

Marine Four Cycle Engine Oil SAE 10W40
Exceeds the requirements of NMMA FC-W®
for use in four stroke marine applications

Why FC-W? Four-stroke outboard engines work much like automotive engines in that they are lubricated by a circulating multi-viscosity oil and require oil changes after a certain period of time.

But as Don Schultz of the NMMA (National Marine Manufacturers Association) explains, there are issues relating to our current methods.

"Four stroke outboard engines often have long periods of idle, and in cooler water the oil can accumulate enough fuel which then dilutes the viscosity which may lead to excess wear.

"In cars, the operating temperature is high enough, just over 100°C, to cook off the fuel but in marine engines the operating temperature is between 50 and 60°C and at that temperature, the fuel does not vaporize as easily.

"Automotive additive packages in API SG oils, which is the category currently recommended for most of today's marine four stroke engines, can handle the oil dilution issue. But with the looming possibility of substantial reductions in the percentage of ZDDP (zinc alkyldithiophosphate ..an anti-wear and EP additive) in future automotive engine oil categories, marine applications may be placed at risk,"

"And we can't simply increase the thermostat temperature because that will cause the second problem. At about 65°C, salt water starts to re-crystallize inside the cooling system and begins to form stalactites and stalagmites and impede the flow of coolant. Some ingenious technological solutions have been devised, such as rerouting the oil through engine hot spots to give it the ability to shed fuel. But cooling system problems can be a major issue."

"We've come up with an oil specification specifically for marine applications, which have special requirements and face a far harsher environment than faced by land applications. Our product will specifically address oil dilution and provide more rust control inside the engine."

NMMA FC-W®. The rapid growth in four stroke marine engines has prompted the NMMA (National Marine Manufacturers Association), to issue the first specifications for oils used in those motors. Whilst the specifications have been driven partially by the environmental objectives of a 75 percent reduction in outboard hydrocarbon and NOx emissions, wear and rust protection was the top priority. Oil for 4-stroke motors is governed by NMMA's new **FC-W® specification**.

NMMA FC-W® Testing. SeaMaster 4-C' formulation has been tested extensively by the NMMA. Tests include:

- **Rust – ASTM B117/Mercury Marine Version.** This test is run for 24 hours @ 100°C and uses a salt-fog procedure, Pass/Fail limits are pre-determined and the candidate oil must provide better or equal protection than the standard.
- **No-Harm Test – Yamaha 115 hp Engine.** The objective of this test is to evaluate engine performance and durability including wear protection and deposit control on components. The test is run for 110 hours total. A duty cycle was established, with 10 hrs break in, 90 hours cyclic condition, and 10 hours at wide open throttle.
- Foam – Seq. I-III (industry limits) D892, Seq. IV (limit 200/0)
- HTHS D4683 Shear Stability Test D6278)
- Noack Volatility D5800
- *API SG Performance



Valve tip



Cam lobes



Slipper surface

Anglomoil Superior Lubricants

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SeaMaster 4-C Four Stroke Outboard Oil.

SeaMaster 4-C four-stroke oil has been formulated to withstand the harsh operating conditions faced by modern outboard motors.

Manufactured from the highest quality base oil and the most advanced additive package, 4-C provides the ultimate in protection and performance, keeping friction, heat and wear to an absolute minimum, while preventing problems such as oil dilution and rust.

SeaMaster 4-C exceeds the requirements of the NMMA FC-W® specifications.

PRODUCT DATA SHEET

SeaMaster 4-C Performance Standards		
Viscosity Grade	10W-40	SAE
KV @ 40°C	107	cSt
KV @ 100°C	15.5	cSt
Viscosity Index	152	
TBN	6.9	Mg KOH/g
TAN	2.5	Mg KOH/g
CCS @ -25°C	6900	cP
Foam Sequence I	0/0	ml
Foam Sequence II	30/0	ml
Foam Sequence III	0/0	ml
Foam Sequence IV	30/0	ml
Shear Stability	12.62	cSt, 30 cycles
HTHS	3.64	>30 shear c, cP
Noack Volatility	16.3	%
Rust	22	%
115HP General performance engine test	Pass	

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