

Technical Brief

Using the Right Cylinder Oil: Which is the Most Suitable BN?

[Published in Apr 2023]

Gulf Marine offers a range of marine cylinder oils with base number (BN) levels between 40 and 140. This brief highlights the potential consequences of using cylinder oils with inappropriate BN levels and provides guidance to vessel operators on selecting the most suitable cylinder oil for their specific operations.

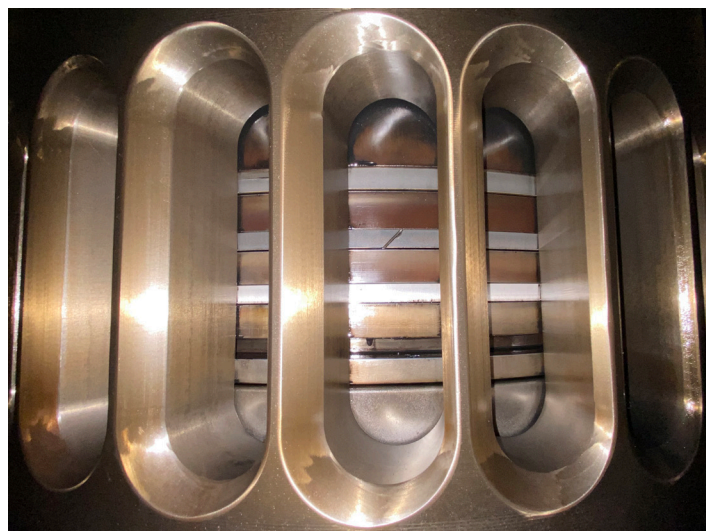
One of the primary functions of lubricants is to neutralize acids, particularly those that may form during the combustion process of high-sulfur fuel oils. As such, the BN, or alkalinity, of lubricants is a useful indicator of their effectiveness.

Vessels operating on high-sulphur bunker fuel require cylinder oils with sufficiently high BN levels (usually $\geq 100\text{BN}$) to neutralize the acidic by-products of combustion. Failure to use an appropriate cylinder oil may lead to corrosive damage to engine components such as cylinder liners. Recently, some OEMs have begun to recommend using 140BN cylinder oils for high-sulphur fuel operations to protect against acidic corrosion; this is particularly important with low cylinder oil feed rates.

But what happens if a vessel on low-sulfur fuel operations uses a high-BN cylinder oil, such as a 100BN cylinder oil?

Although we have not observed immediate damage to cylinder liners, sustained use of inappropriately high-BN cylinder oils can lead to excessive alkalinity in the form of calcium carbonates; this can cause excessive deposit calcium build-up on the piston crown and may reduce the effectiveness of a vessel's after-treatment system, if fitted.

Escaped calcium in the exhaust gas can adversely affect catalyst components in the



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after-treatment selective catalytic reduction (SCR) system, impairing its ability to reduce NOx. OEMs are still trying to determine the exact chemical effects of calcium on the SCR catalyst and why it reduces the system’s ability to manage NOx generated during the combustion process.

Nonetheless, vessel operators should always select the cylinder oil that is most appropriate for their engines and vessel operations.

Table 1 provides a simple guide to help operators choose the most suitable BN cylinder oil for various fuel bunker operations. OEMs’ advisories may vary slightly, please contact **Gulf Marine** technical engineers to provide guidance in line with specific OEM advisories.

In addition to using the appropriate cylinder oil, **Gulf Marine** also encourages operators to regularly monitor the conditions of their engines and liners. This will ensure optimal performance and longevity of their equipment.

Table 1: BN Choice vs Fuel-Options

40 BN	100-140 BN
<div><0.10% S ULSFO *</div> <div><0.50% S VLSFO *</div> <div>LNG, ethane</div> <div>LPG, methanol</div>	<div>High S fuels: above 0.50% S scrubber equipped vessels</div>

** Some OEMs recommend the use of up to 70BN for fuel oils with <0.5%S (such as, ULSFO and VLSFO). We believe it would be prudent to include this caveat: “when excessive residues on piston top lands are observed, adjust the cylinder oil feed-rate and/ or re-select cylinder oil”.*

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