



Tier III Compliance Checklist for Maritime Engineers

Objective:

To ensure continuous compliance with IMO Tier III NOx emission standards, particularly in designated Emission Control Areas (ECAs).

Section 1: Documentation and Certification (Daily/Weekly Check)

This section ensures all required regulatory and manufacturer documentation is on board and up-to-date.

- ☐ Review and understand IMO Tier III regulations and applicability for your vessel and route.
- ☐ Confirm vessel construction date and engine applicability for Tier III rules.
- ☐ Keep up-to-date records of Tier III certification and emission compliance certificates.
 - ☐ Engine International Air Pollution Prevention (EIAPP) Certificate:
 - **Verify:** The EIAPP Certificate is on board for each main and auxiliary engine greater than 130 kW.
 - **Confirm:** The certificate's serial number matches the engine's serial number.
 - **Check:** The certificate is valid and has not expired.
- ☐ Ensure access to relevant MARPOL Annex VI documentation onboard.
 - ☐ Technical File (or NOx Technical File):
 - **Verify:** The Technical File for each certified engine is on board and readily accessible.
 - **Confirm:** The file contains all engine parameters, settings, and components that influence NOx emissions (e.g., fuel injection timing, turbocharger specifications).
 - **Check:** Any modifications or adjustments made to the engine are approved and documented in the Technical File, with a record of the approval from the flag administration or a recognized organization.

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☐ On-board NOx Verification Procedure:

- **Confirm:** A documented procedure for on-board NOx verification is available, as required by the Technical File.
- **Check:** All crew members involved in engine operations are familiar with this procedure.

☐ Maintain a compliance logbook tracking inspections, repairs, and emission-related activities.

Section 2: Operational Compliance (During Transit in ECAs)

This section focuses on the procedures and monitoring required while operating in a Emission Control Area.

☐ System Readiness Check (Prior to entering NECA):

☐ For SCR Systems:

- **Verify:** The Selective Catalytic Reduction (SCR) system is warmed up and operating within its specified temperature range ($>250^{\circ}\text{C}$).
- **Confirm:** The urea solution (DEF - Diesel Exhaust Fluid) tank has sufficient volume for the planned voyage.
- **Check:** The urea dosing system is functioning correctly, with the injection nozzle clear of crystallization or blockages.

☐ For EGR Systems:

- **Verify:** The Exhaust Gas Recirculation (EGR) system is active and the water treatment system is operational.
- **Confirm:** The bleed-off water discharge meets IMO MEPC 307(73) guidelines.
- **Check:** The EGR valves are not stuck and are modulating correctly to control the exhaust gas flow.

☐ Real-time Monitoring:

- **Record:** Log the NOx emissions data from the Continuous Emissions Monitoring System (CEMS) as per the vessel's monitoring plan.
- **Check:** Ensure the monitored NOx levels are well below the Tier III limit for the engine's rated speed.

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- **Monitor:** The consumption of urea or other reducing agents to ensure it is consistent with the Technical File's specifications.

☐ Bridge-Engine Room Communication:

- **Confirm:** The bridge is aware of the vessel's entry into a ECA and has communicated the need for Tier III mode to the engine room.
- **Verify:** The changeover to Tier III mode is logged in the engine room logbook and the ship's bridge logbook.

Section 3: Maintenance and Inspection (Routine Schedule)

This is the most critical section for long-term compliance and system reliability.

☐ Selective Catalytic Reduction (SCR) System:

☐ Catalyst Inspection:

- **Frequency:** As per the manufacturer's recommendations (typically during a scheduled engine overhaul).
- **Procedure:** Inspect the catalyst for contamination, plugging, or mechanical damage.
- **Action:** If contaminated, schedule professional cleaning or replacement.

☐ Urea Dosing System:

- **Weekly:** Check the urea storage tank for any signs of contamination or crystallization.
- **Monthly:** Exercise all valves (Reactor Bypass, Throttle, etc.) to prevent seizing.
- **Quarterly:** Perform a "bucket test" or flow rate verification to confirm the dosing nozzle's accuracy. The flow rate should be within a specified tolerance, usually +/- 3%.

☐ Sensors and Filters:

- **Monthly:** Check and clean the differential pressure sensors and their copper pipes.
- **Regularly:** Replace DEF filters as per the maintenance schedule to prevent clogging and pump failure.

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☐ Exhaust Gas Recirculation (EGR) System:

☐ Carbon Buildup:

- **Routine:** Inspect the EGR valves and passageways for excessive carbon buildup.
- **Procedure:** Follow the manufacturer's guide for cleaning the valve and associated coolers.

☐ Cooler and Piping:

- **Weekly:** Inspect for any external coolant leaks or signs of a leak between the exhaust gas and coolant chambers (e.g., loud engine noise or chemical smell).
- **Quarterly:** Perform a pressure test of the cooler to confirm its integrity.

☐ Bleed-off Water Treatment:

- **Daily:** Verify the water treatment system is operating and the contamination level of the discharge is within regulatory limits.
 - **Log:** Maintain a log of the bleed-off water discharge for port state control inspections.
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Section 4: Troubleshooting and Emergency Procedures

☐ Malfunction in an ECA:

- **Action:** If a Tier III system (SCR or EGR) malfunctions while in an NECA, the Master must immediately notify the flag administration and the nearest coastal state authority.
- **Documentation:** Record the event in the logbook, including the time, location, nature of the malfunction, and all actions taken.
- **Procedure:** Follow the approved procedure in the Technical File for operating in a degraded mode or, if necessary, exiting the NECA.

☐ System Alarms and Fault Codes:

- **Logging:** All system alarms (e.g., "NOx High," "Urea Tank Low," "SCR System Fault") must be logged in the engine room logbook.
- **Diagnosis:** Use the diagnostic tools and fault code manual to identify and rectify the issue. Do not override alarms without proper investigation.

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Section 5: Crew Training and Safety

- ☐ Train engineering crew in Tier III regulatory requirements, system operation, and troubleshooting procedures.
 - ☐ Conduct safety drills and protocols for handling and storing SCR reagents (urea/DEF).
 - ☐ Ensure safe access and working conditions around emission control equipment.
 - ☐ Provide documentation and SOPs for emergency procedures related to emission system failures.
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Section 6: Audit and Compliance Verification

- ☐ Schedule internal audits to verify Tier III compliance status regularly.
 - ☐ Prepare all emission control and monitoring systems for flag state and port state control inspections.
 - ☐ Maintain readiness of emission data logs for instant retrieval and verification.
 - ☐ Review and update compliance procedures following regulatory changes or technological upgrades.
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Section 7: Continuous Improvement and Record Keeping

- ☐ Review system performance and emission data periodically to identify opportunities for optimization.
- ☐ Keep abreast of technological advancements and retrofit options for improved compliance.
- ☐ Engage with shore-side support and manufacturers for technical assistance and upgrades.
- ☐ Archive all records securely and maintain backup copies for at least the required regulatory period.

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