

## MX MARINE (MDCL) SERIES HIGH PERFORMANCE MARINE DIESEL CYLINDER LUBRICANTS (MDCL)

**MaxPro1 MX Marine (MDCL)** oils are specially formulated high-performance marine cylinder lubricants designed for use in highly rated, low-speed crosshead running on residual fuels. It is important for the total alkaline content of the cylinder lubricant to match the sulphur content of the fuel, and to adjust the feed rate accordingly for optimum performance and protection. Insufficient cylinder oil feed rates can lead to corrosive wear, seized and broken rings, and consequent blow-by and scavenge fire risks.

**MaxPro1 MX Marine 5040** is developed for low-speed crosshead engines burning fuels with sulphur content below 2% wt. The lower base number reduces the risk of “sudden severe wear” or scuffing.

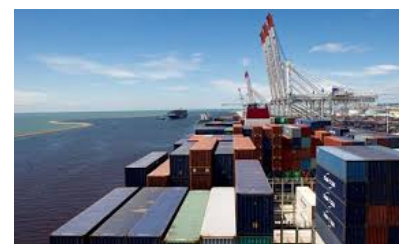
**MaxPro1 MX Marine 5070** is the most commonly used marine cylinder oil for modern low-speed 2-stroke marine diesel engines using Heavy Fuel Oil (HFO) of up to 3.5% wt sulphur content. It has outstanding acid neutralizing capability that helps to prolong the life of engine components. It is best suited for engines operating with higher pressures, temperatures and longer strokes.

**MaxPro1 MX Marine 5100** protects engines that are susceptible to high levels of ‘cold corrosion’. It has been proven to be a more cost effective solution for engines suffering from cold corrosion versus the use of a lower base number oil at a higher feed rate. It is used in newer, more demanding engine types during slow steaming operation. Cold corrosion is when sulphuric acid forms on the liner walls in an engine cylinder and corrodes the liner surface. This abnormal corrosion then creates excessive wear of the liner material. This has become an issue in new engines which are designed to comply with the Tier II NOx regulations and Energy Efficiency Design Index (EEDI) guidelines.

**MX Marine** formulations are based on a proven additive technology that has been established with a range of engine builder approvals including MAN B+W, Sulzer and GMT.

### APPLICATIONS

- **MaxPro1 MX Marine 5040** is optimised for low-speed crosshead engines running on low sulphur fuel of less than 2% wt sulphur, but may also be used on those with higher sulphur content
- **MaxPro1 MX Marine 5070** is a proven marine cylinder oil for marine diesel engines operating on heavy fuel oil of up to 3.5% wt sulphur content
- **MaxPro1 MX Marine 5100** meets the demanding requirements of newer low-speed, 2-stroke marine engines running on residual fuels of up to 3.5% sulphur, especially during slow steaming conditions



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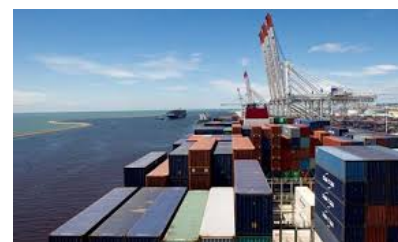
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### FEATURES AND BENEFITS

- Superior thermal and oxidation stability. Slows down oil ageing under severe operating conditions; reduces deposits in piston under crown and ring belt areas.
- Effective detergent and dispersant additive system. Prevents built up of soot, black sludge and heavy fuel contaminants in critical parts of the engine; keeps engine clean.
- Good volatility control. Reduces oil consumption.
- High TBN reserve and retention properties. Protects engine from fuel/combustion related corrosion and deposits.
- Excellent wear and rust protection. Minimizes wear on all moving engine components; provides excellent protection for cams, camshaft and bearings.
- Unique low ash formulation of **MaxPro1 MX Marine 5040**. Avoids excessive piston top land deposits which can sometimes build up when higher TBN 70 oils are used with lower sulphur fuel.
- **MaxPro1 MX Marine 5100** new generation performance oil. Protects engines that are susceptible to high levels of 'cold corrosion', a phenomenon that causes premature liner wear when engine cylinders operate at conditions below the dew point; reduces oil consumption in corrosive engine; saves cost.

### TYPICAL PROPERTIES

Grade	Test Method	MX Marine 5040	MX Marine 5070	MX Marine 5100
Product Code		5069	5070	5071
Density @ 15°C, kg/l	ASTM D4052	0.915	0.920	0.930
Viscosity, cSt @ 40°C	ASTM D445	214.4	219.5	246.6
@ 100°C		19.2	19.5	20.8
Viscosity Index	ASTM D2270	101	101	99
Sulphated Ash, % wt	ASTM D874	5.28	9.24	13.2
Flash Point COC, °C	ASTM D92	248	252	254
Pour Point, °C	ASTM D97	-9	-6	-6
TBN, mg KOH/g	ASTM D2896	40	70	100



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**AVAILABLE SIZE AND PART NUMBER**

	<b>200L</b>	<b>1000L</b>
MX Marine 5040	5069-200	5069-1000
MX Marine 5070	5070-200	5070-1000
MX Marine 5100	5071-200	5071-1000

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