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## MARPOL 73/78 – ANNEX VI: Control of Emission of Nitrogen Oxides (NO<sub>x</sub>) from Marine Diesel Engines

Note to: Owners of merchant ships, fishing vessels and other craft, offshore installations and drilling rigs (*hereinafter referred to as ships*), ship and platform operators, ship builders, marine diesel engine manufacturers, certifying authorities and surveyors.

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### *Summary*

#### Key points:

- Establishment of NO<sub>x</sub> emission limits for marine diesel engines with more than 130 kW power output, which are installed in ships, vessels or offshore installations constructed after 1st January 2000. The same limits will also be applied to marine diesel engines with more than 130 kW power output which undergo a major conversion where the maximum continuous rating (MCR) of an engine is increased by more than 10%.
- Requirements for testing, survey and certification for marine diesel engines to NO<sub>x</sub> emission standards.
- Procedures for demonstrating compliance with NO<sub>x</sub> emission standards after installation.

### 1. ANNEX VI – DATE OF APPLICATION

1.1 The 1997 MARPOL Conference adopted a protocol to add a new annex to MARPOL 73/78, entitled “Annex VI – Regulations for the Prevention of Air Pollution from Ships”. The new annex includes a resolution, which introduces a “Technical Code on Control of Emissions of Nitrogen Oxides from Marine Diesel Engines” (the NO<sub>x</sub> Technical Code). Regulation 13 of Annex VI lays down requirements for NO<sub>x</sub> emissions limits from certain marine diesel engines, whilst the NO<sub>x</sub> Technical Code contains procedures for testing, survey and certification of engines to ensure compliance with the limiting values. The Final Act of the 1997 Conference (including its resolutions and the NO<sub>x</sub> Technical Code) is available from IMO (see Web site <http://www.imo.org>).

1.2 Under Article 6 of the 1997 Protocol, Annex VI enters into force twelve months after the date on which not less than fifteen States, the combined merchant fleets of which constitute not less than 50 per cent of the world’s merchant shipping, have ratified it. The United Kingdom is preparing to ratify Annex VI but it is not possible to estimate when or whether the entry into force conditions will be met.

1.3 Under Resolution 2 of the Conference, the provisions of the NO<sub>x</sub> Technical Code enter into force as mandatory requirements, for all Parties to the 1997 Protocol, on the same date as Annex VI comes into force. The Parties are invited to implement the provisions of the NO<sub>x</sub> Technical Code in accordance with the requirements of Regulation 13. With certain exceptions, Regulation 13 applies to diesel engines with a power output of more than 130 kW power in respect of:

- new engines installed on a ship constructed on or after 1st January 2000.
- existing engines which undergo a major conversion on or after 1st January 2000.

In the event that Annex VI enters into force, it will, in the future, apply the NO<sub>x</sub> limits to new marine diesel engines installed on ships constructed after 1st January 2000. Also to existing engines which undergo major conversion after 1st January 2000.

## 2. PURPOSE OF THIS “MARINE GUIDANCE NOTE”

2.1 In addition to bringing the Final Act of the 1997 Conference to the attention of industry, the purpose of this MGN is to provide information on:

- interim provisions which the Maritime and Coastguard Agency (MCA) will put into place for ships constructed after 1st January 2000 but before Annex VI comes into force.
- the arrangements for the issue of interim “Statements of Compliance” to confirm that the requirements of Regulation 13 and the NO<sub>x</sub> Technical Code have been met.
- the arrangements for the subsequent issue of “International Air Pollution Prevention (IAPP) Certificates” or “United Kingdom Air Pollution Prevention (UKAPP) Certificates”.
- the intended delegation of functions required of an Administration to recognised certifying authorities [listed in para 7.1(a) to (f)].

## 3. THE MAIN PROVISIONS OF ANNEX VI AND THE CODE

3.1 Regulation 5(4) requires the survey of engines and equipment, for compliance with Regulation 13, to be conducted in accordance with the NO<sub>x</sub> Technical Code. Survey and certification is dealt with in Chapter 2 of the Code whilst Chapters 3 to 6, inclusive, deal with NO<sub>x</sub> emission standards; the approval of serially manufactured engines; and procedures for the test bed and on-board measurement of NO<sub>x</sub> emissions.

3.2 Regulation 13(1)(b) excludes application of NO<sub>x</sub> emission control measures:

- to emergency diesel engines, engines installed in lifeboats and any device or equipment intended to be used solely in case of emergency.
- where alternative NO<sub>x</sub> control measures have been established by an Administration for those engines on ships solely engaged on domestic voyages within their flag State [refer to qualification in para. 4.1].

3.3 Regulation 13(1)(c) makes provision for exclusion from compliance with NO<sub>x</sub> control measures for flag State ships, which are constructed (or undergo a major conversion) after 1st January 2000 but before the 1997 Protocol comes into force, provided they are solely engaged on domestic voyages [refer to qualification in para. 4.2].

3.4 Whilst fixed and floating platforms and drilling rigs need to comply with Annex VI in the event it enters into force, Regulation 19(2)(d) excludes application of NO<sub>x</sub> emission control measures to certain engines. These are diesel engines on offshore installations, platforms and drilling rigs which are solely dedicated to the exploration, exploitation and associated offshore processing of sea-bed mineral resources.

3.5 Regulation 13(2) defines a *major conversion*. It includes:

- (a) a replacement engine built on or after 1st January 2000; or
- (b) an engine which undergoes substantial modifications as defined in Chapter 1 of the Code, paragraph 1.3.2
  - (i) a modification which, in respect of ships constructed before 1st January 2000, would increase the engines existing emission characteristics, or
  - (ii) a modification which, in respect of installations made on or after 1st January 2000, means a modification which would cause the engine to exceed the emission standards set out in Regulation 13(3)(a); or

- (c) an engine which undergoes a modification which increases the maximum continuous rating (MCR) by more than 10%.
- 3.6 Regulation 13(3)(b) permits the fitting of an approved exhaust gas cleaning system to a marine diesel engine to reduce the NO<sub>x</sub> emissions to at least the limits specified in Regulation 13(3)(a). Guidelines on such systems have yet to be developed by IMO.
- 3.7 Paragraph 2.1.2 of the Code describes five alternative methods that can be chosen to measure, calculate or test an engine for its NO<sub>x</sub> emissions, including the use of on-board direct measurement and monitoring devices. Under paragraph 2.4.5 of the Code, such devices shall be approved by an Administration based on guidelines to be developed. IMO is in the process of developing the guidelines, meanwhile Marine Information Note – MIN 41 (M+F), published by MCA in January 1999, indicates the methodology under consideration.
- 3.8 Section 2.2 (and Appendix 1) of the Code deals with procedures for pre-certification of an engine by an Administration, as documented by an Engine International Air Pollution Prevention (EIAPP) Certificate. (Note interim guidelines in Section 5 of this MGN).
- 3.9 Paragraph 2.2.2 (and Chapter 4) of the Code specifies criteria to be used to select either the engine family or engine group concept, to avoid pre-certification testing of every engine manufactured. MCA supports this methodology but will take measures to ensure that all engine manufacturers and the recognised certifying authorities apply common standards to the selection process.
- 3.10 Paragraph 2.2.4 of the Code provides for on-board testing to meet the requirements of Chapter 5 where due to their size, construction and delivery schedule certain engines cannot be pre-certified on a test bed [see para. 4.4].
- 4. APPLICATION OF THE CODE**
- 4.1 Regulation 13(1)(b)(ii) – makes provision for alternative emission control measures for ships engaged solely on domestic voyages. Such alternative control measures will be dealt with by the MCA on a case by case basis where due consideration may be given to evidence of equivalent environmental protection.
- 4.2 Regulation 13(1)(c) – makes provision for the Administration to exclude certain ships engaged exclusively on domestic voyages, which are constructed or which undergo a major conversion before the 1997 Protocol comes into force. MCA would not normally allow exclusion from the NO<sub>x</sub> emission limits but may consider proposals in such cases based on an environmental impact assessment. In considering such proposals MCA will seek to ensure that any exclusion did not undermine efforts by the engine manufacturers to reduce the level of air pollution by design measures.
- 4.3 The MCA is aware of the market for second-hand marine diesel engines and wishes to provide the following guidance on compliance with the Code:
- *Regulation 13(1)(a)(i) – the Code does not apply to second-hand engines which may have been overhauled or re-conditioned if they replace existing engines in ships constructed before 1st January 2000, as this does not constitute a major conversion under Regulation 13(2)(a). However, modifications which increase the maximum continuous rating (MCR) of second-hand engines by more than 10 per cent are considered a major conversion and in such instances the NO<sub>x</sub> emission limits in Regulation 13 will apply.*
  - *Regulation 13(2)(a)(i) – the Code does apply to a new engine built on or after 1st January 2000, which is replacing an engine in a new or existing ship.*
- 4.4 Where an engine which cannot be pre-certified on a test bed is to be installed in a ship to be registered under the United Kingdom flag, (as per para 3.10), the engine manufacturer, shipowner or shipbuilder shall make application to the MCA, via the certifying authority, requesting an on-board test in order to demonstrate full compliance with the test bed procedures specified in Chapter 5 of the Code.
- 4.5 Certifying authorities should advise the MCA if an engine constructed on or after 1st January 2000, for installation in a United Kingdom ship constructed after 1st January 2000, will not meet the emission control limits, either by design or with the addition of an approved exhaust gas cleaning system.

## 5. "STATEMENTS OF COMPLIANCE"

5.1 In accordance with IMO Interim Guidelines for the Application of the Code (MEPC/Circ. 344), pending entry into force of Annex VI and the issue of the Engine International Air Pollution Prevention (EIAPP) Certificate and/or International Air Pollution Prevention (IAPP) Certificate, a "Statement of Compliance" for marine diesel engines complying with the Code will be issued. The format of the statement is annexed to this MGN.

5.2 MCA will recognise Statements of Compliance issued by the recognised certifying authorities, when ships are subsequently surveyed for the issue of an initial IAPP or UKAPP Certificate. In exceptional circumstances, the MCA will issue such Statements of Compliance directly, subject to satisfactory testing.

## 6. IAPP/UKAPP CERTIFICATES

6.1 In the event that Annex VI comes into force, every ship of 400 GT or more engaged on international voyages (also offshore installations engaged on voyages to waters under the sovereignty/ jurisdiction of another Party to the 1997 Protocol) will have to be surveyed, periodically, in accordance with Regulation 5 and an IAPP Certificate issued in accordance with Regulation 6.

6.2 IAPP Certificates will evidence that engine NO<sub>x</sub> emissions comply with the requirements of Regulation 13. They will also certify that other requirements of Annex VI, relating to ozone depleting substances, sulphur content of fuels, tanker vapour collection systems and shipboard incinerators, are also met.

6.3 In keeping with MCA procedures and practice for United Kingdom ships and vessels of 400 GT or more and offshore installations engaged exclusively on domestic voyages, provision will be made for the issue of UKAPP Certificates.

6.4 In accordance with Regulation 6, for ships constructed before entry into force of the 1997 Protocol, the IAPP or UKAPP certificate shall be issued no later than the first scheduled dry-docking after entry into force of the Protocol of 1997, but in no case later than three years after entry into force.

## 7. DELEGATION OF FUNCTIONS TO CERTIFYING AUTHORITIES

7.1 MCA proposes to delegate the survey and certification requirements, set out in Chapter 2 of the Code to:

- (a) Lloyd's Register of Shipping
- (b) The British Committee of Bureau Veritas
- (c) The British Committee of Germanischer Lloyd
- (d) The British Committee of Det Norske Veritas
- (e) The British Technical Committee of American Bureau of Shipping
- (f) The British Technical Committee of Registro Italiano Navale

- Pre-certification surveys of marine diesel engines, to ensure compliance with the emission limits and the issue of Statements of Compliance or Engine Air Pollution Prevention (EIAPP) Certificates as appropriate.

- Periodical, intermediate and renewal surveys to ensure engines continue to fully comply with the provisions of the Code.

- Initial engine certification surveys on board when the engine is substantially modified, to ensure it complies with the emission limits contained in the Code.

7.2 MCA will retain responsibility for the initial survey of United Kingdom ships when Annex VI comes into force. This policy will also apply to ships constructed on or after the date Annex VI comes into force, and to existing ships which transfer to the United Kingdom register after that date.

Environment and Cargo Safety Branch  
Maritime & Coastguard Agency  
Spring Place  
105 Commercial Road  
Southampton SO15 1EG

Tel: 02380 329199  
Fax: 02380 329204

Internet: <http://www.mcga.gov.uk/>

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*An executive agency of the Department of the  
Environment, Transport and the Regions*

**STATEMENT OF COMPLIANCE WITH THE NO<sub>x</sub> TECHNICAL CODE**

*(Note; This Statement of Compliance shall be supplemented by a Record of Construction, Technical File and Means of Verification)*

Issued under the Interim Guidelines for the Application of the NO<sub>x</sub> Technical Code (MEPC/Circ. 344) pending entry into force of the Protocol of 1997 to amend the International Convention for the Prevention of Pollution From Ships, 1973, as modified by the Protocol of 1978 related thereto (hereinafter referred to as “the Convention”) under the authority of the Government of:

.....  
 (full designation of the country)

by.....

(full designation of the competent person or organisation authorised under the provisions of the Convention)

Engine manufacturer	Model number	Serial number	Test cycle(s)	Rated power (kW) and speed (rpm)	Engine approval number

**THIS IS TO CERTIFY:**

1. That the above mentioned marine diesel engine has been surveyed for pre-certification in accordance with the requirements of the Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines which will become mandatory when Annex VI comes into force; and
2. That the pre-certification survey shows that the engine, its components, adjustable features and technical file, prior to the engine’s installation and/or service on board a ship, fully comply with the applicable regulation 13 of Annex VI of the Convention.

This Statement of Compliance is valid for the life of the engine, subject to surveys required in accordance with regulation 5 of Annex VI, installed in ships under the authority of this Government.

Issued at .....

*(Place of issue of Statement of Compliance)*

..... 20 .....

*(Date of Issue)*

.....

*(Signature of duly authorised official issuing the certificate)*

*(Seal or stamp of the authority as appropriate)*

## SUPPLEMENT TO STATEMENT OF COMPLIANCE WITH THE NO<sub>x</sub> TECHNICAL CODE

### Record of Construction, Technical File and Means of Verification

In respect of the provisions of Annex VI of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 and the Protocol of 1997 relating thereto (hereinafter referred to as "the Convention") and the Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines (hereinafter referred to as the NO<sub>x</sub> Technical Code).

#### *Notes:*

- 1 This Record and its attachments shall be permanently attached to the Statement of Compliance. The Statement of Compliance shall accompany the engine throughout its life and shall be available on board the ship at all times.
- 2 If the language of the original Record is neither in English nor French, the text shall include a translation into one of these languages.
- 3 Unless otherwise stated, the regulations mentioned in this Record refer to regulations of Annex VI of the Convention and the requirements for an engine's technical file and means of verification refer to requirements from the NO<sub>x</sub> Technical Code, which will be applied retrospectively from 1 January 2000.

### **1 Particulars of the engine**

- 1.1 Name and address of manufacturer .....
- 1.2 Place of engine build .....
- 1.3 Date of engine build .....
- 1.4 Place of pre-certification survey .....
- 1.5 Date of pre-certification survey .....
- 1.6 Engine type and model number .....
- 1.7 Engine serial number .....
- 1.8 If applicable, the engine is a parent engine [ ] or a member engine [ ] of the following engine family [ ] or engine group [ ]  
.....
- 1.9 Test cycle(s) (see chapter 3 of the NO<sub>x</sub> Technical Code) .....
- 1.10 Rated power (kW) and speed (rpm) .....
- 1.11 Engine approval number .....
- 1.12 Specification(s) of test fuel .....
- 1.13 NO<sub>x</sub>-reducing device designated approval number (if installed)  
.....

1.14 Applicable NO<sub>x</sub> emission limit (g/kW h)(regulation 13 of Annex VI)

.....

1.15 Engine's actual NO<sub>x</sub> emission value (g/kW h) .....

**2 Particulars of the Technical File \***

2.1 Technical file identification/approval number .....

2.2 Technical file approval date .....

\* The Technical File, as required by chapter 2 of the NO<sub>x</sub> Technical Code, is an essential part of the Statement of Compliance and must always accompany the engine throughout its life and always be available on board a ship.

**3 Specifications for the On-board NO<sub>x</sub> Verification Procedures for the Engine Parameter Survey \*\***

3.1 On-board NO<sub>x</sub> verification procedures identification/approval number .....

3.2 On-board NO<sub>x</sub> verification procedures approval date .....

\*\* The specifications for the on-board NO<sub>x</sub> verification procedures, as required by chapter 6 of the NO<sub>x</sub> Technical Code, are an essential part of the Statement of Compliance and must always accompany an engine through its life and always be available on board a ship.

**THIS IS TO CERTIFY**

That this Record is correct in all respects.

Issued at.....

*(Place of issue of the Record)*

..... 20 .....

*(Date of issue)*

.....

*(Signature of duly authorised official issuing the Record)*

*(Seal or stamp of the authority as appropriate)*