# Low Sulphur Fuel

## Potential Consequences

The **International Maritime Organisation (IMO)** and the **European Community (EC)** both addressed the subject and issued progressive deadline in the reduction of sulphur content in ***Any*** Marine Fuels.

Main risks associated in running Low Sulphur Fuel (LSF) may involve potential damages to **ship's equipment, ship design modifications** and **crew training needs**.

## Sulphur Oxides (SOx) legislation timeline

**EUROPEAN COMMUNITY (EC)** EU Directives 1999/32/EC & 2005/33/EC

| GO | Marine Fuels | SECA's | SECA's | GO | At Berth |
|---|---|---|---|---|---|
| 0,20% m/m S | 1,00% m/m S | 1,50% m/m S | 1,50% m/m S | 0,10% m/m S | 0,10% m/m S |
| **01.07.2000** | **01.01.2003** | **11.08.2006** Baltic Sea | **11.08.2007** North Sea & English Channel | **01.01.2008** | **01.01.2010** |

**INTERNATIONAL MARITIME ORGANISATION (IMO)** MARPOL 73/78 Annex VI

| | SECA's | Marine Fuels | SECA's | Marine Fuels |
|---|---|---|---|---|
| | 1,00% m/m S | 3,50% m/m S | 0,10% m/m S | 0,50% m/m S |
| **01.01.2010** | **01.07.2010** | **01.01.2012** | **01.01.2015** | **01.01.2020** |

**Sulphur Control Areas** (SECA's) include the Baltic Sea, North Sea and the English Channel

**At Berth** means any ships secured at anchor or alongside in EU ports lasting more than 2 hours

**m/m S** term indicates the percentage on a mass basis (% mass)


For further information or specific questions contact: **techcare@axa-matrixrc.com**

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# Consequences of shift

| Risk of engine damages | Type of equipment | | |
|---|---|---|---|
| **Potential damages** | **2 Stroke Engine** | **4 Stroke Engine** | **Boilers** |
| **Low Viscosity & Lubricity** | | | |
| Insufficient fuel injection | ✔ | ✔ | |
| Potential power shortfall | ✔ | ✔ | |
| Poor combustion and ignition | ✔ | ✔ | |
| Engine starting difficulty | ✔ | ✔ | |
| Fuel valves, pump plungers and suction valves sticking/scuffing/seizure | ✔ | ✔ | ✔ |
| **Compatibility** | | | |
| Heavy deposits leading to excessive wear (TBN70 with LSF) | ✔ | | |
| Cylinder liner bore-polishing and scuffing (TBN70 with LSF) | ✔ | | |
| Fuels compatibility leading to clogging filters and fuel starvation | ✔ | ✔ | |
| **Heat Value** | | | |
| Re-adjustment of the air/fuel ratio | | | ✔ |
| **Low Density** | | | |
| Increased smoke emission | | | ✔ |
| Explosive atmosphere in case of flame failure | | | ✔ |

## Ship design challenges

Vessel's sailing into SECA's or calling in EU ports for more than 2 hours, will have to check the following and possibly go through structural modifications to avoid any fuel or lubricating oil contamination.

- Additional Fuel tanks capacity for different fuel grades
- Fuel oil supply system adjustment
- Lubricating oil system adjustment
- Main and Auxiliary boiler upgrading

## Crew training on technical and operational issues

**Shipowner's should be required to implement:**

- Change-over procedures under ISM 1.2.2.2
- Record three specific entries in Oil Record Book…
  - – FWE time
  - – Change-over starting time
  - – Time at which vessel is operating only on 0,1 m/m S

… same apply at departure taking "Engine required for" time instead of FWE.

**Vessel should be required to keep available onboard the following**

- Bunker Delivery Notes (BDN) for a minimum of 3 years
- Oil Record Book up to date
- Bunker sample in safe storage location

## Recommendations

Shipowner's are invited to conduct a risk assessment on each individual ship and to contact their…

- Engine Manufacturers
- Boilers Manufacturers
- Classification Society

…for engine checks and modifications, as well as tank and system modifications onboard. Plans could typically address the issues and include arrangement drawings, together with a description of change-over procedures and the quantities of fuel available for operation of the propulsion and generating plant.


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