

# Technical File



REVISION	DESCRIPTION		DATE	DRAWN	CHECKED APPD
SHIP YARD / OWNER		KAWASAKI / SOLVANG ASA	APPROVED	J. Y. Lee <i>[Signature]</i>	
HULL NO.		SNO-1543			
ENGINE	TYPE	5L28/32H	CHECKED	<i>[Signature]</i>	
	NO.	SB5L28-3135			
	RATING	1050kW @ 720rpm	DRAWN	J. Y. Jo	
SHIP FLAG		NORWAY	DATE	01. Sep. 2003	
FLAG		NT03079-GB416-1			

# D. Emission test sheet for parent engine

**stx**

Engine Type (Parent engine) 9L28/32H	Engine No. (Parent engine) SB9L28-2127	Power kW 2079	Speed rpm 720	No. of cyl. 9	Bore mm 280	Stroke mm 320	Comp Ratio 13.3
Fuel MDO	Hu kcal/kg 10136.0	Density kg/m <sup>3</sup> 871.3	Hydrogen % 12.19	Carbon % 87.41	Sulphur % 0.20	Nitrogen % 0.075	Oxygen % 0

**Remark : Worst condition test**

Mode	1	2	3	4	5
Load, %	100	75	50	25	10
Speed, %	100	100	100	100	100
Time at beginning of mode	9:30	10:00	10:30	11:00	11:56
Test date	2000-04-21	2000-04-21	2000-04-21	2000-04-21	2000-04-21

Engine Data					
Generating power, kW	2000	1497	991	481	172
Generating efficiency, %	96.2	96.0	95.3	92.4	82.6
Engine power, kW	2079	1559	1040	520	208
Engine speed, rpm	720	720	720	720	720
Mean effective pressure, bar	19.5	14.7	9.8	4.9	2.0
Fuel rack position, mm	36.9	30.4	23.9	16.4	12.4
Fuel flow, kg/h	399.9	302.4	209.1	114.9	90.9
Maximum combustion pressure, bar	147.2	121.2	94.3	65.6	49.4
Turbocharger speed, rpm	26100	24000	18600	12300	9000
Air temp. before compressor, °C	19.0	22.0	24.0	24.0	24.0
Air temp. before cooler, °C	166	130	88	48	36
Air temp. before cylinder, °C	44	42	40	40	40
Reference air temp. before cyl. T <sub>Scrf</sub> °C	44	42	40	40	40
Air press. before cylinder, bar	2.16	1.47	0.74	0.20	0.00
Cooling water temp. before air cooler, °C	36	36	37	36	36
Cooling water temp. after air cooler, °C	48	43	40	37	36
Cooling water temp. before engine, °C	67.0	67.0	67.0	68.0	69.0
Cooling water temp. after engine, °C	73.8	72.8	71.7	71.7	71.4
Cooling water press. before engine, bar	1.8	1.8	1.8	1.8	1.8
Fuel oil temperature before engine, °C	40	32	40	46	50
Lub. oil temperature before cooler, °C	65	66	65	62	61
Lub. oil temperature after cooler, °C	50	50	50	48	50
Lub. oil pressure before engine, bar	3.3	3.3	3.3	3.4	3.5
Exhaust gas temp. before turbine, °C	430	400	370	310	220
Exhaust gas temp. after turbine, °C	315	320	330	300	230
Exhaust gas back pressure, mmH <sub>2</sub> O	260	160	72	20	8



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## Ambient Data

Pressure, bar.abs	1.006	1.005	1.005	1.005	1.005
Temperature, °C	21.7	23.3	23.6	23.5	23.5
Relative humidity, RH %	47.8	42.4	43.4	42.9	42.7
Absolute humidity, g/kg	7.784	7.614	7.940	7.800	7.763

## Emission Data

Uncorrected spec.fuel consumption, g/kWh	192.4	194.0	201.1	221.0	437.0
Exhaust flow (GEXHW), kg/h	16173.3	12614.2	8528.0	5070.8	5942.9
Air flow (GAIRW), kg/h	15773.4	12311.8	8318.9	4955.9	5852.0
NOx concentration (dry), ppm	984	928	864	718	364
CO concntration (dry), ppm	93.0	101.7	112.5	143.4	144.0
CO <sub>2</sub> concentration (dry), %	5.46	5.26	5.29	4.94	3.29
O <sub>2</sub> concentration (dry), %	13.56	13.75	13.35	14.15	16.48
THC concentration (wet), ppmC1	107.5	129.0	148.0	159.5	163.0
Dry/wet correction factor, (KWEXH)	0.9451	0.9469	0.9462	0.9490	0.9616
NOx Humi.&Temp. correction factor	0.9577	0.9599	0.9642	0.9624	0.9620
NOx(15% O <sub>2</sub> ), ppm	792.3	766.9	676.4	628.3	484.5
NOx mass flow, g/h	22860	16884	10668	5277	3176
CO mass flow, g/h	1373	1173	877	667	795
CO <sub>2</sub> mass flow, g/h	1267755	954300	648382	361095	285601
O <sub>2</sub> mass flow, g/h	2290376	1814706	1190312	752411	1040700
THC mass flow, g/h	833	779	605	387	464
NOx specific, g/kWh	11.00	10.83	10.26	10.15	15.27
CO specific, g/kWh	0.66	0.75	0.84	1.28	3.82
CO <sub>2</sub> specific, g/kWh	609.79	612.12	623.44	694.41	1373.08
O <sub>2</sub> specific, g/kWh	1101.67	1164.02	1144.53	1446.94	5003.37
THC specific, g/kWh	0.401	0.500	0.581	0.745	2.231
IMO D2 Cycle NOx specific, g/kWh	10.7		IMO Limit =	12.1	g/kWh