



Service Information No. 08/04

Date: 27-AUG-2004

KBB Turbocharger KBB Service Information S44 and S45

M20 / M25

- 1. KBB Service Information S44
Subject:Maintenance interval for MDO / HFO
Valid for TC type:R2-2 to R4-2, R4-3, R5-3
- 2. **KBB Service Information S45** Subject: Turbine cleaning Valid for TC type: R3-2, R4-2, R4-3 and R5-3

Service Information



S44(12/2003)

Exhaust gas turbocharger

Subject:	Maintenance interval for MDO/ HFO
Valid for TC type:	R2-2 to R4-2, R4-3, R5-3
Valid for engines:	All

1.1 Maintenance interval

1.1.1 Maintenance for Marine Diesel Oil (MDO) application



The operating hours given in the table below are guidelines which can be reduced for adjustment to the maintenance intervals of the engine.

ltem	Maintenance work	Maintenance interval (operating hours)
1.	Check for abnormal noise	24
2.	Compressor washing during operation, actuate compressor washing system	24 - 48
3.	Clean air filter at silencer	approx. 250 or on demand
4.	Check fastening bolts at the feet, tighten all housing bolts and piping joints	once after commissioning, then every 1,000 hours
5.	Inspection I disassembly cleaning checking of rotor and bearings checking of housings assembly 	max. 10,000
6.	Inspection II like inspection I replacement of the bearings 	max. 20,000
7.	Inspection II Inspection II If the inspection II If the rotor	max. 40,000



Exhaust gas turbocharger

S44(12/2003)

1.1.2 Maintenance for Heavy Fuel Oil (HFO) application



The operating hours given in the table below are guidelines which can be reduced for adjustment to the maintenance intervals of the engine.

Item	Maintenance work	Maintenance interval
		(operating hours)
1.	Check for abnormal noise	24
2.	Compressor washing during operation, actuate	24 - 48
	compressor washing system	
3.	Turbine washing during operation, actuate turbine	approx. 300
	washing system	depending on HFO
	Cleaning with water	quality
4.	Clean air filter at silencer	approx. 250
		or on demand
5.	Check fastening bolts at the feet, tighten all housing	once after
	bolts and piping joints	commissioning, then
		every 1,000 hours
6.	Inspection I	max. 10,000
	disassembly	
	cleaning	
	 checking rotor and bearings 	
	checking housings	
	assembly	
7.	Inspection II	max. 20,000
	as inspection I	
	 replacement of bearings 	
8.	Inspection III	max. 40,000
	as inspection II	
	 replacement of rotor 	



The nozzle ring is subject to an increased wear for heavy fuel oil operation. Therefore it is a wear part.

The lifetime of the nozzle ring is approximately 12,000 hours, but it depends on HFO quality and operating conditions.

After exceeding the lifetime the nozzle ring should be replaced in case of fundamental change of performance data as charge air pressure and exhaust temperature.



S45(12/2003)

Subject:	Turbine cleaning	
Valid for TC type:	R3-2, R4-2, R4-3	
Valid for onginos:	M20 and M25 fro	

2, R4-2, R4-3 and R5-3

M20 and M25 from CAT / MaK Valid for engines:

Cleaning of turbine

Heavy fuel oil operation results in contamination and deposits on nozzle ring and turbine wheel reducing the efficiency. Due to these deposits the charge air pressure will be increased.

The washing intervals depend on the fuel quality and operating conditions. That's why they must be adjusted based on the experience gained during engine operation if necessary later on. The washing interval could be adjusted from 50 to 600 hours.

The increase of charge air pressure could be used for adjusting the washing interval, which could adjusted within 50 to 600 hours.

Read and take down the charge air pressure and exhaust gas temperatures at a reference point (at 75 % or 100 % of the output) before and after washing to check the washing effect.



Legend (Example, could vary depending on engine installation)

- 1 Sanitary fresh water
- 2 Regulating valve
- 3 Fresh-water piping
- 4 Removable flexible tube
- 5 Stop valve

- 6 Wash-water piping
- 7 Injector
- 8 Connection for drain
- 10 Escape funnel or sight glass
- 9 Valve
- 2100 Turbine inlet housing
- 11 Turbine outlet housing



Work sequence:

- 1. Connect the flexible tube (4) to fresh-water piping (3).
- 2. Reduce the engine output to approx. 15 % of its rating until the temperature after cylinder has come down to its specified value. (see table)
- 3. Wait for approx. 10 minutes!
- 4. Open the valve (9) of the drain (8) (if present).
- 5. Open valve (2) and adjust the water pressure (see table).
- 6. Open stop valve (5) for approx. 30 seconds and close again.
- 7. Wait for approx. 3 minutes so that the injected water can evaporate.
- 8. Repeat steps 6. and 7. twice or three times.
- 9. Close the stop valve (5), valve (2) and the valve (9) of the drain.
- 10. Run dry the exhaust gas turbocharger at constant load for approx. 30 minutes, increase engine load slowly!
- 11. Repeat the washing process if the exhaust gas turbocharger is affected by vibrations which did not occur before.
- 12. Remove the flexible tube (4).

Operating values for turbine washing

Engine	Exhaust gas	Exhaust gas	Water pressure	Total
output	temperature after	temperature	(gauge)	washing
	cylinder	before / after the		period
		turbine		
max. 15%	300 – 330 <i>°</i> C	400 – 420 / <330 ℃	1.5 – 2 bar	3-4x 30 sec



- Hot exhaust gas can escape from the drain Risk of burning!
- Continue to operate the engine for at least 30 minutes after cleaning.
- Do not wash before a stop of operation. Corrosion risk!
- Washing is ineffective in case of hardened deposits, thus perform washing at regular intervals.
- Pay attention also to instruction of the engine's operating manual!