

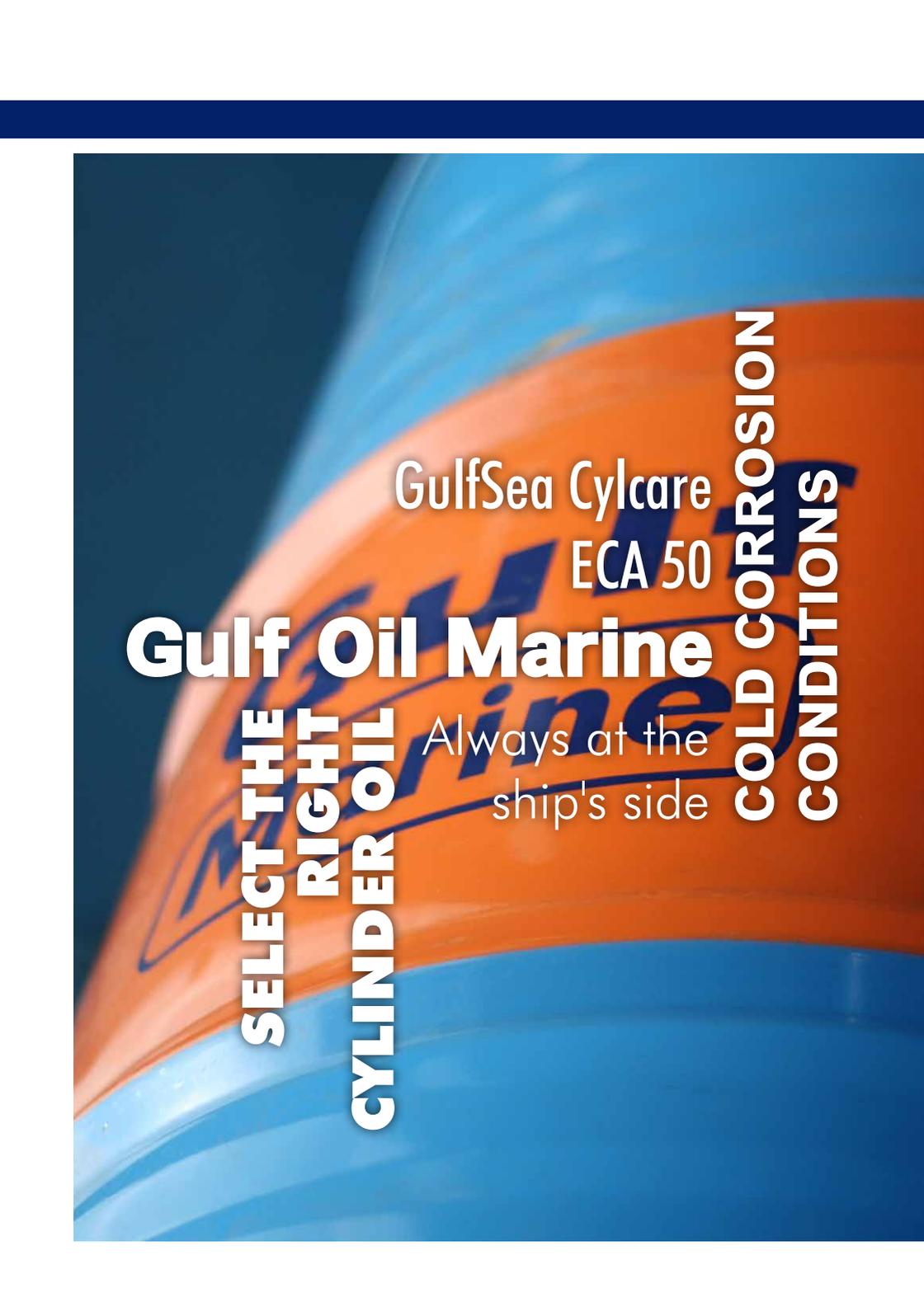


Brief on ECA Operations

GulfSea Cylcare ECA 50

always at the ship's side





Gulf Oil Marine

**SELECT THE
RIGHT
CYLINDER OIL**

GulfSea Cylcare
ECA 50

Always at the
ship's side

**COLD CORROSION
CONDITIONS**

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Ready to change fuels

ECA Compliance Regulations

Since the implementation of Emission Control Areas (ECAs) on 1 January 2015, all vessels sailing into the Emission Control Areas of the Baltic Sea, the North Sea, English Channel, the waters off the US and Canadian coastlines and the US Caribbean Sea are now required to use fuel with a maximum sulphur content of just 0.1%, a significant reduction from the current ECA limit of 1%. The ECAs span 200 nautical miles from the respective coastlines.



in ECA

Approaches to Sulphur Compliance

In general, there are a number of different approaches to ensure compliance with the new regulations.

(1) Distillate fuel

- ✓ Minimal extra expenditure
- × Difficult to ensure sufficiently high flashpoint
- × Change-over problem

(2) Low Sulphur Fuels

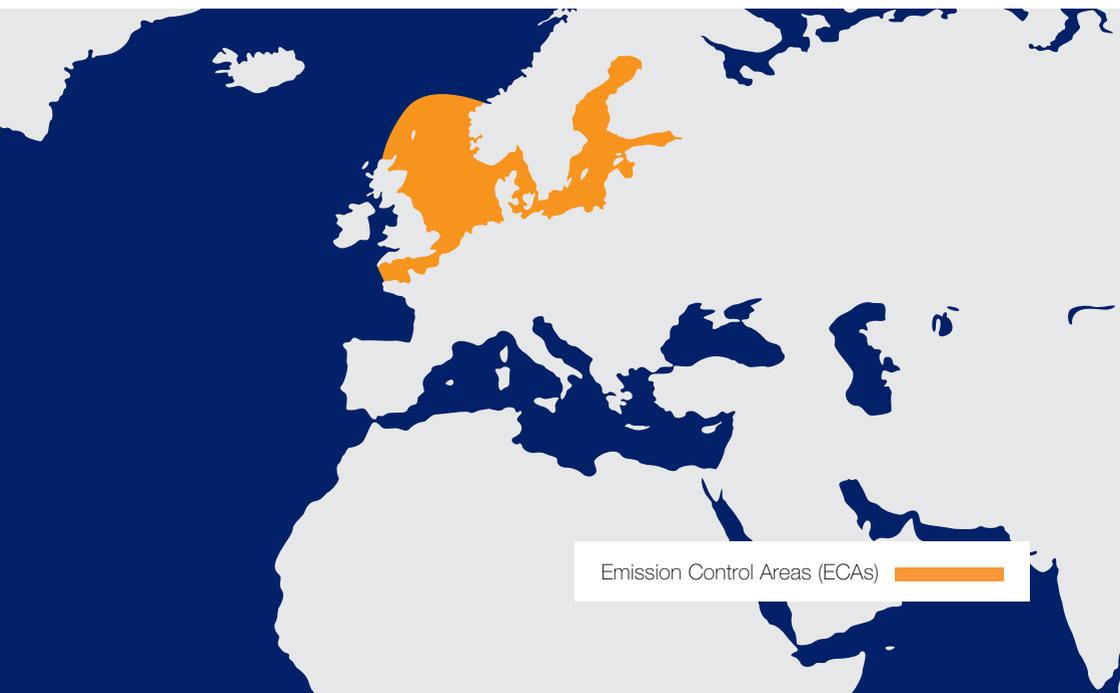
- ✓ Commonly used
- ✓ Proven performance
- ✓ No extra technology investment
- × LS Fuels more expensive than HFO

(3) Exhaust Gas Scrubber Technology

- ✓ Reduce both air and water pollution
- × Complicated & immature technology
- × Needs extra space by vessel, reducing cargo carrying capacity

(4) Other Energy Sources

- ✓ Environment friendly fuels such as LNG
- × Only as an alternative fuel
- × Reduce amount of time operating in waters



Select the Right Cylinder Oil for your engine

Cylinder Oil Requirements for 0.1%S Fuel Operation

The majority of Gulf Oil Marine customers will be switching fuels prior to arrival in an ECA and recording the changeover in the ship's log for Post State Control inspection.

Gulf Oil Marine offers a 0.1%S cylinder oil GulfSea Cylcare ECA 50. Our ECA 50 has been formulated to enable a simple switch over from the customer's standard GulfSea Cylcare cylinder oil without the need to make any adjustments to the cylinder oil feed rate.

GulfSea Cylcare ECA 50 is fully compatible with other GulfSea Cylcare cylinder oils. When changing to a 0.1%S fuel (entering an ECA) the cylinder oil should be switched at the next daily top-up of the cylinder oil day tank. When changing back to high sulphur fuel oil (leaving an ECA) the cylinder oil should be switched on the day prior during the daily top-up of the cylinder oil day tank. By adopting this procedure the cylinder liners will always be provided with sufficient BN reserve to neutralize any acidic conditions.



It is recommended that for those engines where higher cylinder oil feed rates are being used due to cold corrosion problems that the cylinder oil feed rate is reduced to the recommended average feed rate in accordance with the OEMs feed rate chart when operating on GulfSea Cylcare ECA 50.

Cylinder Oil Requirements for Scrubber Operation

Vessels fitted with exhaust gas cleaning systems will not under normal circumstances be required to change fuel oil in use. Likewise the cylinder oil will not need to be switched.

Cylinder Oil Requirements for Gas & Methanol Operation

Vessels operating on natural gas, (Methane) Ethane and Methanol should use GulfSea Cylcare ECA 50. This cylinder oil is suitable for pilot injection using Gas Oil or HFO.

When a natural gas fuelled engine switches to using 100% HFO for periods of longer than 12 hours the cylinder must be switched to GulfSea Cylcare DCA5070H or GulfSea Cylcare 50100 dependent upon the recommendation in the vessel's lubrication chart.

Cold Corrosion Conditions



Corrosion is an essential element of satisfactory liner lubrication and liner wear. When operating with very low sulphur content fuels it is essential that there is sufficient residual alkalinity to neutralize acid formation but not too high to cause piston crown land deposits. The latter will in the presence of low corrosion, create liner polish and loss of cylinder oil retention.

Although both MAN and Wärtsilä have previously approved SAE 40 grade cylinder oils, their position today is for the use of SAE 50 grade with a minimum viscosity of 18.5cSt @ 100°C. The use of blend on board is likely to produce cylinder oil that is not in compliance with current minimum viscosity requirements.

Both MAN and Wärtsilä recommend cylinder oil feed rate in the range of 0.6g/kWhr to 1.0g/kWhr. The use of a periodic SWEEP test is a useful indicator of the engine corrosivity. The test consists of adjusting the cylinder oil feed-rate every 24 hours starting with a cylinder oil feed-rate of 1.4g/kWhr and reducing it in 0.2g/kWhr steps to 0.6g/khr. SDA sampling is done after each 24 hour period and prior to reducing the cylinder oil feed-rate.

Cold corrosion is believed to occur where the liner and combustion chamber conditions are such that the gas temperatures fall below the dew point and acids form on the liner walls. Most corrosion normally occurs at the top of the liner hence the essential need to ensure BN reserve in the SDA. In the past liner lifetime was defined by a maximum allowable liner diameter. This rule of thumb no longer applies due to bowl effects and liner ovality. It is quite common for corrosive wear to occur on only part of the liner circumference due to combustion patterns and intensity of flame path. As the wear and ovality progress liner life will be limited by piston ring performance and eventual ring blowby and ring failure.

Proven performance for GulfSea Cylcare ECA 50

OEM Guidelines – MAN, Wärtsilä and Mitsubishi

MAN have for some years recommended the installation of two cylinder oil daily tanks; designated high BN and low BN cylinder oils respectively. In ships with two daily tanks fitted, the switch from high BN to low BN and vice versa should be performed at the same time as fuel switching.

In general the most common combination of cylinder oils used by most customers will be GulfSea Cylcare ECA 50 and GulfSea Cylcare 50100. In situations where the ship is likely to use consistently low sulphur fuels such as commonly delivered in South America, then there will then be a requirement to use GulfSea Cylcare DCA 5040H.

MAN strongly recommends the use of specially formulated cylinder oil for ECA operations. It is therefore recommended that customers deplete their stocks of

GulfSea Cylcare DCA 5040H and then switch to GulfSea Cylcare ECA 50. Wärtsilä is more relaxed about the continued use of 40BN cylinder oil but also specify a switch to a specially formulated cylinder oil for ECA operation. Mitsubishi does not require a special formulation cylinder oil for ECA operation. However Gulf Oil Marine strongly recommends a switch to GulfSea Cylcare ECA 50 when stocks of 40BN are depleted.



Features & Benefits

- Outstanding detergency capability minimizes deposits on critical parts viz. pistons, piston rings, ring grooves and cylinder ports.
- Low BN for residual acid scavenging and neutralization capability whilst achieving OEM's specified residual BN reserve in scrape down oil.
- Enhanced anti-wear property minimizes piston ring & cylinder wear leading to reduced maintenance costs.
- Compliant with MARPOL Annex VI Regulation 14 for marine fuels with <0.1%wt Sulphur.
- Excellent thermo-oxidative stability reducing deposit and sludge formation.
- Zero ash content minimizing deposits and reducing environmental footprint.
- Good compatibility with all normal seal materials.

Applications

- Cylinder lubrication of all generations including the latest MAN Mk 8.2 to Mk 9 & G type engines and Wärtsilä RT-Flex & W-X engines operating on very low sulphur fuels, <0.1%wt and natural gas.
- The recommended manufacturers feed rate should be maintained. It is highly recommended to inspect the liners via a scavenge port inspection upon initial and subsequent switches to GulfSea Cylcare ECA 50.
- Changeover to GulfSea Cylcare ECA 50 should be undertaken, upon entering an ECA, at the next daily top-up of the cylinder oil day tank. When changing back to high sulphur fuel oil, upon leaving an ECA, the cylinder oil should be switched on the day prior, during the daily top-up of the cylinder oil day tank.

Typical Properties

GulfSea Cylcare ECA 50

Typical Properties	SAE Grade	50
Test Parameters	ASTM Method	Typical Values
Viscosity @ 100°C, cSt	D 445	19.0
Viscosity Index	D 2270	107
Flash Point, °C	D 92	270
Pour Point, °C	D 97	-18
Density @20°C, kg/l	D 4052	0.899
Detergency	Panel Coker	Exceeds Industry Standard





For further information,
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