

MAK MARINE

Crankcase oil for medium-speed trunk piston engines

MAK Marine range of oils are multifunctional engine oils developed for use in medium-speed marine engines operating on distillate, blended or residual fuels with various levels of sulphur. These oils are blended using high quality base oils. Superior quality additive chemistry imparts very high resistance to oxidative and thermal stress on the oil. MAK Marine oils have the ability to retain TBN over a long service life. They offer excellent protection to engine components against rust, corrosion and wear. Optimised level of detergency leads to clean crankcase. They have low pour points and excellent fluidity at very low temperatures.

Grades: MAK Marine range is available in the following grades – **301, 302, 303, 304, 401, 402, 403, 404, 501, 502, 503** and **504**.

Applications:

MAK Marine range is recommended for crankcase lubrication of medium-speed trunk piston type marine diesel engines running on distillate, blended or residual fuels having varying degree of sulphur content. They are suitable for medium speed industrial engines also. TBN values are decided based on the sulphur content of the fuel.

Commonly Used Classification of Diesel Engines:

Type	Slow Speed	Medium Speed	Medium to High Speed	High Speed
Speed (rpm)	Upto 250	250 – 750	600 – 1500	Above 1500

Performance/ Benefits:

Excellent Resistance to Oxidation – outstanding resistance to the effects of oxidising agents. Resists sludge and deposit formation. Minimises filter choking and valve sticking. Ensures reliability, longer drain period and less maintenance.

Excellent Thermal Stability – provides resistance to thermal break down and capability to work under varying degree of stress to offer optimum life and performance.

Excellent TBN Retention – has the ability to retain TBN over a long service life to neutralise combustion acids and protect engine components. High alkalinity level controls cylinder wear.

Clean Engine – highly optimised and effective level of detergency ensures clean engine components like crankcase, valve deck, piston, piston under-crown etc. Controls deposits on piston land and ring to prevent ring sticking.

Balanced Detergency and Dispersancy – combination of high detergency and low dispersancy allows excellent separation of heavy contaminants and water in the centrifuge.

Good Antiwear Property – protects engine components like liner, ring from wear. Provides excellent protection against adhesive wear of cam, camshaft and bearings. Enhances system reliability.

Resistance to Rust & Corrosion – provides excellent protection from rust and corrosion.

Performance Level/ Specification:

- API CF

Suggested Grades Based on Sulphur Concentration:

Sulphur Content in Fuel	Suggested MAK Marine Grades
<1%	301 or 401 or 501
>1% & <2.5%	302 or 402 or 502
2.5% to 3.5%	303 or 403 or 503
>3.5%	304 or 404 or 504

Check with supplier more details

Storage & Handling:

The product should be stored inside. Keep it properly sealed to avoid contamination. Avoid freezing. Shelf life is 5 yrs. under protected storage conditions.

Health & Safety:

They are unlikely to be hazardous when properly used in recommended applications. Contamination of the oil from other oils, greases, chemicals, dirty water etc. can occur during the use. It should be avoided. Regular monitoring of the in-use product is recommended.

**Typical Physico-Chemical Data: MAK Marine Grades**

Characteristics	Method	301	401	501	302	402	502	303	403	503	304	404	504
Appearance	Visual	Clear & Bright											
Color	Visual	Brown											
Density, g/cc @ 15°C	ASTM D1298	0.8821	0.9165	0.9267	0.8822	0.9166	0.9269	0.8820	0.9168	0.9268	0.8820	0.9168	0.9268
SAE Viscosity Grade		30	40	50	30	40	50	30	40	50	30	40	50
Kinematic Viscosity @40°C, cSt	ASTM D445	98.1	137.3	224.7	103.6	148.5	247.0	103.6	148.5	247.0	103.6	148.5	246.9
Kinematic Viscosity @100°C, cSt	ASTM D445	11.5	14.5	20.3	11.5	14.5	20.3	11.5	14.5	20.3	11.5	14.5	20.3
Viscosity Index	ASTM D2270	105	105	105	98	96	96	98	96	96	98	96	96
Pour Point, °C	ASTM D97	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12
Flash Point, COC, °C	ASTM D92	244	256	260	244	256	260	244	256	260	244	256	260
Copper Corrosion, 100°C, 3 hrs.	ASTM D130	1a											
Total Base Number, mg KOH/ g	ASTM D2896	12.5	12.5	12.5	20	20	20	30	30	30	40	40	40