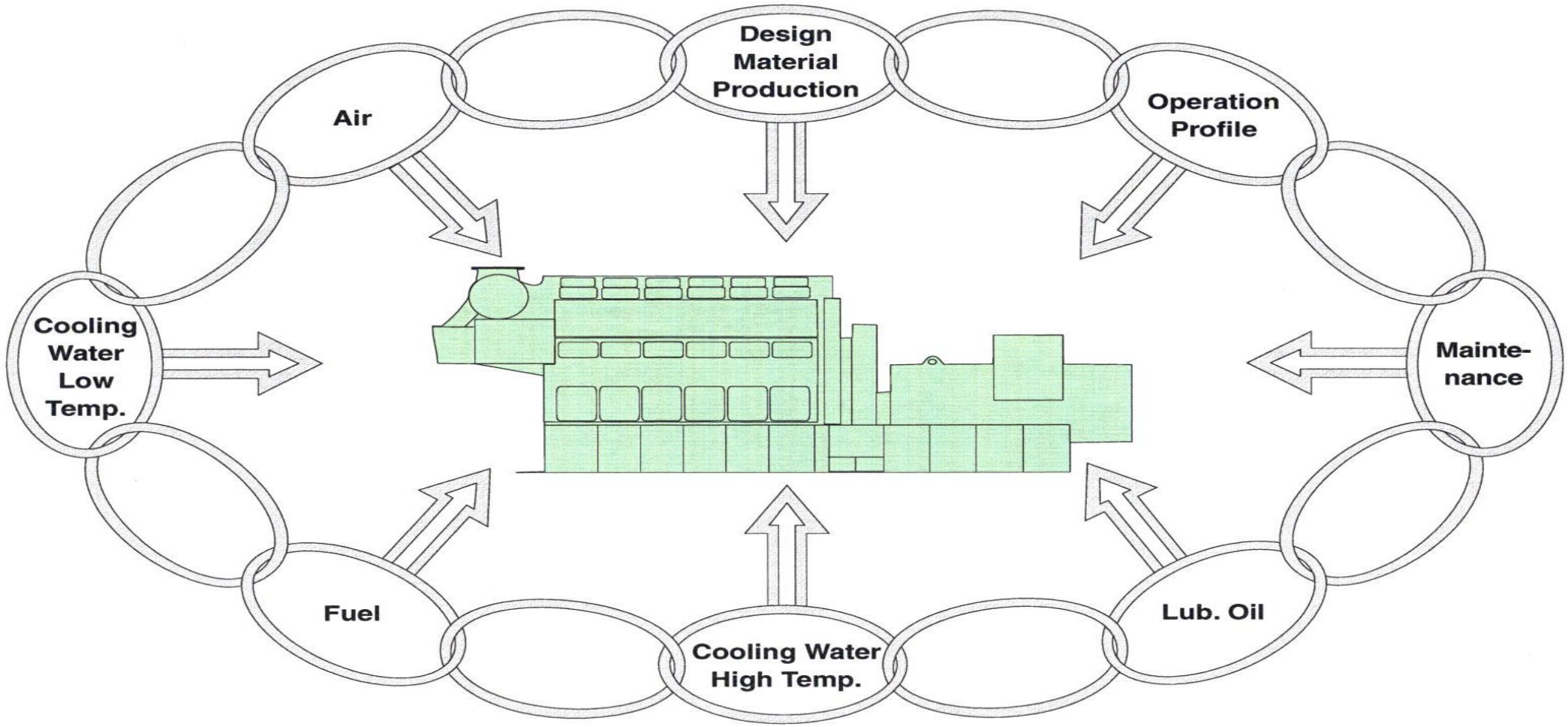
L23/30H & L28/32H Operation of engine

L23/30H & L28/32H Operation of engine



L23/30H & L28/32H Operation of engine

Preparations for Starting

1. Check the oil level in the base frame air lubricator and in the governor. Start-up the pre-lubricating pump. The engine shall be pre-lubricated at least 2 minutes prior to start. Check oil pressures before and after the filter.

2. Open the cooling water supply, start separate cooling water pumps where installed, and check the cooling water pressure.

Note: It is recommended:

a) to preheat the engine, cooling water of at least 60 °C should be circulated through the frame and cylinder head for at least 2 hours before start.

-either by means of cooling water from other engines or by means of a built-in pre-heater

b) When starting without preheated cooling water, the engine must only be started on MDO Initially the engine should not be run up to more than 50% load, increase to 100% should take place gradually over 5 to 10 minutes.

Note: When starting on HFO (Heavy Fuel Oil), only item "a" should be used.

3. Open the nozzle cooling oil supply (only when started on HFO), circulate preheated oil through the nozzles for at least 15 minutes.

L23/30H & L28/32H Operation of engine

4. Open the fuel oil supply to the feed pump. Starting on HFO: circulate preheated fuel through the pumps until correct working temperatures has been obtained. Takes normally 30-60 minutes.
5. Check the pressure in the starting air receiver(s) and open the starting air supply (blow-off water, if any, drain the starting air system before opening.
6. Check that the sealing oil system for the injection pumps are working correct.
7. Check in the regulating gear:
    - That all fuel pumps are at index "0" when the regulating shaft is in the STOP position.
    - That each fuel pump can be pressed by hand to full index when the regulating shaft is in the STOP position, and that the pumps return automatically to the "0" index when the hand is removed.
    - That the spring-loaded pull rod is working correctly.
    - That the stop cylinder for regulating shaft works properly, both when stopping normally and at over -speed and shut down.
    - Testing is made by simulating these situations.
8. Open the indicator valves and turn the engine some few revolutions

L23/30H & L28/32H Operation of engine

Starting

1. Start the engine, by activating the start button.
2. Check the lubricating oil pressure, cooling water pressure, fuel oil feed pressure. Check that the pre-lubricating oil pump is stopped.
3. Check that all alarms are connected.

- The lubricating oil pressure must be within the stated limits
- The lubricating oil temperature must be kept within the stated limits
- The fuel oil pressure must be kept at the stated value, and the filter must be cleaned
- The cylinder cooling water temperature must be kept within the limits

-The cooling water temperature at the charging air cooler inlet should be kept as low as possible

-The exhaust gases should be free from smoke at all loads.

-Keep the charging air pressure and temperature under control.

-Recharge the starting air tank when the pressure has dropped to about 20 bar. Stop recharging at 30 bar

L23/30H & L28/32H Operation of engine

Stopping

Before stopping, run the engine at reduced load, or idle for about 5 minutes for cooling-down purposes.

The engine is stopped by keeping the fuel pump delivery rate at "0", by turning the "load- limit“ knob on the governor to "0", or by activating the remote stopping device.

Start and stop of the engine should take place on HFO in order to prevent any incompatibility problems by change-over to MDO.

MDO should only be used in connection with maintenance work on the engine or longer periods of engine standstill.

L23/30H & L28/32H Operation of engine

L23/30H & L28/32H Operation of engine

L23/30H & L28/32H Operation of engine

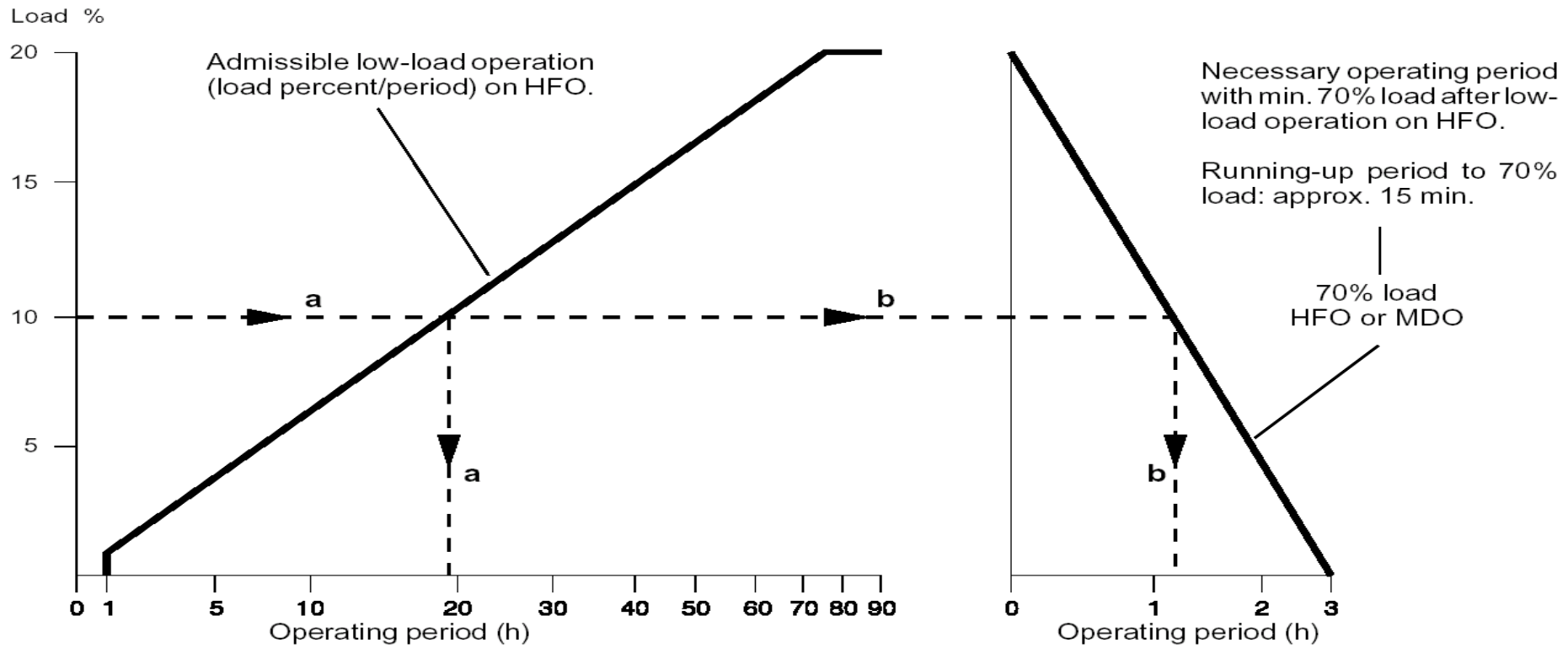
Suction Valves

L23/30H & L28/32H Operation of engine

At loads lower than 20% MCR there is a risk of time dependant retardation of the engine performance
condition due to fouling of the exhaust gas channels and combustion air channels, combustion chambers and turbocharger.

HFO-operation at loads lower than 20% MCR should therefore only take place within certain time limitations according to the curves.

L23/30H & L28/32H Operation of engine



Example: a) with 10% load 19 hours maximum operation on HFO admissible, then change-over to MDO
or b) operate engine for approx. 1.2 hours with 70% rating minimum, in order to burn off residues.
Afterwards low load operation on HFO can be continued.

L23/30H & L28/32H Operation of engine

The operator must be aware of the fact that fouling in the combustion air inlet channels, if any, will not be cleaned at high load operation. Extensive low load running can therefore result in the need for manual cleaning of the combustion air inlet channels.

L23/30H & L28/32H Operation of engine

Description	● = Overhaul to be carried out ■ = Check the condition												
		Time Between Overhaul											Working Card No.

Description
● = Overhaul to be carried out
■ = Check the condition

Operating of Engine:
Readings of data for En…
rence to "Engine Perfor…

Cylinder Head:
Inlet and exhaust valve…
spindel and valve seat…
Inspection of inlet, exha…
Check of valve rotators…
Sleeve for fuel injector…
Safety valve - Overhaul…
pressure …
Indicator valve …
Cylinder head cooling w…
Cylinder head nut - Reti…

Piston, Connecting Ro…
Inspection of piston …
Piston ring and scraper…
Piston pin and bush for…
clearance…
Connecting rod - Measu…
Inspection of big-end be…
Connecting rod - Retigh…
Cylinder liner - Cleaning…
Cylinder liner removed -…
guide ring in frame…

Camshaft and Camsha…
Camshaft - Inspection o…
etc. …
Camshaft bearing - Insp…
Camshaft adjustment - …
Lubrication of camshaft…

Description
● = Overhaul to be carried out
■ = Check the condition

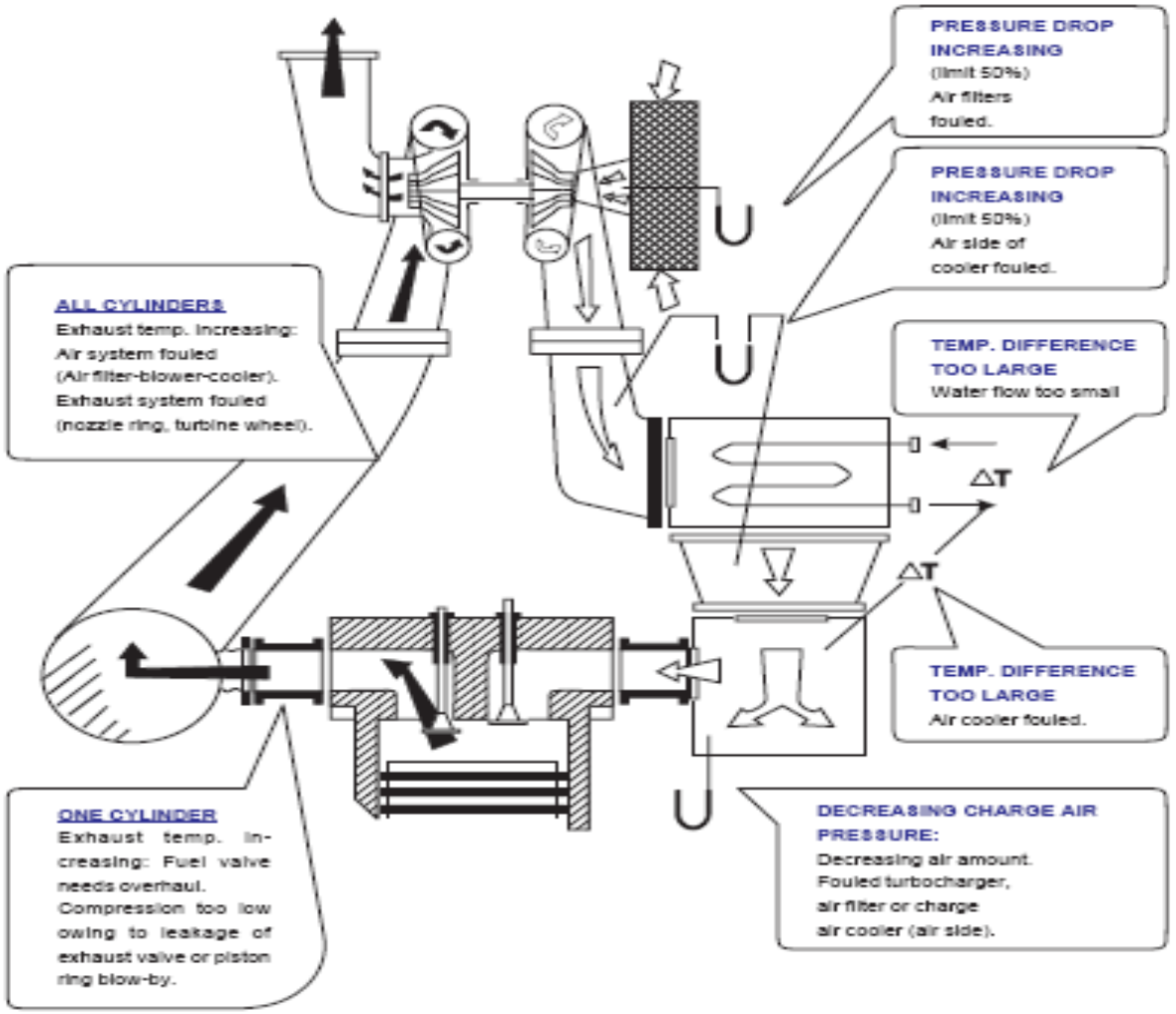
Operating Gear for Inlet Valves, Exhaust V…
Fuel Injection Pumps:
Roller guide for valve gear …
Valve gear - Valve bridge, spring, push rod, …
Roller guide for fuel injection pump …
Roller guide housing …
Inlet and exhaust valve - Check and adjustm…
clearance …
Lubricating of operating gear - Check …

Control and Safety System, Automatics a…
Instruments:
Safety, alarm and monitoring equipment …
Jet system - Adjustment …
Pick-up - Adjustment …
Governor - Check oil level, see governor inst…
book, section 609 …

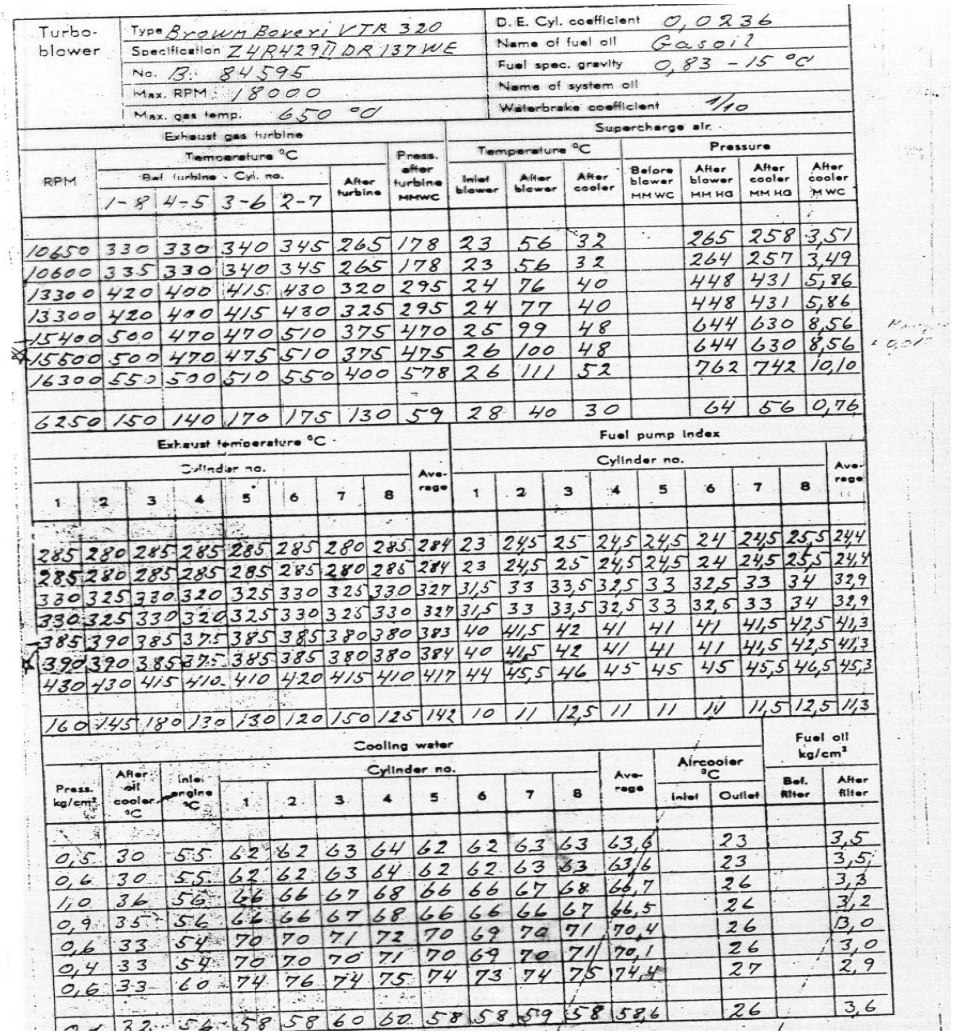
Crankshaft and Main Bearing:
Checking of main bearings aligment, (autolo…
Inspection af main bearing …
Inspection of guide bearing …
Vibration damper - Check the condition …
Lubricating of gear wheel for lub. oil pump a…
water pump etc. …
Counter weight - Retightening, see page 600…
Main- and guide bearing cap - Retightening …

Description (● = Overhaul to be carried out; ■ = Check the condition)	Check new/Overhauled parts after hours	50	200	2000	8000	12000	24000	Daily	Weekly	Monthly	6th month	Observations	Working Card No.
Engine Frame and Bedplate:													
Holding down bolts - Retightening, see page 600.40	200				■								
Bolts between engine frame and base frame - Retightening, see page 600.40	200				■								
For flexible mounted engines - Check anti-vibration mountings	200				■								619-03.00
Safety cover - Function test					■								611-01.00
Turbocharger System:													
Dry cleaning of turbine side		●											612-10.00
Wet cleaning of turbine side									●				612-15.00
Water washing of compressor side		●											612-05.00
Cleaning of air filter - Compressor side (see turbo-charger instruction book)													
Turbocharger complete - Dismantling, cleaning, inspection etc. (see turbocharger instruction book)													
Charging air cooler - Cleaning and inspection												■	612-01.00
Charging air cooler housing - Draining												●	
Exhaust pipe - Compensator												■	
Compressed Air System:													
Air starter motor - Dismantling and inspection												■	613-01.30
Function test - Main starting valve, starting valve, main valves and emergency start valve											■		613-01.40
Dirt separator - Dismantling and cleaning												●	
Muffler - Dismantling and cleaning												●	
Compressed air system - Draining												●	613-01.90
Compressed air system - Check of the system											■		613-01.90
Drain of bowl ..... (filter element to be replaced when pressure drop exceeds 0.7 bar)								●					613-01.21

L23/30H & L28/32H Operation of engine



L23/30H & L28/32H Operation of engine



Turbo-blower
Type Brown Boveri VTR 320
Specification Z4R429 DR 137 WE
No. B. 84595
Max. RPM: 18000
Max. gas temp. 650 °C

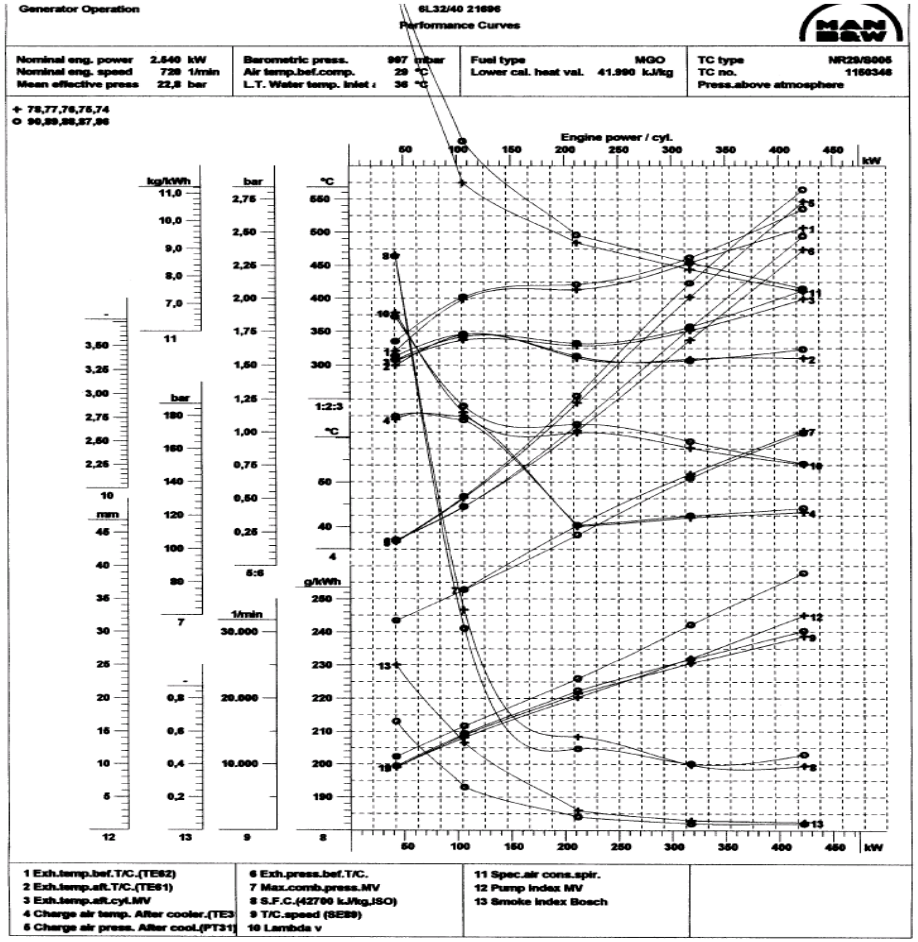
D. E. Cyl. coefficient 0,0236
Name of fuel oil Gasoil
Fuel spec. gravity 0,83 – 15 °C
Name of system oil
Waterbrake coefficient 1/10

RPM	Exhaust gas turbine: Temperature °C: Bef. turbine - Cyl. no. 1-8	4-5	3-6	2-7	Temperature °C: After turbine	Press. after turbine mmWC	Supercharge air: Temperature °C: Inlet blower	After blower	After cooler	Pressure: Before blower mm WC	After blower mm HG	After cooler mm HG	After cooler m WC
10650	330	330	340	345	265	178	23	56	32		265	258	3,51
10600	335	330	340	345	265	178	23	56	32		264	257	3,49
13300	420	400	415	430	320	295	24	76	40		448	431	5,86
13300	420	400	415	430	325	295	24	77	40		448	431	5,86
15400	500	470	470	510	375	470	25	99	48		644	630	8,56
15500	500	470	475	510	375	475	26	100	48		644	630	8,56
16300	550	500	510	550	400	578	26	111	52		762	742	10,10
6250	150	140	170	175	130	59	28	40	30		64	56	0,76

Exhaust temperature °C: Cylinder no. 1	2	3	4	5	6	7	8	Average	Fuel pump index: Cylinder no. 1	2	3	4	5	6	7	8	Average
285	280	285	285	285	285	280	285	284	23	24,5	25	24,5	24,5	24	24,5	25,5	24,4
285	280	285	285	285	285	280	286	284	23	24,5	25	24,5	24,5	24	24,5	25,5	24,4
330	325	330	320	325	330	325	330	327	31,5	33	33,5	32,5	33	32,5	33	34	32,9
330	325	330	320	325	330	325	330	327	31,5	33	33,5	32,5	33	32,5	33	34	32,9
385	390	385	375	385	385	380	380	383	40	41,5	42	41	41	41	41,5	42,5	41,3
385	390	385	375	385	385	380	380	384	40	41,5	42	41	41	41	41,5	42,5	41,3
430	430	415	410	410	420	415	410	417	44	45,5	46	45	45	45	45,5	46,5	45,3
160	145	180	130	130	120	150	125	142	10	11	12,5	11	11	11	11,5	12,5	11,3

Cooling water: Press. kg/cm²	After oil cooler °C	Inlet engine °C	Cylinder no. 1	2	3	4	5	6	7	8	Average	Aircooler °C: Inlet	Outlet	Fuel oil kg/cm²: Bef. filter	After filter
0,5	30	55	62	62	63	64	62	62	63	63	63,6		23		3,5
0,6	30	55	62	62	63	64	62	62	63	63	63,6		23		3,5
1,0	36	56	66	66	67	68	66	66	67	68	66,7		24		3,3
0,9	35	56	66	66	67	68	66	66	66	67	66,5		24		3,2
0,6	33	54	70	70	71	72	70	69	70	71	70,4		26		3,0
0,4	33	54	70	70	70	71	70	69	70	71	70,1		26		2,9
0,6	33	60	74	76	74	75	74	73	74	75	74,4		27		
	32	54	58	58	60	60	58	58	59	58	58,6		26		3,6

L23/30H & L28/32H Operation of engine



measurement-no: 97
Jørn Næss

Operating Results

2002-07-03, 15:10 Run. hours 7532:01 100 %

Engine Type	6L32/40	Barometric Press.	1.022 mbar
Engine No.	21696	Temp. Testroom	30 °C
Turbocharger Type	NR29/S005	Humidity	- %
Turbocharger No.	1150346	Lubeoil Spec.	BP Energol DS3/154
Generator Type	Nishishiba NTAKL-VE	Fuel Oil Spec.	MDO
Attached Pumps	2	Lower Heat Value	- kJ/kg

Power

Engine speed (SE90-1)	750,0	1/min	Engine Output	100 %
Engine power	1.500	kW	Mean effective press	12,4 bar
Generator power	1.500	kW	Efficiency compressor	- %
Engine power / cyl.	250	kW	Effic. turbocharger stat.	- %
			Effic. turbocharger tot.	- %

Governor

		1	2	3	4	5	6
Pump Index MV	39,8 mm	40,0	39,0	41,0	40,0	39,0	40,0
Actuator Index	80,0 %						

Fuel

Fuel oil temp. Inlet engine (TE40)	- °C	Fuel consumption	300,0 kg/h
Fuel oil press. Inlet engine (PT40)	- bar	Spec. fuel cons.(42700)	- g/kWh
		S.F.C.(42700 kJ/kg,ISO)	- g/kWh

Charging Air

Air temp.bef.comp.	30 °C	Air press. after comp.	1.500 mbar
Air temp.aft.comp.	175 °C	Charge air press. After cool.(PT31)	- bar
Charge air temp. After cooler.(TE31)	45 °C	Air amount spir.	4.210 kg/h
Diff. press. cooler	- mmH2O	Spec.air cons.spir.	2,81 kg/kWh

Firing Pressure

	1	2	3	4	5	6
Max.press.ind.cock MV	-	-	-	-	-	-

Exhaust Gas

		1	2	3	4	5	6
Exh.temp.aft.cyl.MV	402 °C	400	380	420	410	425	375
Exh.temp.bef.T/C.(TE62)	450 °C						
Exh.temp.aft.T/C.(TE61)	- °C						
Exh.press.bef.T/C.	1.200 mbar						
Exh.press.aft.T/C.	- mmH2O						
T/C.speed (SE89)	27.000 1/min						
Smoke Index Bosch	- -						

Diff.press. air-exh - mbar

Lubrication Oil

Lub.Oil temp. Inlet filter (TE21)	- °C	Lub.press.bef.T/C. (PT23)	- bar
Lub. oil press. Outlet filter (PT22)	- bar	Lub.temp.aft.T/C.	- °C
Dp lub. filter	- bar		

Cooling Water

L.T. Water press. Inlet air cool.(PT01	- bar	H.T.Water press. Inlet engine (PT10)	- bar
L.T. Water temp. Inlet air cool.(TE01)	36 °C	CW temp.bef.cooler (HT)	- °C
CW temp.aft. cooler (LT)	- °C	H.T. Water temp. Inlet engine	- °C
CW press.bef. nozz.	- bar	H.T. Water temp. Outlet engine (TE12	- °C
CW temp.bef.nozz.	- °C	Exh.temp.bef.T/C.(TE62)	450 °C
CW temp.aft. nozz.	- °C		

M.A.N. - B & W

Alternator Winding temp.

Alternator temperature alternator 1	- °C	Press. crankcas	11 mmH2O
Alternator temperature alternator 2	- °C		
Alternator temperature alternator 3	- °C		

All pressure values without ambient pressure !

Page 1

Disclaimer

All data provided in this document is non-binding.

This data serves informational purposes only and is especially not guaranteed in any way. Depending on the subsequent specific individual projects, the relevant data may be subject to changes and will be assessed and determined individually for each project. This will depend on the particular characteristics of each individual project, especially specific site and operational conditions.

Any questions are welcome?