資料36-5

CIMAC
INTERNATIONAL COUNCIL ON COMBUSTION ENGINES

Updates for emission topics

CIMAC WG 5, 31st May 2023, Varsa

Agenda

IWT-related topics

- EU ISM
- Use of NRE engines in inland shipping
- Progress of technical requirements / discussion in CESNI
- FAQ updates

NOx emissions from SCR-equipped marine engines at low loads – discussion at IMO

- Overview current publications and studies
- Status of discussion and next steps

Updates IWT

- ISM amendment completed as Regulation (EU) 2022/2387
  - ISM plans need to be submitted by 26th June 2023 (for current products)
  - Last results need to be submitted by 26th December 2026 (for current products)
  - EUROMOT will provide an updates FAQ soon
- Still discussion on marinisation of NRE engines / effects on inducements
  - Interest of (Dutch) marinisers of truck engines want to limits market access of truck / NRMM engines where inducements are still operational → refer to Article 9.09 in ES-TRIN on ensuring safe navigation
  - Topic may come up again and could lead to problems to receive a certificate for the IWT vessel
- Further development of requirements on methanol engines for IWT
  - currently only provision for „liquid/gas“ dual-fuel engines, not for „liquid/liquid“
  - CESNI/PT group asked EUROMOT to support
  - Methanol safety standards (based on IMO) are under development at CESNI
- Joint FAQ document will be further developped in order to reflect recent clarifications on use of previous stage engine which are alreday placed on the market, test cycles, repairs

Updates IWT - backup

13 PREVIOUS STAGE ENGINES THAT WERE ALREADY PLACED ON THE MARKET

After the Stage V placing on the market date for the respective engine power category are there restrictions on the installation in vessels of engines that do not meet Stage V but that were produced prior to the Stage V placing on the market date and placed on the market in compliance with Regulation (EU) 2016/1628 or Directive 97/68/EC? This would include engines placed on the market but still in stock, for example at dealers or shipyards.

Regulation (EU) 2016/1628 **in conjunction with Directive (EU) 2016/1629 and the associated ES-TRIN** ~~2017~~ effectively prohibits the installation in a vessel of an engine that does not meet Stage V but was already previously placed on the market in compliance with Regulation (EU) 2016/1628, Direc 97/68/EC or RVIR. ES-TRIN (Article 9.01(4)) fundamentally prohibits the installation of replacer engines (see question 4).

There are two exceptions:

- The engine complies with the definition of a transition engine (see question 6).

  or

- The engine complies with the transitional provisions laid down in ES-TRIN.

Consequences: The engines placed on the market but still in stock (ie CCNR II or EU Stage IIIA), f example at dealers or shipyards, can only be installed within the framework of the transition engi scheme (valid no later than 24 months after the Stage V placing on the market date) ~~or used to repla an existing engine using the same technology and of the same type (unlimited time period)~~.

References:
Regulation (EU) 2016/1628, Article 3(11), Article 58(5)
ES-TRIN ~~2017~~, Articles 9.01(4), 32.02, 32.05 and 33.02 in relation with Chapter 9~~Articles 9.01 and 9~~

FAQ updates - – Revised Q13 explanation

'N.R.C.': the provision does not apply to craft which are already operating, unless the parts concerned are replaced or converted, i.e. the provision applies only to Newly-built craft and to the Replacement or Conversion of the parts or areas concerned. If existing parts are replaced by replacement parts using the same technology and of the same type, this does not constitute replacement 'R' within the meaning of the transitional provisions.

2017

CHAPTER 9			For engines which are already installed onboard and a) non type-approved or b) for which no installation test had to be carried out, only Article 9.02 applies.	1.1.2020
9.01	(1) to (4)	General provisions	For engines complying with the type and installation provisions in force at the date of installation: N.R.	
9.06		Installation test		

2023

CHAPTER 9			Chapter 9 applies to engines with the following exceptions. a) Only Article 9.02 applies for engines which are already installed onboard and aa) non-type-approved or bb) for which no installation test had to be carried out. b) Without prejudice to (a), Article 9.10(2) only applies to repairs of engines carried out after 1 January 2024 including those carried out on an engine in service before this date. c) Without prejudice to (a), Article 9.01(2) does not apply for engines installed before 1 January 2020, if they comply with the provisions on type approval and installation in force on the installation date.	

Updates IWT - backup

FAQ updates – New Q.24

Engine type-approval category	Engine speed operation	IWP test-cycles included in type-approval	IWA test-cycles included in type-approval (additional in case of IWP primary cycle)	NRE or Euro VI test-cycles included in type-approval	Installation purpose					
					Propulsion					**Auxiliary**
					Direct propulsion (including bow thruster for any purpose)		Electrically coupled (indirect) propulsion (including bow thruster for any purpose)		Second use driving auxiliaries irrespective whether propulsion is engaged	Sole use driving auxiliaries (including bow thruster solely for assisting steering)
					Operates on a fixed-pitch propeller curve	Controllable-pitch propeller	Diesel-electric	Charging propulsion batteries		
IWP	variable	E3	**None**			**Var. speed only***	**Var. speed only***	**Var. speed only***	**Var. speed only**	
			C1			Var. speed only*	Var. speed only*	Var. speed only*	Var. speed only	Var. speed only
			D2			Var. speed only*	Var. speed only*	Var. speed only*		Const. speed only
			C1 + D2			Var. speed only*	Var. speed only*	Var. speed only*		
		E3 + E2	**None**							
			C1							Var. speed only
			D2							Const. speed only
			C1 + D2							
	constant	E2	**None**				**Const. speed only**	**Const. speed only**	**Const. speed only**	
			D2				Const. speed only	Const. speed only	Const. speed only	Const. speed only
IWA	variable		C1							
	constant		D2							Const. speed only
NRE < 560 kW	variable			NRTC + C1						
	constant			D2			Const. speed only	Const. speed only	Const. speed only	Const. speed only
Euro VI < 560 kW				WHTC + WHSC						

Updates IWT - backup

FAQ updates – New Q.25

Annex 1 to CESNI/PT (22) 37 rev. 1

Date of installation of the engine	Before 2003	Between 2003 and 2007	Between 2007 and 2019*	After 2019*
Emission standard at the installation	None	RVIR (**CCNR I**) for the vessels with Rhine vessel inspection certificate.	RVIR (**CCNR II**) or EU Directive 97/68 (~~IIIa~~IIIA) for the vessels with Rhine vessel inspection certificate or Union certificate	EU Regulation 2016/1628 (**NRMM, Stage V**) as well as transition engines for the vessels with Rhine vessel inspection certificate or Union certificate
Technical requirements of Chapter 9 of ES-TRIN at the renewal of the vessel certificate	Only Article 9.02 of ES-TRIN (identification numbers of all internal combustion engines mentioned in the vessel certificate)	Chapter 9 of ES-TRIN, except Article 9.01(2) (if the engine still complies with the provisions on type approval and installation in force on the installation date)		Chapter 9 of ES-TRIN
Repairs	Article 9.10 does not apply	Article 9.10 applies only for **repairs** performed **after 1 January 2024**		

*2018 for < 300 kW engines

Explanations

No report on repairs carried out before 1st January 2024 is required. Article 9.10 does not therefore apply retroactively to repairs prior to this date.

This solution enables article 9.10 to be implemented as quickly as possible and to institute documentary tracking of any repairs carried out to ensure that they are consistent with the engine's type approval. For engines brought into service before 1st January 2024, this documentary tracking will be incomplete because it will not log earlier repairs. In certain instances, this may complicate the assessment of conformity or make it harder to understand what repairs have been carried out. However, in most cases, it will enable information to be retained that is relevant to evaluating the general state of the engine.

NOx emissions from SCR-equipped marine engines at low loads – discussion at IMO

- NOx emissions from SCR-equipped marine engines are in focus of several studies
- Studies from Danish EPA”NOX Emissions From Ships In Danish Waters” Rapport (mst.dk) and the project SCIPPER – Shipping Contributions to Inland Pollution Push for the Enforcement of Regulations (scipper-project.eu) are already published
- Canada has provided another study to IMO MEPC 80 (MEPC 80/5/1) with following statements

  - Operation in ports and coastal areas often under low engine load
  - IMO propulsion engines do not have requirements < 25% load
  - SCR systems do not function (properly) < 25% loads and are impacted by environmental conditions
  - EGR systems are anticipated with better low-load performance

NOx emissions from SCR-equipped marine engines at low loads – discussion at IMO

- Canda proposes to keep test cycles but to add an NTE approach (remark DS: already part of MEOP discussion)
- Identifiy existing data and perform gap analysis
- Industry stakeholders are invited to provide input:

Proposals

11 Canada would like to share the findings of the Starcrest study which is provided in the annex to this document, and invite input from engine designers, Original Equipment Manufacturers (OEMs), EUROMOT, and regulators on its findings.

12 Based on further research/data/real world information, potential test cycle for NO_x Tier III may be established that better reflects real world ship operations within ECAs, including those near coastal regions and ports. Canada would also like to invite comments on this concept.

- EUROMOT is preparing a response for discussion and is in contact with Canada
- Feedback from CIMAC WG 5 experts? Immediate views and observations?

NOx emissions from SCR-equipped marine engines at low loads – ideas for discussion at IMO

- Expressing emissions in g/kWh provides maybe not the full picture at lower loads → mass flow?
- SCR is not switched off simply at 25%, SCR function depends on exhaust gas temperature and other parameters, Dosing will be gradually reduced and not switched-off immediately at a certain threshold in many cases. Refer to discussion on *rational vs. irrational emission control strategy* which will be covered in the currently ongoing discussion on MEOP.
- IMO covers already test points <25% load for test cycles where it is deemed to represent normal operation. It needs to be noted that the 50 % mode cap does not apply for these test point in order to take account SCR technologies boundaries
- Operation in ports and coastal areas is not automatically related to operation on low loads
- SCRs systems can typically be operated below 25 %, load, as long as the temperature is sufficiently high
- EGR and SCR are both capable solutions to reduce NOx. It cannot be stated (as Canada does in the submission) that EGR is better performing at lower loads