



Service Letter

SL03-417/HRJ  
January 2003

**Cylinder Oil Dosage Optimisation  
S/L/K-MC/MC-C/ME, Mk 6 engines  
with Alpha Lubricator System  
Action Code: WHEN CONVENIENT**

Dear Sirs

**Standard Guidelines**

As informed in our Service Letter [SL02-398/HRJ](#), January 2002, we have reduced our guiding feed rates for K/L-MC/MC-C engines equipped with the Alpha Lubricator system.

Service experience has now demonstrated that it is also possible to reduce the feed rate for the super-long-stroke S-MC/MC-C engines fitted with Alpha Lubricators, even down to the same low level as for the K/L engines, i.e. to a basic feed rate of 0.8 g/bhph and a minimum of 0.6 g/bhph, see the enclosure.

**Alpha ACC (Adaptive Cylinder oil Control)**

The actual need for cylinder oil quantity varies with the operational conditions such as load and fuel oil quality. Consequently, in order to obtain the optimal lubrication, the cylinder oil dosage should be adapted to such operational variations.

With the introduction of the electronically controlled Alpha Lubricator system, featuring the easy-to-operate "HMI" panel, such adaptive lubrication has become feasible. The Alpha Lubricator system offers the possibility of saving a considerable amount of cylinder oil per year and, at the same time, to obtain a safer and more predictable cylinder condition.

Intensive studies of the relation between wear and lube oil dosage have revealed that the actual need for cylinder lubrication follows the amount of fuel being burnt and the fuel quality.

This calls for part-load lube oil control which is proportional to the engine output, as load and oil consumption in this connection are practically proportional. This is, at the same time, the most economical control mode, compared to the previous practice where part-load dosages were controlled proportionally with either engine speed or cylinder mean pressure.

The basic feed rate control should be adjusted in relation to the actual fuel quality being burnt at a given time. Of course, fuel quality is rather complex. However, studies have also shown that the sulphur percentage is a good indicator in relation to wear, and an oil dosage proportional to the sulphur level will give the best overall cylinder condition.

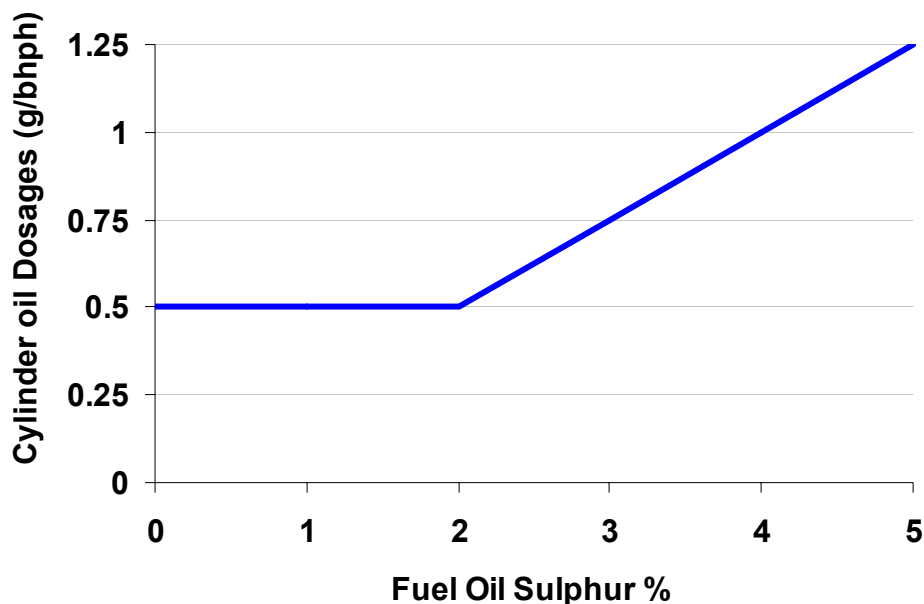
This new cylinder oil control principle is called the “**Alpha Adaptive Cylinder oil Control**”, or abbreviated “**Alpha ACC**”.

Tests with Alpha ACC on K and S engines of various engine sizes have shown that a safe and optimum lube-economical control is obtained with a basic setting according to the below formula:

$$\text{Basic lube oil setting} = 0.25 \text{ g/bhph} \times \text{S}\%$$

with a minimum setting of 0.5 g/bhph, i.e. the setting should be kept constant from 2% sulphur and down.

### Alpha ACC



## How to adjust the dosage according to the Alpha ACC principle

First of all, knowledge of the sulphur percentage of the fuel oil being burnt at any time is a condition for obtaining the savings with Alpha ACC. Therefore, we recommend that the ships in question join one of the well-known fuel analysis programmes on the market, and that burning of the oil is not started until the analysis result is known. This will normally take two to four days after bunkering.

One of the key parameters in Alpha ACC lubrication is part-load control proportional to engine load. This is important in order to prevent over-lubrication at low loads, and it is one of the main parameters to save oil, compared with conventional lubrication.

If “load-proportional control” is not already preset from delivery of your Alpha Lubricator system, we suggest that you contact MAN B&W Diesel A/S in order to get instructions on how to change the software from either speed-proportional control or cylinder-mean-pressure proportional control.

When starting to burn new bunker oil, the HMI setting of the Alpha ACC should be adjusted according to the bunker analysis results. For reference, the below table should be used:

Sulphur	Dosage		HMI
	%	g/bhph	g/kWh
0.0-2.0	0.50	0.68	63
2.2	0.55	0.75	69
2.4	0.60	0.82	75
2.6	0.65	0.88	81
2.8	0.70	0.95	88
3.0	0.75	1.02	94
3.2	0.80	1.09	100
3.4	0.85	1.16	106
3.6	0.90	1.22	113
3.8	0.95	1.29	119
4.0	1.00	1.36	125
4.2	1.05	1.43	131
4.4	1.10	1.50	138
4.6	1.15	1.56	144
4.8	1.20	1.63	150
5.0	1.25	1.70	156

Some of the early Alpha Lubricator systems have deviating relations between the delivery dosage and the HMI setting. Please check with your instruction manual that the HMI setting is 100% at 0.8 g/bhph. If not, please contact MAN B&W Diesel A/S.

Our 'basic setting' is traditionally chosen to obtain a dosage which, in average conditions, results in a safe and lube-oil-economical cylinder condition. This leaves possibilities for further individually based reductions, towards the recommended minimum setting.

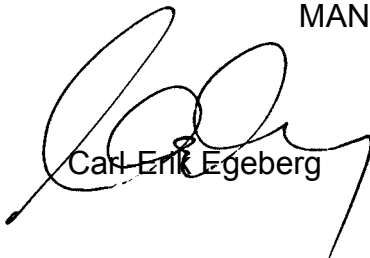
In the case of the Alpha ACC, the basic factor of 0.25 g/bhph x S% may, of course, also be lowered. Currently, we have experienced down to a factor of 0.21 g/bhph x S%.

Regarding running-in, part load and load change situations and lubrication in the event of abnormal cylinder condition, please refer to the attached "Guiding Cylinder Oil Feed Rates".

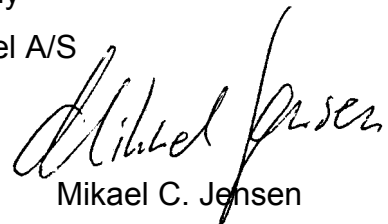
Questions or comments regarding this SL should be directed to our Dept. 2300.

Yours faithfully

MAN B&W Diesel A/S



Carl-Erik Egeberg



Mikael C. Jensen

Encl.

<b>Guiding Cylinder Oil Feed Rates</b>			
S/L/K-MC/MC-C/ME/ME-C engines with Alpha Lubricators, based on a BN 70 cylinder oil			
		Standard guidelines (ref. to MCR load)	Alpha Adaptive Cylinder oil Control (Alpha ACC)
<b>Basic setting</b>		<b>0.8 g/bhph</b> <b>1.1 g/kWh</b>	<b>0.25 g/bhph x S%</b> <b>0.34 g/kWh x S%</b>
Minimum feed rate		0.6 g/bhph 0.8 g/kWh	0.5 g/bhph 0.7 g/kWh
Maximum feed rate during normal service		1.25 g/bhph 1.7 g/kWh	1.25 g/bhph 1.7 g/kWh
Part-load control		Proportional to mean cylinder pressure	Proportional to engine load
		Below 25% load, proportional to engine speed.	
Running-in new liners and piston rings	Alu-coat piston rings:	Feed rate:	First 5 hours: 1.6 g/bhph = 200% From 5 to 250 hours: Basic setting +50% From 250 to 500 hours: Basic setting +25%
		Engine load:	Stepwise increase to max. load over 5 hours
	Non-coated or hard-coated rings:	Feed rate:	First 15 hours: 1.6 g/bhph From 15 to 250 hours: Basic setting +50% From 250 to 500 hours: Basic setting +25%
		Engine load:	Stepwise increase to max. load over 15 hours
Running-in new rings in already run-in liners:		Feed rate: Basic setting +25% for 24 hrs. Alu-coat piston rings: No load restrictions Non-coated or hard-coated rings: Stepwise load increase to max. load over 5 hours.	
Load change dependent lubrication (LCD)		During starting, manoeuvring and load changes, regulation proportional to load or mean effective pressure should be replaced by rpm proportional control, and the dosage increased by 25%.	
Lubrication of cylinders that show abnormal conditions:		Frequent scavenge port inspections of piston rings and cylinder liners are very important for maintaining a good cylinder condition. If irregularities are seen, adjustments of the lube oil rate should be considered. In case of scuffing, sticking piston rings or high liner temperature fluctuations, the feed rate should be raised by 25–50%.	