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Service Letter

Date : 27 June, 2019
Ref. No.: HGS-HSM-SL-19-002

Subject: LUBRICATING OIL GUIDANCE FOR HiMSEN DF ENGINES

Type: All HiMSEN DF ENGINES

To whom it may concern.

Please be informed that proper use of lubricating oil is very important for safe operation of HiMSEN DF Engine, therefore the customers are recommended to select proper lubricating oil through the service letters.

Recently, HHI-EMD issues TEC2019-K2D0-006-OP-R0 to inform customer what kind of lube oil should be selected on the basis of fuel and expected problem of each case, hence please refer to the attachment for safe operation of HiMSEN DF Engine.

We hope this information would be helpful to you.

Enclosure :

- TEC2019-K2D0-006-OP-R0 , Lubricating oil guidance for HiMSEN DF engines

Yours sincerely,

G. Y. Oh, General Manager
Head of Machinery Service Dep't
Technical Division

TECHNICAL CIRCULAR

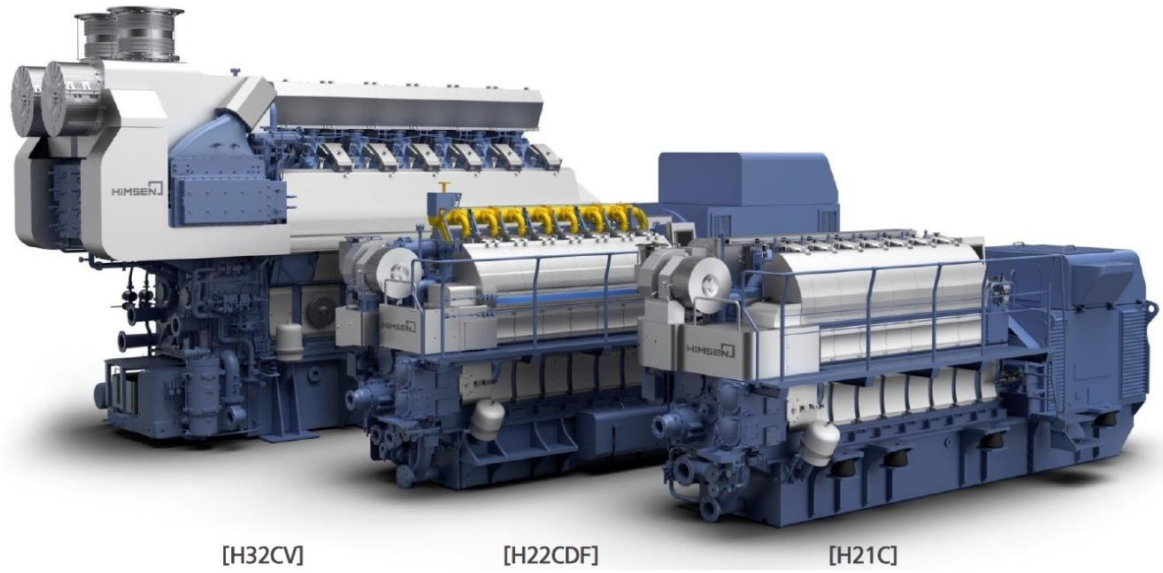
SUBJECT: LUBRICATING OIL GUIDANCE FOR HiMSEN DF ENGINES

TYPE: All HiMSEN DF ENGINES

DOC No.: TEC2019-K2D0-006-OP-R0

DISTRIBUTION

Marine	☐ Ship yard (Y)	☑ Ship owner (O)
Stationary	☑ Power plant (P)	



Date	TEC No.	Write	Checked	Approved	Change	R
190626	TEC2019-K2D0-006-OP-R0	SJS	NHM	KHS	First issue.	0
						1
						2
						3
						4
						5

[BACKGROUND]

Alkalinity in lubricating oil is necessary to neutralize the acidic combustion products coming from the sulfur in fuel. Therefore, lubricating oil with suitable BN (Base Number, Alkalinity) should be selected carefully to maintain proper balance between alkalinity in lubricating oil and the sulfur level in fuel. Improper selection may cause the following problems.

1) High sulfur fuel + Low BN lubricating oil
   → Excessive corrosive wear on combustion chamber components

2) Low sulfur fuel + High BN lubricating oil
   → Excessive deposit formation on combustion chamber component surfaces, turbocharger contamination, lacquering formation on cylinder liner surface and the risk of knocking in gas mode

DF engines can be operated using natural gas, distillate / residual fuel depending on the needs of the customer, and these fuels have different sulfur level. Therefore, the optimum BN level should be selected based on sulfur content of each fuel being used, operating periods on each fuel as well as on lubricating oil consumption.

[PROBLEMS]

It has been occasionally reported that DF engines using lubricating oil with too high BN and running mainly on natural gas and/or low sulfur distillate fuel had excessive (white) deposit formation on combustion chamber component surfaces and turbocharger. This is because the higher the lubricating oil BN is, the more it also contains ash constituents (mainly calcium). These ash constituents stick to component surfaces under several conditions (their composition, temperature, etc.). These phenomena may cause higher turbocharger speed, exhaust gas temperature in diesel mode and knocking in gas mode.

Figure 1 is of turbine blades, sealing bush for shaft, nozzle ring of engine using BN40 lubricating oil and running mostly on natural gas.

Figure 2 is of piston, cylinder head, exhaust valve spindle of engine using BN14 lubricating oil and running mostly on natural gas.

Figure 1. White deposit on turbocharger components

Figure 2. White deposit on combustion chamber components

[GUIDANCE]

1. Lubricating oil selection

For reliable engine operation, it is recommended to follow the instructions below. BN basically should be selected on the basis of what kind of fuel will be dominantly used. If engine is operated in turn on two or three fuels including residual fuel and only one lubricating oil is available, lubricating oil should be selected based on residual fuel operation requirement.

Engines operation	Fuel S content (% mm)	Recommended BN	Allowed Max. operating hours
Continuous Natural Gas (Gas mode operation ≥ 95%)	-	BN 3-7 (Sulphated Ash : Max. 0.6 % m/m)	N/A
Alternate Natural Gas and Distillate Fuel [1]	<0.20		Distillate Fuel : 15% of total monthly accumulated operating hours [4]
	0.20-0.50		Distillate Fuel : 10% of total monthly accumulated operating hours [4]
Continuous Distillate Fuel or Alternate Distillate Fuel and Natural Gas	<0.40	BN 10-15	Natural Gas : 15% of total monthly accumulated operating hours
	0.40-1.50	BN 15-20	Natural Gas : 10% of total monthly accumulated operating hours
Continuous Residual Fuel [2] or Alternate Residual Fuel, Distillate Fuel, Natural Gas	<1.00 [3]	BN 20	Residual Fuel : 15% of total monthly accumulated operating hours [5]
	1.00-2.50 [3]		Residual Fuel : 5% of total monthly accumulated operating hours [5]
	≤3.50 [3]	BN 30-50	Natural Gas : 10% of total monthly accumulated operating hours

Table 1. Recommended oil BN for operation cases

[1] Distillate Fuel : ISO 8217 2017(E) ISO-F-DMX,DMA,DMZ,DMB

[2] Residual Fuel : ISO 8217 2017(E) ISO-F-RMA10-RMK700

[3] Sulfur content of Residual Fuel

[4] When operating beyond the specified maximum operating hours, lubricating oil with BN 10-15 or BN 15-20 should be selected depending on the fuel sulfur content.

[5] When operating beyond the specified maximum operating hours, lubricating oil with BN 20 or BN 30-50 should be selected depending on the fuel sulfur content.

2. Turbocharger turbine side washing interval

For more reliable engine operation, it is recommended to adjust turbine side washing interval based on lubricating oil BN.

T/C Maker	Maker's general recommendation	Recommendation based on lubricating oil BN		Remark
		BN ≤ 20	BN 30-50	
ABB	50-200h	50-200h (same as maker's)	Max.100h	Washing interval depends on the fuel quality and the operating condition, therefore may have to be adjusted based on experience with engine operation
KBB	25-600h (normal 300h)	25-600h (same as maker's)	Max.150h	

Table 2. Turbocharger turbine side washing interval

[The end]

Yours sincerely,

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