All OSCAR (no CC-fdbk)	−141	−68	−40	−15	−11	−9

[a] Because we use a numerical resolution method while the IPCC used an analytical one, some values in these rows may differ from the IPCC values by 1 because of the rounding (by 100 in the case of SF_6); these differing values are shown in italic font. [b] This does not account for the oxidation of CH_4 into CO_2 (see e.g. Boucher et al., 2009). [c] Metrics for BC and SO_2 are not directly provided by the IPCC; rather, we use here the IPCC method with lifetimes and radiative efficiencies from Fuglestvedt et al. (2010).

IMO Black Carbon CG and ICCT Workshop
CIMAC WG 5

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IMO Black Carbon CG and ICCT Workshop
CIMAC WG 5

MEPC 73 has been requested to note the outcome of PPR 5

- agreed to the Reporting protocol for voluntary measurement studies to collect BC data;
- identified the most appropriate BC measurement methods for data collection as Filter Smoke Number (FSN), Photo Acoustic Spectroscopy (PAS) and Laser Induced Incandescence (LII); and
- invited Member Governments and international organizations to continue to collect BC data, using the agreed reporting protocol and measurement methods, and to submit relevant data to PPR 6.

Terms of Reference for the Correspondence Group (CG) with report to PPR 6

- Identify candidate control measures to reduce the impact of BC emissions from international shipping, taking into account documents PPR 5/7/5, PPR 5/7/7, PPR 5/INF.7 and PPR 5/INF.16;
- Assess the feasibility and appropriateness of the identified candidate control measures, with a view to finalization of the investigation of appropriate control measures at PPR 6.

Request of CG Chair

- Based on the current availability of technology, members are requested to identify which of the candidate measures listed could be implemented within the next 5 years to reduce the impact on the Arctic of BC from international shipping. Include assumptions and rationale in the answer

IMO Black Carbon CG and ICCT Workshop

CIMAC WG 5

Status

- Three rounds with the goal to identify the most practical BC control measures are finalized, draft report with INF.paper have been circulated
- ICCT- workshop with ToR similar to the CG took place September in San Francisco

Corrections required by EUROMOT

- Delete "~~top rated~~" before "reduction strategies" and numbering of control measures in the report. Both could be misinterpreted as ranking within one structure – use of bullet points is recommended.
- Besides the general disposition, a lot of comments to specific measures have been received, e.g. about applicability and reduction potential. These comments should be better extracted from the attachment and being reflected in the report.
- Since the baseline, from which BC emission reduction is calculated and how BC emissions are quantified, could not be clarified or validated within the ToR of the Correspondence Group, the list of candidate control measures do not indicate a conclusive ranking. There is only estimation about an earlier availability made.
- The term "slide valves" to be replaced with "further development of fuel injection equipment"

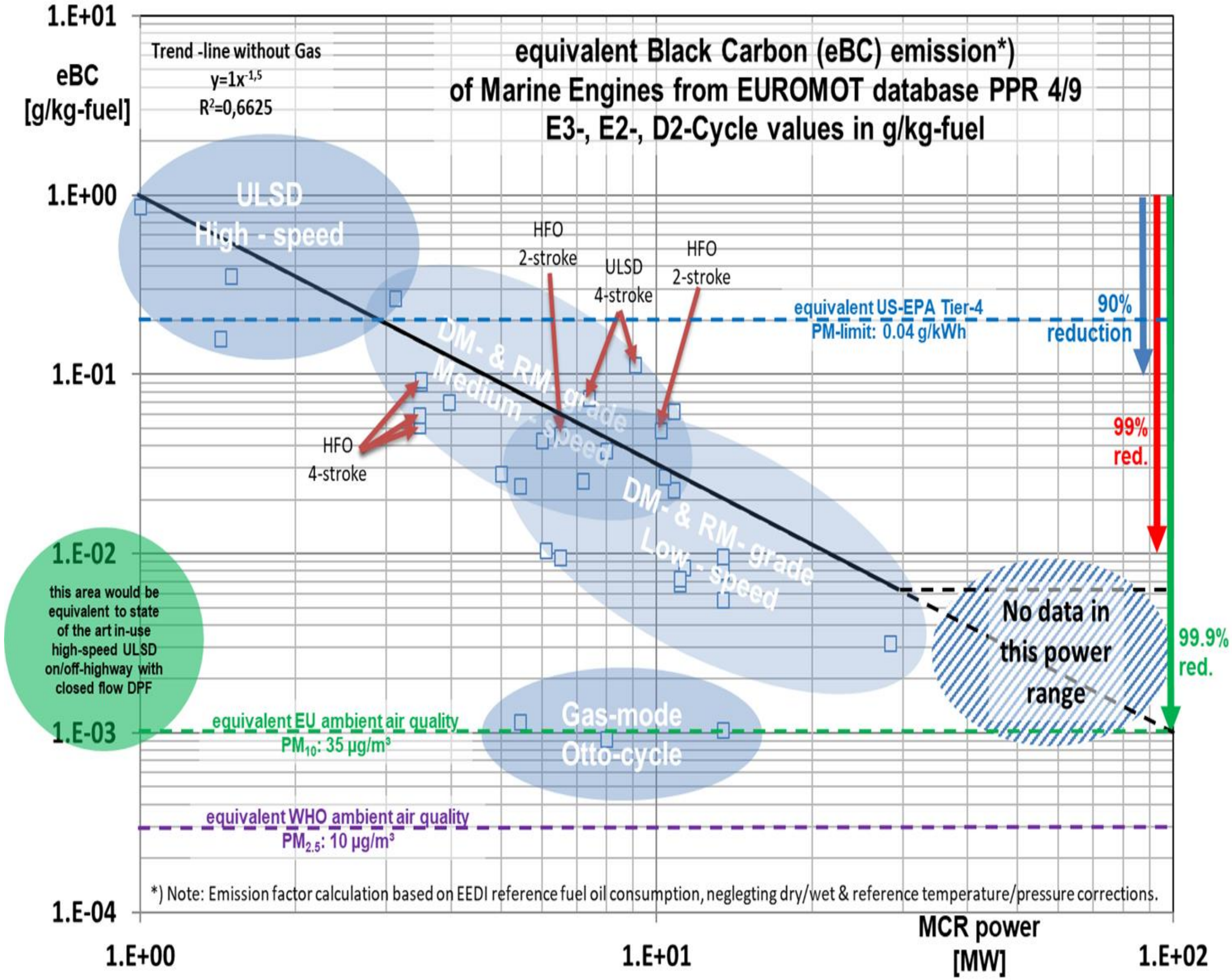
IMO Black Carbon CG and ICCT Workshop

CIMAC WG 5

Trends from relevant responses

- Finland, Korea, ICS questioning fuel switch as well as Netherlands asking for detailed explanation
- Japan: Engine tuning NOx vs. BC with SCR and/or EGR/WiFE. Comments on measures currently not reflected in the report. Finalizing a standardized measurement approach is needed before enforcing a regulation on BC emissions.
- Canada: LNG not viable for Arctic due to non-existent infrastructure.
- Korea: SCR on DPF (SCR-F)
- Denmark: DPF in combination with scrubber by Haldor Topsoe A/S and EcoSpray for HFO operation. No rating of measures, baseline is not clear.
- Germany: Effect of scrubbers on BC not clear. Focus on available technologies.
- CESA: General supports EUROMOT-comments.
- IMarEST: Requests focusing on conditions to be fulfilled before any BC standard is to be established, NTC 2008 is not suitable
- FOEI & CSC: HFO to distillate fuel switch as only viable option when engines are properly adjusted. Transferability of technology from other sectors is regarded „as given“: Examples: hydrogen, ammonia, electrification, DPF. Efficiency of scrubbers is regarded critical. BC standard to time consuming to establish. Directly challenges Finland, Denmark, ICS and EUROMOT. Stick to “top-rated” within ranking. LNG unsuitable due to methane slip and infrastructure. Promotes fuel-switch and then DPF.

IMO Black Carbon CG and ICCT Workshop
CIMAC WG 5



Use of Multiple Engine Operational Profiles
CIMAC WG 5

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Use of Multiple Engine Operational Profiles (EOPs)
CIMAC WG 5

- No agreement to the terms “map” and “emission control strategy”. “Engine operational profile” was considered as compromise.
- No definition was developed – agreement to “description”
- MEPC 73 decided to take on board the work item and to consider document MEPC 73/11/1 and MEPC 73/INF.15 in the further discussion

Title of the proposed new output

Development of amendments to MARPOL Annex VI and the NOx Technical Code on the use of multiple engine operational profiles for a marine diesel engine

Use of Multiple Engine Operational Profiles (EOPs)
CIMAC WG 5

Associated scope of work

Clarify whether multiple engine operational profiles are allowed, and if so, what regulatory controls should be applied, noting these may also need to include amendments to MARPOL Annex VI and the NOx Technical Code 2008, and if not allowed, then what amendments would be necessary to MARPOL Annex VI and the NOx Technical Code 2008 to explicitly prohibit multiple engine operational profiles."

Description of "Engine Operational Profile“

Engine Operational Profile is a particular set of NOx influencing settings applied in an electronic engine management system which influences the NOx emission performance. Those settings may relate to, but are not limited to, fuel injection, inlet and exhaust valve operation, charge air, exhaust bypass/waste gate or exhaust after treatment controls and auxiliary control devices.

Use of Multiple Engine Operational Profiles (EOPs)
CIMAC WG 5

MEPC 73/11/1 and **MEPC 73/INF.15**
Multiple engine operation profiles and Not to Exceed Zones for NOx emissions

Submitted by the United States

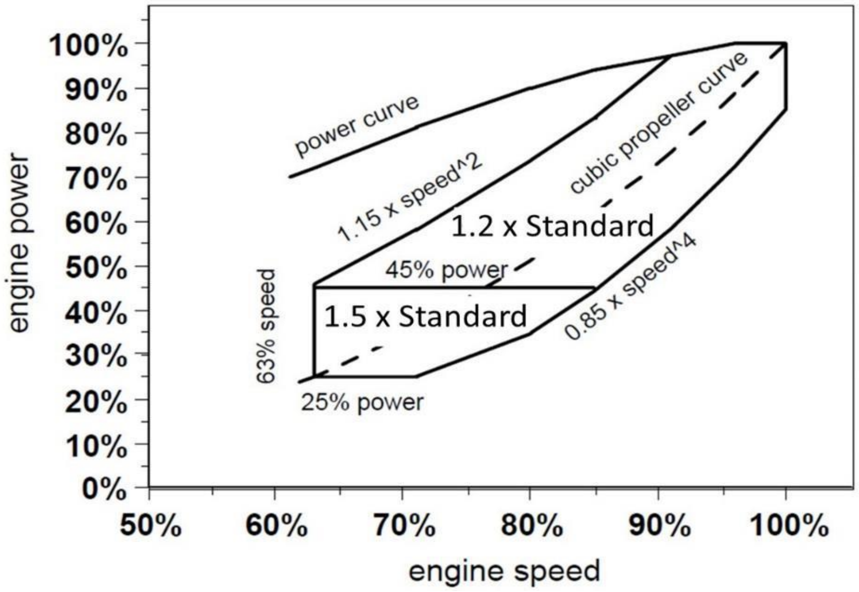

Figure 1: Example NTE zone. The United States. Tier 2 emission standards – propeller law engines (E3)

Amendments to Mandatory Instruments
CIMAC WG 5

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Amendments to Mandatory Instruments, 1 March 2020
CIMAC WG 5

Regulation 14
Sulphur oxides (SOx) and particulate matter

General requirements
1 The sulphur content of fuel oil used or carried for use on board a ship shall not exceed 0.50% m/m.

Requirements within emission control areas
3 For the purpose of this regulation, an emission control area shall be any sea area, including any port area, designated by the Organization in accordance with the criteria and procedures set forth in appendix III to this Annex. The emission control areas under this regulation are:

.1 the Baltic Sea area as defined in regulation 1.11.2 of Annex I of the present Convention;
.2 the North Sea area as defined in regulation 1.14.6 of Annex V of the present Convention;
.3 the North American Emission Control Area, which means the area described by the coordinates provided in appendix VII to this Annex; and
.4 the United States Caribbean Sea Emission Control Area, which means the area described by the coordinates provided in appendix VII to this Annex."

4 While a ship is operating within an emission control area, the sulphur content of fuel oil used on board that ship shall not exceed 0.10% m/m.

The subtitle "Review provision" and paragraphs 8, 9 and 10 are deleted.

Amendments to Mandatory Instruments, 1 March 2020
CIMAC WG 5

Appendix I

Form of International Air Pollution Prevention (IAPP) Certificate (Regulation 8)

Supplement to International Air Pollution Prevention Certificate (IAPP Certificate)

2.3.1 When the ship operates outside of an emission control area specified in regulation 14.3, the ship uses:

.1 fuel oil with a sulphur content as documented by bunker delivery notes that does not exceed the limit value of 0.50% m/m, and/or

………………………………………………………………………….................☐

.2 an equivalent arrangement approved in accordance with regulation 4.1 as listed in paragraph 2.6 that is at least as effective in terms of SOX emission reductions as compared to using a fuel oil with a sulphur content limit value of 0.50% m/m

……………………………………………………………………………......☐

2.3.2 When the ship operates inside an emission control area specified in regulation 14.3, the ship uses: ... 0.10% m/m, and/or …..

……………………………………………………………………………….☐

2.3.3 For a ship without an equivalent arrangement approved in accordance with regulation 4.1 as listed in paragraph 2.6, the sulphur content of fuel oil carried for use on board the ship shall not exceed 0.50% m/m as documented by bunker delivery notes

Other Relevant Documents to MEPC 73
CIMAC WG 5

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Other Relevant Topics at MEPC 73 (1/2)
CIMAC WG 5

EGR-bleed off water guidelines, adopted
An intervention by IACS asked to clarify the application date, which is now set to 1 June 2019. In addition, the text in section 2.2 of the draft guidelines specifies, that the guidelines apply *"… to a marine diesel engine fitted with an EGR device having a bleed-off water discharge arrangement, for which the EIAPP Certificate is first issued on or after 1 June 2019…"* that means for new engines. There was text added to emphasize that the discharge of oil and oily mixtures into polar waters is prohibited by the Polar Code.

Shaft Power Limitation for assuring minimum power under EEDI requirements, document MEPC 73/5/1, Germany et al.
The document has been forwarded to the working group for further deliberation. The discussion was controversial and no action item has been developed. Germany will further work on the issue in an informal correspondence with interested parties.

Tier III NOx requirements for large yachts further delay beyond 2021, document MEPC 73/5/11, ICOMIA
Support was given by Malta. The Committee invited interested parties to submit proposals to a later session. ICOMIA is now requested to find supporting Member States.

Other Relevant Topics at MEPC 73 (2/2)
CIMAC WG 5

2018 Guidelines for the calculation of the attained EEDI
The guidelines have been revised with the goal to include an alternative calculation method for ice class ships and to make the numbering in the guidelines more user-friendly.

EEDI reference lines, reduction beyond phase 2
Common agreement to lower EEDI reference lines for bigger container ships by 40%; Inconsistent agreement for smaller container ships; No agreement to other ship types

2020 Global sulphur cap
Guidance on ship implementation plan and guidance on best practice for fuel oil supplier are approved

Draft best practice for Member States/coastal States need further refinement in a Correspondence Group with report to MEPC 74

Development of measures to reduce risks of use and carriage of heavy fuel oil as fuel by ships in Arctic waters
Addressed under a distinct agenda item. No decision has been made and it was agreed to forward the documents to the Sub-Committee PPR

IACS Unified Interpretation MPC 51
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IACS Unified Interpretation MPC 51
CIMAC WG 5

Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines (1/4)

Chapter 3.2.1 reads as follows:

For every individual engine or parent engine of an engine group or family, one of the test cycles specified in 3.2.2 to 3.2.6 shall be applied for verification of compliance with the NOx emission limits in accordance with regulation 13 of Annex VI. *(2004)*

For every individual engine or parent engine of an engine family or engine group, one or more of the relevant test cycles specified in 3.2.2 to 3.2.6 shall be applied for verification of compliance with the applicable NOx emission limit contained in regulation 13. *(2017)*

IACS Unified Interpretation MPC 51

CIMAC WG 5

Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines (2/4)

Interpretation:

(a) One of the test cycles specified in Chapters 3.2.2 to 3.2.6, applicable to the application, shall be applied.

(b) Where more than one test cycle is to be applied the average cycle weighted NOx emission value (in g/kWh) for each cycle is to be stated on the EIAPP Certificate 1.15, together with the corresponding limit value, 1.14.

(c) A Parent Engine test for a particular duty cycle is to follow the appropriate test cycle. A Parent Engine emission value shall not be 'constructed' by, for example, adding data from one test to emission values taken from another test.

(d) In those instances where a constant speed engine as installed can be used either solely for main propulsion or auxiliary purposes, then that engine should be certified to both the E2 and D2 cycles.

(e) Where a generator is also permanently fitted or coupled to main engine propulsion shafting then certification of that main engine using only the E2 or E3 cycle, as appropriate, is required.

IACS Unified Interpretation MPC 51
CIMAC WG 5

Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines (3/4)

Withdrawn Interpretation in MEPC 71/5/4:
(a) For a parent engine of an engine family or engine group, one or more test cycles maybe applied where an engine family or engine group may contain engine models which can be used solely for one application and engine models which can be used for another application.
(b) Individual engines or member engines of an engine family or engine group intended to be used for more than one application are to be certified for the relevant test cycles.
(c) In those instances where an engine as installed on board may be used simultaneously or separately for supplying energy for auxiliary purposes and for supplying energy to main propulsion that engine is to be certified to the test cycle only which represents the main purpose of the engine application. In such cases main propulsion is considered to be the main purpose and takes precedence. This, for example, means that any-diesel-electric propulsion application only requires E2 certification irrespective of whether energy can be distributed to the switchboard for other (auxiliary) purposes. Similarly, this applies to main engines which e.g. can also drive cargo pumps.

IACS Unified Interpretation MPC 51
CIMAC WG 5

Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines (4/4)

Description of the issue:

- For diesel-electric main propulsion applications with variable speed sometimes the combination of E2/C1 test cycles is required.
- For the same application sometimes the combination of E2/D2 test cycles is deemed to be appropriate.
- Testing two joint test cycles is burdensome and might require a new set up of the engine.
- Often the combination required by the classification society/Administration is not clear or known during an essential project stage.

Request:

- Against the background that flexible board grids will gain more importance as well for hybrid systems, the revised UI should provide clarity with a view to applicable test cycle for variable speed diesel-electric main propulsion applications.

Requirements to Analyzers for Onboard Confirmation Tests

CIMAC WG 5

1	IMO GHG Strategy
2	IMO Black Carbon Correspondence Group and ICCT Workshop
3	Use of Multiple Engine Operational Profiles
4	Amendments to Mandatory Instruments
5	Other Relevant Topics at MEPC 73
6	IACS Unified Interpretation MPC 51
7	**Requirements to Analyzers for Onboard Confirmation Tests**

Requirements to Analyzers for Onboard Confirmation Tests

CIMAC WG 5

Situation

SCR-Guidelines in Resolution MEPC.291(71)

- 7.1 After installation on board of an engine system fitted with SCR and before entry into service an initial confirmation test should be performed on board. *(parent engine)*

- 7.6 The NOx analyser should meet the requirements of chapter 5 of the NTC 2008.

NTC 2008 Appendix IV 5.4 Calibration

- 5.4.1 Each normally used operating range shall be calibrated. Analysers shall be calibrated **not more than 3 months** before being used for testing or whenever a system repair or change is made that can influence calibration, or as per provided for by 1.3.2.2.

Proposal for a solution in NTC 2008 Appendix IV 5.4 Calibration

- 5.4.1 Each normally used operating range shall be calibrated. Analysers shall be calibrated **in accordance with the requirements of the analyser manufacturer** ~~**not more than 3 months**~~ before being used for testing or whenever a system repair or change is made that can influence calibration, or as per provided for by 1.3.2.2.

Disclaimer

All data provided in this document is non-binding.
This data serves informational purposes only and is especially not guaranteed in any way.
Depending on the subsequent specific individual projects, the relevant data may be subject to changes and will be assessed and determined individually for each project. This will depend on the particular characteristics of each individual project, especially specific site and operational conditions.

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Future in the making

Thank you very much!

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