

MAN CAT II APPROVAL

CUTTING EDGE
TECHNOLOGY





NEW CYLINDER OIL • *elin CDO 40 MC II*

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Engine designer MAN Energy Solutions responded to the emerging challenges of VLSFO (Very Low Sulphur Fuel Oil) in modern, efficient engines in May 2020, publishing a **Service Letter, SL2020-694/JUSV**, which sets out a new cylinder oil strategy “where the aim is to raise the performance level of cylinder oils by dividing them into two performance categories” - **Category I** and **Category II**.

Category II cylinder oils - designed for all MAN B&W engines and recommended for Mark 9 and higher. In 2020, performance levels were introduced to distinguish between different types of cylinder oils. **Cat. II** is the overall higher performing category of the two categories (Cat. I and Cat. II). **Cat. II** cylinder oils have excellent overall performance with a particular emphasis on the exceptional cleaning ability. To achieve this status, a cylinder oil must complete extensive testing. The lubricants awarded **Cat. II** status are **40 BN, 100 BN and 140 BN cylinder oils**.

Cat. II cylinder oils are suitable for all engine types and are recommended for MAN B&W two-stroke engines Mark 9 and higher, including the ME-GA type engines. Cat. II 40 BN oils may also be advantageous for engines of Mark 8 design and lower. Cylinder oils with 100 and 140 BN are mainly used for high-sulphur fuel applications.

Cat. II 40 BN oils can be used for operation on <0.10%- 0.50% S fuels and LNG, ethane, methanol, and LPG.

Category II cylinder oils are recommended for continuous use. Alternating between high - and low - BN cylinder oils for cleaning up purposes should not be necessary when a Category II 40 BN is used. Choosing a suitable lubricant for the engine has now become easier with the Category II strategy.

New cylinder oil *elin CDO 40 MC II* with NOL issued by MAN is the latest addition to **elin Marine Lubricants** range of **cylinder oils** meeting the highest performance standards. It is designed to provide improved **marine engine protection** over previous generation of low Base Number (BN) formulations. Particularly intended for lubricating the cylinders of the slow-speed crosshead (2 stroke) engines running on VLSFO (DM/RM) Sulphur content 0,50 % max or partially in ECA areas using ULSFO (DM/RM) with sulphur content 0,10 % max, blended from highly refined base oils and carefully selected new generation additives to provide **superior ring and liner wear protection** and **excellent piston cleanliness** in **crosshead engines**.



Main performance Features of the product

- Offers enhanced **piston** and **piston ring pack cleanliness** and **liner wear protection** as a result of high dispersant and detergent effectiveness, at moderate BN level



25% CLEANER than Category I BN 40 Cylinder Oils

Equal Cleanliness to CAT II BN 100 Cylinder oils

*Photo at left shows scavenge port from a vessel using 100BN and 40BN 'switching' on a six- or eight-day rotation.



*Photo at right shows scavenge port from a vessel using MAN Cat. II 40BN – no switching required





Prolongs components life



Further extends thermal stability

- Improves **scavenge space** and **exhaust track cleanliness** by having significantly lower sulfated ash content than existing MAN ES Category II 100 and 140 BN lubricants
- Avoids alternating between high and low BN cylinder oils to improve **piston cleanliness**, simplifying operations



Time saving



Storage tanks saving



Protects the latest engine designs, operating on fuels with sulphur content of 0,5% and lower, from wear and corrosion

- **Storage stability**

Recommended Applications

elin CDO 40 MC II is recommended for **cylinder lubrication** of the latest generation large low-speed marine diesel engines equipped with exhaust abatement technologies, operating with a range of low and up to zero sulphur fuels including VLSFO, ULSFO, LNG and methanol. **elin CDO 40 MC II** should be used in accordance with OEM guidelines and recommendations.

Recommendations (Approvals)

- **elin CDO 40 MC II is Approved For:**
MAN ES (MAN B&W) (Category II cylinder oils) NOL

elin CDO 40 MC II is fully compatible with all cylinder oils.

Specification	Test	Test results*
SAE		50
Specific gravity @ 15 °C	ASTM D 4052	0,9189
Kin. Viscosity at 100°C, cSt	ASTM D 445	18,87
Kin. Viscosity at 40°C, cSt	ASTM D 445	192,37
Viscosity Index	ASTM D 2270	110
Flash point (C.O.C.), °C	ASTM D 92	240
Pour Point, °C	ASTM D 97	-12
Base Number, mg KOH/g (TBN)	ASTM D 2896	40
Calcium % wt	ASTM D 5185	1,43
Zinc % wt	ASTM D 5185	0,05
Phosphorous % wt	ASTM D 5185	0,05
Magnesium % wt	ASTM D 5185	0,006

* Typical characteristics - the above figures are typical of those obtained within normal production tolerances and do not constitute a specification



NEW system oil *elin CDS 30M*

Due to the crosshead engine design, the system oil of a 2T low-speed marine engine is not affected substantially by the advent of IMO 2020 fuels. However, the cleanliness of the piston ring pack and crankcase area, still requires a high detergency and dispersancy lubricant.

Elin has formulated a **New System Oil *elin CDS 30M***, featuring a unique detergent system, that delivers **enhanced crankcase cleanliness** and helps to **prevent build-up of piston undercrown deposits**. The new system oil performs well even in the presence of moderate amounts of contamination by cylinder oil or heavy fuel oil, while its anti-wear additive system provides excellent protection for highly loaded engine parts, such as gear drives and bearings.

Main performance Features of the product

- Detergency that guarantees the cleanliness of the casing and oil-cooled piston heads.
- Excellent resistance to oxidation.
- Great water and insoluble separation capacity, achieving high additive resistance to hydrolysis.
- Sufficient alkalinity to neutralise the acid compounds that may leak into the casing through the rod gaskets
- High resistance of the additives to high temperatures, ensuring extended service life.
- Miscibility and compatibility with cylinder oils which that may leak through the rod gaskets.
- Excellent anti-rust and anti-corrosion properties, protecting circuit and bearing metals.
- Good anti-foam properties.

Recommendations (Approvals)

- *elin CDS 30M* is Approved For 2T engines: **MAN ES (MAN B&W) NOL**

Specification	Test	Test results*
SAE		30
Specific gravity @ 15 °C	ASTM D 4052	0,89
Kin. Viscosity at 100°C, cSt	ASTM D 445	11.5
Viscosity Index	ASTM D 2270	95
Flash point (C.O.C.), °C	ASTM D 92	>200
Pour Point, °C	ASTM D 97	-9
Base Number, mg KOH/g (TBN)	ASTM D 2896	5

(*) The above figures are typical of those obtained within normal production tolerances and do not constitute a specification



with the credibility of international institutions



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