

SULPHUR OXIDE AND NITROGEN OXIDES INTERNATIONAL AND EUROPEAN LEGISLATION.

A United Kingdom perspective
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The United Kingdom Implementation of Annex of Marpol

Merchant Shipping (Prevention of Air Pollution From Ships) Regulations 2007

- Annex VI of Marpol came into force international on 19 May 2005
- UK ratified Annex VI in August 2004
- UK Merchant Shipping legislation is late because the Merchant Shipping Act may not cover air pollution (only covers pollution of the seas) and needs to be amended
- It is expected that UK legislation will be in place in the first half of 2007.



What is the UK doing to solve the problem of late implementation?

A series of Marine Information Notes are planned on the following subjects.

- Fuel Oil Suppliers (May 2005 (MIN 212))
- Survey for NOx (November 2005(MIN 221))
- Sulphur in fuel (March 2006)(MIN 258)
- VOC,s (March 2007)
- Ozone depleting substances (April 2007)
- Incinerators (April 2007)
- Survey and certification (April 2007)



Port State Control inspections Regulation 10 of Annex VI

The Port State Control guidelines were agreed at MEPC 53 in July 2005 (Resolution MEPC.129(53)).

Detainable offences include

- Absence of IAPP certificate, EIAPP certificate or technical file/s
- Non compliant 'major conversion' of engine
- Sulphur content of any fuel over 4.5%
- Non compliance in a SOx Emission control area.
- Non compliant incinerator
- Master and crew not familiar with essential procedures.

An amendment was agreed to resolve the problem of ships not being given an IMO bunker delivery note and sample where the State had not yet ratified Annex V



Nitrogen Oxides International Requirements

What engines are covered?

All **diesel engines** with a power output of over 130 kW which are installed on a ship constructed on or after 1 January 2000 or any engine that has undergone a *major conversion* must comply with the NOx requirements of Regulation 13 of Annex VI.

- All diesel engines fitted to any craft of *any size or type* operating in the '*marine environment*' must comply with the NOx requirement of regulation 13 and the NOx technical code.
- The only exception is for safety reasons



Nitrogen Oxides International Requirements

- The States can give exemptions from this regulation to ships operating *between the states ports or its offshore terminals* **provided** the engine was installed or modified before 19th May 2005.
- The State can also give exemption to any engine on any ships of what ever age operating *solely within its own waters* provided it has alternative equivalent NOx measures.



Nitrogen Oxides and the EC

Apart from Annex VI there are several other sets of European legislation that cover (or will soon cover) NO_x and they are;

- *The Recreational Craft Directive*
- *The Inland Waterways Directive*
- *The Marine Equipment Directive*

The European Commission does not have competency in the NO_x requirement for commercial ships covered by Annex VI of MARPOL that operate in the marine environment so Member State of the European Union are free to negotiate their own position with regard to NO_x limits at the IMO although there will be an efforts make for EU States to come to an agreed position.



Nitrogen Oxides Regulation 13 Annex VI

What are the present limits?

- 17.0 g/kW h when n (the rated engine speed) is less than 130rpm
- $45.0 \times n^{-0.2}$ g/kW h when n is 130 or more but less than 2000 rpm.
- 9.8 g/kW h when n is 2000 rpm or more



Nitrogen Oxides Regulation 13 Annex VI

What are the proposed limits?

Tier II between 15% and 40% with no after treatment depending on;

- Type engine
- Size of engine,
- Type of fuel used
- Tier III reduction of 80% with after treatment such as;
- SCR
- Water injection
- Other technical solutions?

There are however both safety issues and practicality problems with both SCR and water injection if such methods are to be used on all ships.



Nitrogen Oxides Regulation 13 Annex VI

Engine International Air Pollution Prevention (EIAPP) Certificate and the Marine Equipment Directive

- The NO_x technical code requires that each engine be issued with an EIAPP Certificate and that certificate is included in the technical file which is normal provided by the engine manufacturer when the engine is delivered.
- The certificate is valid for the life of the engine provided that the engine is maintained in accordance with the technical file and surveys are completed.



Nitrogen Oxides

Regulation 13 Annex VI

Engine International Air Pollution Prevention (EIAPP) Certificate and the Marine Equipment Directive

•In the UK if the EIAPP is not a UK certificate and the Certifying Authority conducting the initial survey is not the body that issued the EIAPP then the Certifying Authority will be required to satisfy itself that the engine and technical file meets the requirements of the NOx technical code and issue a UK EIAPP for each engine.

•Such engine certification can not be covered by the **Marine Equipment Directive** as an international certificate rather than normal 'type approval' is required.



Nitrogen Oxides

Regulation 13 Annex VI

Engine International Air Pollution Prevention (EIAPP) Certificate and the Marine Equipment Directive

•The United Kingdom would like an amendment of Annex VI and the NOx technical code to allow the type approval of smaller engine rather than the issue of an individual EIAPP.

•This would allow such engines to be approved under the MED removing the need to have multiple approvals and the uncertainty that Class face when issuing such certificates



Nitrogen Oxides Regulation 13 Annex VI

Documentation to be kept on board the ship for each engine.

- Technical file with onboard NOx verification procedure.
- EIAPP Certificate

and in addition for engines using the parameter check method

- Record book of engine parameters
- Engine parameter list
- Technical documentation of any engines component modifications.



Nitrogen Oxides Regulation 13 Annex VI

What are the Survey options?

- *Engine parameter check method.*

This is the only method that is used in most cases at present.

- *Simplified method.*

This method is anything but simple and I am not aware of any Certifying Authority that has completed one successfully.

- *Direct measurement and monitoring method.*

This is the future for demonstration of NOx compliance.

The NOx Technical code need to be changed to allow a more pragmatic system of approval, particularly with regard to NOx monitoring



Nitrogen Oxides

Certification of Existing engines

Can pre January 2000 engines be approved under the present draft of the NOx technical code?

It will be, in nearly all cases impossible to approve such engines under the NOx technical code because.

- 1. Most do not have a technical file**
- 2. The simplified method will be almost impossible to do on large engines onboard ship**
- 3. The Direct monitoring method can not be used because ships are required to have a parameter check and a technical file issued at the initial survey.**



Nitrogen Oxides

Regulation 13 Annex VI

NOx Exhaust gas cleaning systems

- Regulation 13 permits the use of an Exhaust Gas Cleaning System (EGCS) approved by a Certifying Authority taking into account the present IMO guidelines or any other equivalent method taking into account IMO guidelines to be developed.**
- United Kingdom has in conjunction with LR approved an NOx monitoring system for use on UK flag ships.**



Nitrogen Oxides

Regulation 13 Annex VI

NOx Exhaust gas cleaning systems

- NOx EGCS should be approved as part of the engine approval with details of the EGCS included in the technical file with the onboard NOx verification procedure.
- The United Kingdom is not aware of any ships on its flag using NOx monitoring equipment to comply with NOx EGCS requirements but it is willing to assist any ship owner that decides to do so.
- An NOx EGCS can be used when it is found that an engine does not meet the NOx requirements of regulation 13 so there is potential for retro fitting NOx EGCS and monitoring equipment for existing ships.



Sulphur Oxides

Regulation 14 Annex VI

General Requirement

- The sulphur content of any fuel used on board a ship must not exceed 4.5%.
- This regulation is not affected by any European legislation except for MGO when it is used in the waters of a Member State of the European Union



Sulphur Oxides Regulation 14 Annex VI and SCLF Directive.

SOx Emission Control Area (SECA).

- The Baltic sea became effective on the 19th May 2006
- The North Sea and English Channel will become effective on the 22nd November 2007
- However the EC date is August 2007 for the SCLF Directive.



Sulphur Oxides Regulation 14 Annex VI and the SCLF Directive

Requirement while in a SOx emission control area are to use;

- Fuel oil with a sulphur content of less than 1.5% or;
- an Exhaust gas cleaning system approved by a Certifying Authority taking into account guidelines developed by the IMO or;
- any other technological method that is *verifiable and enforceable* to limit SOx emissions to an equivalent level.
- The United Kingdom believes that there should be the possibility to conduct emission trading trail to reduce SOx in 'Hot Spots'.



Sulphur Oxides

Regulation 14 Annex VI and the SCLF Directive

SOx Exhaust Gas Cleaning Systems (EGCS)

- Must reduce the total emission of sulphur oxides from ships, *including both auxiliary and main propulsion engines* to less than 6.0g SOx/kWh calculated as a total weight of sulphur dioxide.
- The EGCS may be approved using the 'System A' Parameter Check method or 'System B' Direct Monitoring method.
- Each EGCS fitted to an engine must have a *SECA Compliance Certificate* unless it has an approved Direct Monitor system.
- Each ship using a EGCS to comply with regulation 14 must have a *SECA Compliance Plan* regardless of whether option A or Option B is used.
- The UK is currently in the process of approving such system on a UK flag ship.
- The SCLF Directive requires an additional approval by the EC and continuous monitoring of exhaust flue gas.



Sulphur Oxides

Regulation 14 Annex VI and the SCLF Directive

SOx Exhaust Gas Cleaning Systems (EGCS)

- Waste streams from SOx EGCS must not be discharged into ports or other enclosed waters unless ship can prove, to the satisfaction of the Secretary of State that waste stream does not harm the eco system. It is important to note **waste streams** and **EGCS residue** are different. Annex does not make this clear as waste streams may or may not contain the EGCS residue.
- The UK will hopefully be providing IMO with agreed wash-water criteria for the port of Dover from the trials conducted on the *Pride of Kent*.
- The SCLF Directive will require different criteria when the maximum level of sulphur in the fuel is reduced to 0.1% in port.



Sulphur Oxides

Recording of SECA entry

- When a UK registered ship enters or leaves a SO_x emission control area (SECA) and a change over of fuel is made the ship must recorded in either the *Oil Record Book* or a *Log Book* approved by the Secretary of State.
- The United Kingdom has approved a log book for use on UK flag ships produced by LR that will satisfy the requirements of both Annex VI and the SCLF Directive.
- The United Kingdom is considering the approval of an electronic system using GPS/AIS in conjunction with an EGCS.



Reception Facilities

Regulation 17 Annex VI and the SCLF Directive

Exhaust gas cleaning residue

- Ports terminals and repair ports must provide adequate provisions for the reception of exhaust gas cleaning residue from an approved exhaust gas cleaning system fitted to a ship if a ship is not permitted to discharge the residue into the enclosed port, harbour or estuary,
- A ship would NEVER discharge EGCS residue at sea let alone in port and waste steams will not contain residue as this is normally removed in the scrubbing process.
- Annex VI needs to be reworded in the current amendments to distinguish between **wash water** and **residue**.



Fuel Oil Quality

Regulation 18 Annex VI (MIN212)

Local supplier of fuel oil register

- All *local suppliers of fuel oil* are required to register with the MCA
- Detail of all *local suppliers of fuel oil* registered with MCA are kept on a data base.
- Each local supplier has a reference number and a file number if applicable.
- A list of local suppliers is contained in MIN 212 which can be downloaded from the MCA website
- This regulation is now also covered by the SCLF Directive.



Fuel Oil Quality

Regulation 18 Annex VI (MIN212)

Local supplier of fuel oil responsibilities.

- Local suppliers of fuel oil are required to supply an IMO bunker delivery note and sample as prescribed in the IMO guidelines which are contained in MIN 212.
- The local suppliers representative is required to sign the sample
- Local suppliers of fuel oil may apply to the MCA for an **equivalent system** if they have a sound environmental or safety reason for doing so.
- If the local supplier has applied for a alternative system the supplier will be issued with a letter of equivalence
- The letter of equivalence and the alternative system will be kept on file in Spring Place and entered in the database



Fuel Oil Quality

Regulation 18 Annex VI (MIN212)

Ships master's responsibilities.

- Ships master must keep the bunker delivery note for 3 year for inspection by flag state or port state inspectors.
- The sample provided by the local supplier of fuel oil must be kept under the ships control until the fuel is substantially consumed but in any case not less than 1 year.
- The '**under the ship control**' provision allows the sample to be kept ashore. In the UK this is mainly used by HSC and quick turn around ferries.
- The ships master or officer in charge of taking the bunkers is required to counter sign the sample supplied by the local supplier of fuel oil.
- Details of the sampling requirements are contained in MIN 212



Fuel Oil Quality

Regulation 18 Annex VI

Port State Verification under the SCLF Directive

The SCLF Directive will require Port States to check fuel oil quality on ships by;

1. Taking samples to the IMO guidelines
2. Taking samples from ship's tanks
3. Checking documentation.
4. These requirements are in addition to Annex VI

Member States are required to take report back to the EC annual on the samples and inspection they have done.



The Sulphur Content in Liquid Fuels Directive

- **At present SCLF Directive requires that all MGO used in territory of a Member State is less than 0.2%.**
- **Because of this Directive and the amendments to it the European Commission has competency in this area.**
- **This means that EU States MUST give an agreed position at the IMO for all matters concerning the Sulphur Content in marine fuels**



Amendments to the Sulphur Content in Liquid Fuels Directive (SCLF)

- **The amendment to SCLF implement regulation 14 and 18 of Annex VI into EU law with the following additions came into force in August of 2006**
- **A number of EU Member States are yet to implement these requirements into their national law.**



Amendments to the Sulphur Content in liquid fuels Directive

- Passengers ships on a regular service to or from any European Ports are required to use 1.5% when they are in the waters of a Member State



Amendments to the Sulphur Content in liquid fuels Directive

- All fuel oil used alongside in port must have a sulphur content of less than 0.1% after the 1 January 2010 if the ship is alongside for more than 2 hours.
- This requirement will have a direct effect on the use of scrubbers and scrubber technology with regard not only to the efficiency of the scrubber but also the wash water criteria.



Amendments to the Sulphur content in Liquid fuels Directive

Unlike Annex VI which regulates **all** fuel oil the same way the amendments to the SCLF directive splits fuel oil into;

- Heavy Fuel Oil
- Marine Diesel Oil
- Marine Gas Oil

There are now 7 different types of fuel that can be carried by a ship that are regulated by these regulation



Recreational craft Directive Directive

- The Recreational Craft Directive is applicable to craft of over 24 m used for pleasure.
- Many of these craft will have diesel engines of over 130 kW.
- This Directive uses 9.8 g/kWh is the same value that is used in Annex VI of Marpol for smaller engines.
- Technical files and EIAPP are not required under the RCD.
- The United Kingdom recommends owner of craft fitted with diesel engines of over 130 kW manufactured after the 1 January 2000 to request from the builder of the craft a technical file and other relevant documentation.

