

MPC 112 ~~2011~~ 2017 Guidelines Addressing Additional Aspects ~~to~~ of the NO_x Technical Code 2008 with regard to Particular Requirements related to Marine Diesel Engines fitted with Selective Catalytic Reduction (SCR) Systems

(Nov 2015)
(Rev.1
Nov 2019)

(Resolution MEPC. ~~498(62)~~ 291(71), Paragraph ~~3.2.4.8~~ 3.2.8)

MEPC.~~498(62)~~ 291(71), Paragraph ~~3.2.4.8~~ 3.2.8 reads:

3.2.4 Technical File and on board NOX verification procedures

In addition to the information supplied in paragraph 3.1.3 of these ~~guidelines~~ Guidelines and items in section 2.4 of the NTC 2008, engine systems fitted with SCR should include the following information in ~~its~~ Technical File:

.8 factors related to the deterioration rate of SCR performance, e.g. exchange condition for SCR catalyst blocks and recommended exchange time of SCR catalyst blocks;

.1 where a feedback or a feed forward reductant control strategy is incorporated with a NOX measurement device, this is acceptable as a means of monitoring catalyst condition/degradation. The exchange criteria of catalyst blocks against the reading of the NOX measurement device is to be specified by the applicant as well as the maintenance, service, and calibration requirements for the NOX measurement device;

.2 where a feed forward reductant control strategy is adopted without a NOX measurement device, the application is to provide the details of:

.1 the expected deterioration curve under expected operating conditions or the life of catalyst under expected operating conditions;

.2 factors which can influence catalyst NOX reduction efficiency; and

.3 guidance on how to assess catalyst NOX reduction efficiency based on periodical spot checks or monitoring as specified by the applicant, if applicable; records are to be kept for inspection during annual, intermediate and renewal surveys. The frequency of periodical spot checks is to be defined by the applicant considering the expected deterioration of the catalyst. The frequency for spot-checks should be at least after installation and once every 12 months; and

.3 other strategies on monitoring the catalyst condition/degradation are subject to the approval of the Administration;

Note:

1. This Unified Interpretation is to be uniformly implemented by IACS Societies not later than 1 July 2016.
2. Rev.1 of this Unified Interpretation is to be uniformly implemented by IACS Societies from 1 July 2020.

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Interpretation

The engine technical file is to include details of factors related to the deterioration rate of SCR performance, e.g., exchange condition for SCR blocks and recommended exchange time of SCR blocks.

Where a feedback reductant control strategy is adopted utilising NO_x monitoring then this is acceptable as a means of monitoring catalyst condition/degradation.

Where a feed forward control reductant control strategy is used then the applicant is to provide details of:

- a) The expected deterioration curve under expected operating conditions
- b) The life of catalyst under expected operating conditions
- c) Factors which can influence catalyst condition
- d) Guidance on how to assess catalyst condition and activity by spot checks, if applicable, should be provided. Records are to be kept for inspection during annual survey, intermediate and renewal surveys

SCR systems using a feed forward reductant control strategy may be fitted with NO_x monitoring devices for the purposes of monitoring catalyst condition.

The technical file is to include guidance to assist the crew in recovering from SCR fouling and poisoning mechanisms where recovery from such fouling and poisoning can be achieved without exchanging catalyst blocks or applying specialised re-activation techniques.

For application of 3.2.8.1:

1. A NO_x measurement device, incorporated in a SCR feedback or feed forward reductant control system, is not required to be in compliance with appendix III of NO_x Technical Code if the suitability of this NO_x measurement device had been proven by the corresponding Parent Engine test.

The suitability shall be verified by comparing the emission data of the NO_x measurement device with the results of an analyzer complying with 3.4, Appendix III of NTC2008. The values obtained by the NO_x measurement device shall not differ by more than $\pm 5\%$ from the readings of the analyzer during the parent engine test.

The applicant shall specify the accuracy of the NO_x measurement device based on a defined calibration procedure and/or exchange requirements for the device.

2. Irrespective of the reductant control strategy, the criteria for catalyst block exchange are to be specified by the applicant. The criteria shall ensure permanent compliance with the applicable NO_x emission limit for the relevant Engine type, Engine Group or Engine Family, as applicable.

Depending on the proposed onboard verification procedure for assessment of catalyst NO_x reduction efficiency, allowances may be given according to NTC2008, 6.3.11.1 or Resolution MEPC.291(71) Section 7.5.

3. In case where feedback system is applied as a means of monitoring catalyst condition degradation, generating alarms or failure codes in case of non-compliance is to be provided and to be specified in the Technical File.

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For systems generating alarms or failure codes in case of non-compliance without access to the measured NOx values, the applicant is to provide details, not necessarily in the Technical File but at least in supportive documentation for approval, about the alarm strategy, failure codes and calculation algorithm. From the view point of the purpose of achieving NOx compliance, application of the feedback system with the alarms or failure codes is considered as fulfilling the requirements of NTC2008 2.3.6 (a means of monitoring the consumption of substances).

For application of 3.2.8.2.3:

The spot checks after installation shall be performed on board the vessel after installation of the complete Engine+SCR system in cases where they are specified as a method of assess catalyst NOx reduction efficiency by the applicant. In this case the record of this test including information on compliance of NOx measurement device and its calibration record shall be available for the initial survey. The spot checks do not need to be witnessed by the Administration.

In cases where spot checks are required, the checks are to be performed at least at 75% of the rated power.

The guidance on how to assess catalyst NOx reduction efficiency shall include, but not be limited to, the following items:

- a) Procedure for spot checks
- Preparation of calibration gas, if applicable
 - Details of NOx measurement device including calibration requirements.
 - Test condition (e.g. power and speed setting ranges as well as other applicable engine and SCR settings)
 - Data to be recorded. It is recommended to include a test report template in the Technical File.
 - Sampling probe position(s) for NOx measurement.
 - Time duration for engine+SCR stabilisation and the NOx emission measurement
- b) Criteria to assess catalyst NOx reduction efficiency

In case where the spot checks are conducted following the procedure specified in resolution MEPC.291(71) Section 7, the criteria specified in 7.5 of the resolution MEPC.291(71) shall be applied.

Otherwise, the criteria shall be determined based on applicable NOx emission limits corresponding to the rated engine speed of the subject engine rather than the parent engine emission value. Also, allowance of the criteria may be given according NTC2008, 6.3.11.1 or Resolution MEPC.291 (71) Section 7.5.

For application of 3.2.8.3:

Other monitoring strategies may only be accepted if the entire SCR chamber with all catalyst blocks installed is covered. Testing of single catalyst blocks after removing them from the SCR chamber is not considered as representative for the entire SCR system.

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