


Important

This Technical Data Sheet and the corresponding Installation Instructions provide important information to ensure the installed engine will operate according to the design specification in the Volvo Penta application for certification.

Requirements marked with  are considered as critical for exhaust emissions compliance according to the design specification in the Volvo Penta application for certification.

Failing to follow and meet these instructions and requirements when installing a certified engine in a piece of nonroad equipment for use in the United States violates U.S. federal law (40 CFR 1068.105(b)), subject to fines or other penalties as described in the Clean Air Act.

General

In-line four stroke turbocharged diesel engine with direct injection.

Rotation direction, anti-clockwise viewed towards flywheel.

Number of cylinders			6
Displacement, total		litre	7.70
		in ³	469.9
Firing order			1-4-2-6-3-5
Bore		mm	110
		in	4.33
Stroke		mm	135
		in	5.31
Compression ratio			17.5:1
Wet weight w/o EATS	Engine only	kg	707
		lb	1559
	Engine incl. cooling system and air filtration system	kg	917
		lb	2022
Engine incl. cooling system, air filtration system, and frame	kg	N/A	
	lb	N/A	

Performance

			rpm	1500	1800
Standby Power	without fan	kW		299	307
		hp		407	418
	with fan	kW		287	287
		hp		390	390
Prime Power	without fan	kW		273	281
		hp		371	382
	with fan	kW		261	261
		hp		355	355
COP Power	without fan	kW		205	211
		hp		278	287
	with fan	kW		196	196
		hp		266	266
Torque at:	Standby Power	Nm		1903	1629
		lbft		1404	1201
	Maximum within fine speed range	Nm		2025	1714
		lbft		1493	1264
Total mass moment of inertia, J (mR ²)		kgm ²		0.420	
		lbft ²		10.0	

Derating due to altitude - see Technical Diagrams

Engine noise emission

Test Standards: ISO 3744-1981 (E) sound power with fan

Tolerance ± 0.75 dB(A)

		rpm	1500	1800
Measured sound power Lw	Standby Power	dB(A)	112.9	116.1
	Prime Power	dB(A)	112.1	116.1
	No load	dB(A)	111.9	116.1
Calculated sound pressure Lp at 1 m	Standby Power	dB(A)	100.9	104.1
	Prime Power	dB(A)	100.1	104.1
	No load	dB(A)	99.9	104.1

Test conditions for load acceptance data

Engine at working temperature, fuel that is used..... Nominal operating conditions

Generator	Brand	Model		Type of AVR
	Stamford	HCI 444 F1		SX440
AVR Settings	UFRO (Hz):	3	std	std
	Stability (%)*:	std	Voltage (V):	400
			Power factor:	1

Load acceptance performance can vary due to actual alternator inertia, voltage regulator, type of load and local ambient conditions.

Nomenclature

Abbreviation:	Full name:	Descriptions
AVR	Automatic Voltage Regulator	Generator performance and safety control unit
UFRO	Under Frequency Roll Off	Overheating protection at under frequency
-	Dip	Controls the slope of voltage drop when the UFRO is active
-	Dwell	Controls the slope of voltage recovery when the UFRO is active.

Load Acceptance at 1500 rpm

Genset Classification

This engine fulfills G1, G2 and G3 classes, according to ISO8528-5. For other class, please, see the table below.

Load (%)	Speed diff (%)	Speed Recovery time (s)	
0-46	7 (G3)	1.3	G3 boundary conditions
0-51	10 (G2)	2.8	G2 boundary conditions

Load (%)	Speed diff (%)	Speed Recovery time (s)	Voltage diff (%)	Voltage Recovery time (s)	Remaining load (%)	Speed diff (%)	Speed Recovery time (s)	Voltage diff (%)	Voltage Recovery time (s)
0-20	2.3	1.1	1.0	0.1	20-100	54.7	7.0	61.3	7.4
0-40	4.3	1.5	3.0	1.9	40-100	17.3	3.6	15.0	3.0
0-60	22.4	1.8	23.8	3.1	60-100	6.4	2.2	3.7	2.0
0-80	43.7	4.8	50.0	3.9	80-100	3.9	1.6	1.0	0.8
0-100	69.3	7.4	55.0	4.9					
0-110	74.5	13.7	73.4	13.1					
100-0	13.3	2.0	7.5	1.0					

Load Acceptance at 1800 rpm

Genset Classification

This engine fulfills G1, G2 and G3 classes, according to ISO8528-5. For other class, please, see the table below.

Load (%)	Speed diff (%)	Speed Recovery time (s)	
0-59	7 (G3)	1.5	G3 boundary conditions
0-67	10 (G2)	1.9	G2 boundary conditions

Load (%)	Speed diff (%)	Speed Recovery time (s)	Voltage diff (%)	Voltage Recovery time (s)	Remaining load (%)	Speed diff (%)	Speed Recovery time (s)	Voltage diff (%)	Voltage Recovery time (s)
0-20	1.5	0.6	0.0	0.1	20-100	15.4	3.0	13.9	2.8
0-40	2.7	0.7	0.1	0.8	40-100	8.7	2.0	6.8	1.8
0-60	7.5	1.2	5.6	1.0	60-100	5.0	2.7	3.2	1.4
0-80	15.9	2.0	17.8	3.2	80-100	1.1	0.5	0.2	0.1
0-100	27.9	3.2	36.8	3.7					
0-110	33.6	5.0	46.1	4.0					
100-0	5.6	1.0	6.3	1.0					

RPM**Cold start performance****Ambient Temp. [°C]****Manifold Heater****Block heater****1500****1800**

Time to Set Speed from start	Ambient Temp. [°C]	Manifold Heater	Block heater	1500	1800
	20	-	-	4.8	5.5
	5	-	-	4.3	5.5
	-15*	Yes	-	6.4	7.1
	-25*	Yes	-	8.6	-
	-30 **	Yes	Yes	5.3	7.9

Min start temp w/o Block Heater*	-25	°C
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* With manifold heater kW engaged, lubrication oil SAE 10W/30.

** With manifold heater kW engaged, lubrication oil SAE 10W/30 and block heater, Fuel MK-1.

Block heater type	Power kW	Engaged hours	Cooling water temp engine block
M9T701	1.5	16	28°C

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02**Lubrication system**

		rpm	1500	1800
Lubricating oil consumption	Standby Power	litre/h US gal/h	0.02 0.005	0.02 0.005
	Prime Power	litre/h US gal/h	0.02 0.005	0.02 0.005
Oil system capacity including filters		litre US gal	27 7.1	
Oil sump capacity:	max	litre US gal	25 6.6	
	min	litre US gal	16 4.2	
Oil change intervals/specifications:		h	1000	
Engine angularity limits:	front up	°	10	
	front down	°	10	
	side tilt	°	10	
Oil pressure at nominal set speed		kPa psi	330 - 430 48 - 62	
Lubrication oil temperature in oil sump:	max	°C	125	
		°F	257	
Oil filter micron size		μ	5.000	

* See also general section in the sales guide

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Fuel system		rpm	1500	1800
Standby Power Specific fuel consumption at:	25%	g/kWh lb/hph	220 0.357	231 0.374
	50%	g/kWh lb/hph	207 0.336	212 0.344
	75%	g/kWh lb/hph	199 0.323	203 0.329
	100%	g/kWh lb/hph	196 0.318	201 0.326
Prime Power Specific fuel consumption at:	25%	g/kWh lb/hph	221 0.358	232 0.376
	50%	g/kWh lb/hph	209 0.339	216 0.350
	75%	g/kWh lb/hph	201 0.326	204 0.331
	100%	g/kWh lb/hph	198 0.321	204 0.331
CO2 emission declaration		rpm	1500	1800
Carbon dioxide (CO ₂) emissions determined during the EU type approval process, NRSC-D2.		g/kWh	697	685

Fuel system		rpm	1500	1800
Fuel to conform to	ASTM-D975-No1-D and 2-D EN 590 / JIS KK2204 / HVO100% B30(Sulphur levels up to 3000ppm)			
System supply flow at:	litre/h US gal/h	134 35.5	139 36.7	
Fuel supply line max restriction (Measured at fuel inlet connection)	kPa psi	-55.0 -8.0	-55.0 -8.0	
Fuel supply line max pressure, engine stopped & running	kPa psi	20.0 2.9	20.0 2.9	
System return flow at:	litre/h US gal/h	64.0 16.9	65.0 17.2	
Fuel return line max restriction (Measured at fuel return connection)	kPa psi	15.0 2.2	15.0 2.2	
Maximum allowable inlet fuel temp (Measured at fuel inlet connection)	°C °F	80 176	80 176	
Prefilter / Water separator micron size	μ	30		
Fuel filter micron size	μ	5		
Governor type/make, standard	Volvo / EMS 2.4			
Injection pump type/make	Denso HP4			

Intake and exhaust system

		rpm	1500	1800
Air consumption at: (+25°C and 100kPa)	Standby Power	m ³ /min	18.2	21.5
		cfm	642	760
	Prime Power	m ³ /min	18.0	21.7
		cfm	636	767



**See front page for important information**

Max air intake restriction including piping with maintained performance		kPa	3	3.8
		psi	0.4	0.6
Max <u>allowable</u> air intake restriction including piping		kPa	5	5
		psi	0.7	0.7
Air filter restriction clean Volvo Penta filter		kPa	3.0	3.0
		psi	0.4	0.4
Heat rejection to exhaust at:	Standby Power	kW	197	211
		BTU/min	11203	11999
	Prime Power	kW	188	200
		BTU/min	10691	11374
Exhaust gas temperature after turbine at:	Standby Power	°C	495	457
		°F	923	855
	Prime Power	°C	481	440
		°F	898	824

**See front page for important information**

Max allowable back pressure in exhaust after turbine		kPa	10	10
		psi	1.5	1.5
Heat rejection to exhaust:		kW	197	211
		BTU/min	11203	11999
Exhaust gas temperature after turbine at maximum power:		°C	495	457
		°F	923	855
Exhaust gas flow at max power: (temp and pressure after turbine)		m ³ /min	47	51
		cfm	1660	1801

Charge air cooler system

	rpm	1500	1800
Heat rejection to charge air cooler at standby power	kW BTU/min	67 3810	80 4550
Charge air mass flow at standby power	kg/s	0.377	0.455
Charge air inlet temp at standby power (Charge air temp after turbo compressor)	°C	217	215
	°F	423	419
 See front page for important information Max allowable Charge air outlet temp at standby power (Charge air temp after intercooler)	°C	45	45
	°F	113	113
 Maximum pressure drop over charge air cooler incl. Piping	kPa	8.4	12.3
	psi	1.22	1.78
Maximum charge air pressure (After charge air cooler)	kPa	285	280
	psi	41.34	40.61
Standard charge air cooler core area	m ²	0.217	
	foot ²	2.34	

Cooling system

Coolant type and mixture		VCS 40/60	
Coolant capacity,	engine only	litre	17
		US gal	4.49
	charge air coolers	litre	N/A
		US gal	
	coolant radiators incl piping	litre	19
		US gal	5.02
	expansion tank	litre	5
		US gal	1.32
		rpm	1500
			1800
Heat rejection radiation from engine at Standby power:		kW	8
		BTU/min	455
Heat rejection to coolant at standby power		kW	120
		BTU/min	6824
Standard radiator core area		m ²	0.485
		foot ²	5.22
Min coolant flow engine coolant circuit (at fully open thermostat)		litre/s	3.55
		US gal/s	0.94
Maximum coolant temperature entering engine (25°C amb. Temp.)		°C	96.5
		F	206
Maximum external engine coolant circuit restriction, including piping (25°C amb. Temp.)		kPa	45
		psi	6.5
Nominal coolant pressure		kPa	100
		psi	14.5
Nominal coolant flow with standard system		litre/s	3.8
		US gal/s	1.00
Fan diameter		mm	650
		in	25.59
Fan power consumption		kW	12
Standard Fan		hp	16
Fan drive ratio			1.4:1
Coolant pump		drive/ratio	1.4:1
Thermostat	start to open	°C	85
		°F	185
	fully open	°C	100
		°F	212
Maximum static pressure head (expansion tank height + pressure cap setting)		kPa	110
		psi	16.0
Minimum static pressure head (expansion tank height + pressure cap setting)		kPa	60
		psi	8.7
Standard pressure cap setting		kPa	100
		psi	14.5
Maximum top tank temperature		°C	107
		°F	225
Charge air pressure (after charge air coolers)		kPa	285
		psi	41.3
			280
			40.6

Cooling performance

Standard fan: 650mm Fan ratio: 1:1.4 Fan type: Fixed

Cooling air flow and external restriction at different radiator air temperatures based on 107°C TTT and 40% glycol. Valid at 1 atm. (radiator and cooling fan, see optional equipment)

Engine speed rpm	External restriction Pa	Air flow m ³ /s	STANDBY POWER	PRIME POWER
			Air on temp °C	Air on temp °C
1500	0	5.3	62	64.4
	100	5.1	61	63.4
	200	4.9	59.9	62.4
	300	4.7	58.7	61.3
1800	0	6.4	65.5	67.9
	100	6.2	64.9	67.3
	200	6.0	64.2	66.6
	300	5.9	63.5	65.9

Note! External restrictions are calculated for values >0 Pa

Optional fan: 650mm Fan ratio: 1:1.4 Fan type: Visco

Cooling air flow and external restriction at different radiator air temperatures based on 107°C TTT and 40% glycol. Valid at 1 atm. (radiator and cooling fan, see optional equipment)

Engine speed rpm	External restriction Pa	Air flow m ³ /s	STANDBY POWER	PRIME POWER
			Air on temp °C	Air on temp °C
1500	0	4.9	59.5	62
	100	4.7	58.5	61
	200	4.6	57.6	60.2
	300	4.5	56.7	59.3
1800	0	5.8	63.1	65.6
	100	5.6	62.3	64.9
	200	5.5	61.8	64.4
	300	5.4	61.1	63.8

Note! External restrictions are calculated for values >0 Pa

Engine management system

Functionality	Alternatives	Default setting
Governor mode	Isochronus / Droop	Isochronus
Governor droop	0-8%	0.0
Governor response	Adjustable PID-constant (VODIA)	Standard
Dual speed	YES	1500 / 1800
Idle speed	600-1200	900,0
Fine speed adjustment	± 90	0
Stop function	Energized to Run / Stop	Energized to Run / Stop
Preheating function	On / Off	On

Engine protection map

Parameter	Unit	Warning Level (Yellow)	Engine protection			
			Alarm level (Red)	Default	Optional	
Oil temp	°C	125	130	Shut Down		
Oil pressure	Low idle	kPa	151	101	Shut Down	
	1500 rpm	kPa	233	183	Shut Down	
	1800 rpm	kPa	263	213	Shut Down	
Oil level		N/A	N/A	N/A		
DEF Dosing injector failure		N/A	N/A	N/A		
Piston cooling pressure >1000 rpm	kPa	N/A	N/A	N/A		
Coolant temp	°C	105	107.0	Shut Down		
Coolant level		N/A	Low	Shut Down (10 s delay)		
Fuel feed pressure	Low idle	kPa	N/A	N/A	N/A	N/A
	>1400 rpm		N/A	N/A	N/A	N/A
Water in fuel		On	N/A	N/A		
Crank case pressure	kPa	N/A	N/A	N/A		
Air filter pressure droop	kPa	5.0	N/A	Warning		
Altitude, above sea	m					
Charge air temp	°C	80	85.0	Shut Down		
Charge air pressure	kPa	95-330	200-435	Shut Down		
Engine speed	rpm					
Exhaust Temperature (Before SCR volume)	°C	N/A	N/A	N/A		
		N/A	N/A	N/A		

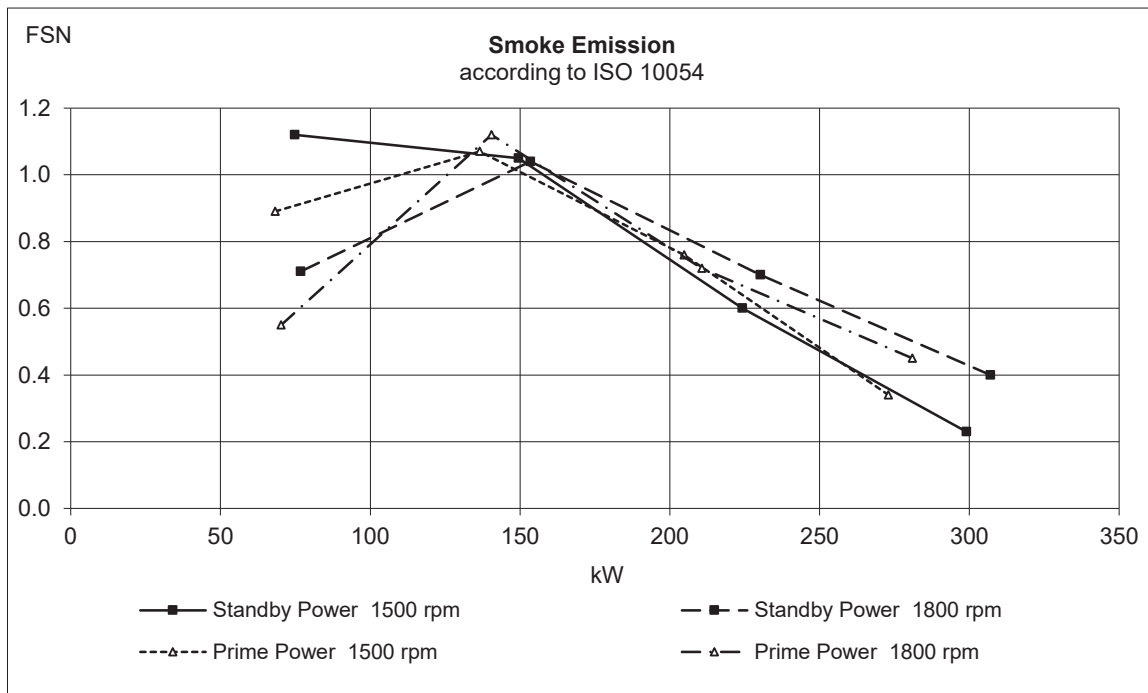
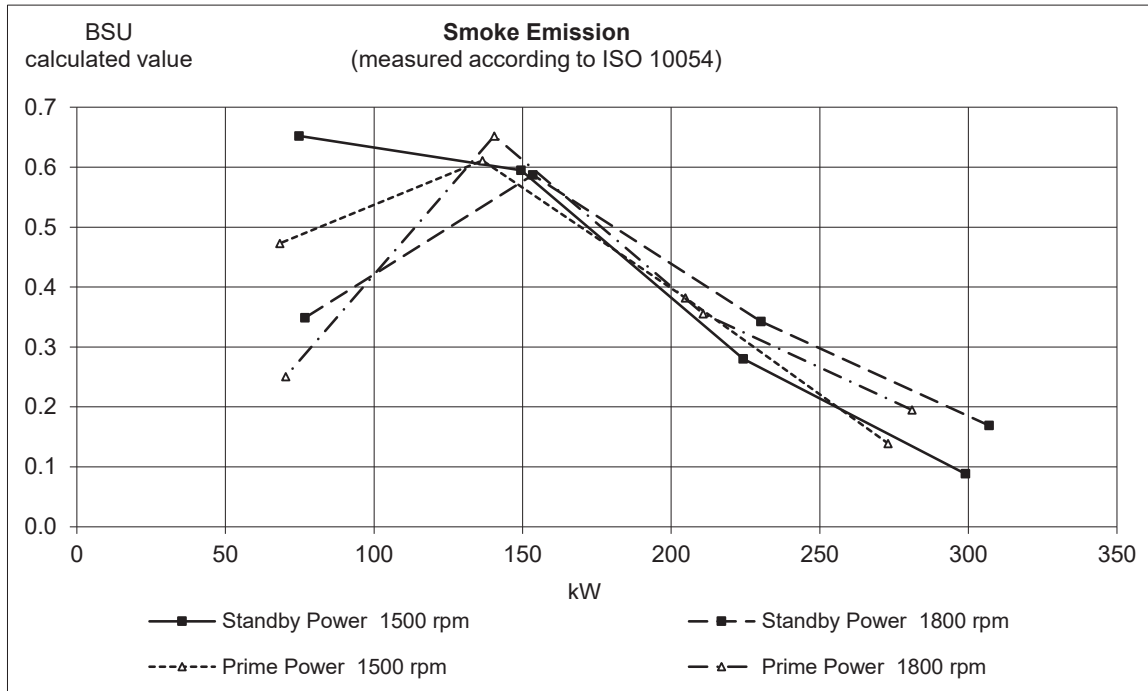
Electrical system

Voltage and type		24V Dc	
Alternator:	make/output	A	110 A
	tacho output	Hz/alt. Rev	
	drive ratio		1:4
Starter motor	make		
	type		
	kW		5.6
Number of teeth on:	flywheel		137
	starter motor		10
Max wiring resistance main circuit		mΩ	5
Cranking current at +20°C		A	507
Crank engine speed at 20°C		rpm	230
Starter motor battery capacity:	min	Ah	100 / 680
	CCA at -18°C	Ah/A	140 / 800
Inlet manifold heater (at 24 V)		kW	
Power relay for the manifold heater		A	200

Performance	Power (kW)	Rpm
Standby Power	299	1500
Standby Power	307	1800
Prime Power	273	1500
Prime Power	281	1800

Sensors Alarm	Signal	Range	Alarm switch	Alarm Level	Shut down level	Condition/Delay	Derating
Boost pressure	0.5-4.5 V	50-400 kPa	N/A	320 kPa	330 kPa	N/A	N/A
Boost temperature	50-0 kΩ	-40° - 130°C		80°C	85°C	N/A	N/A
Coolant level switch	Digital	-	Alarm when closed	N/A	Low	10s	N/A
Coolant temperature	45-0 kΩ	-40°-140°C	N/A	105	107	N/A	N/A
Crankcase pressure	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Engine Speed Cam	Frequency	-	N/A	Lost sign	N/A	N/A	N/A
Engine Speed Crank	Frequency	-	N/A	Lost sign	N/A	N/A	N/A
Exhaust gas temp	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Oil level sensor	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Oil temperature	45-0 kΩ	-40° - 140°C	N/A	125°C	130°C	N/A	N/A
Piston cooling switch	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Water In fuel switch	Digital		Alarm when closed	Water in Fuel	N/A	N/A	N/A

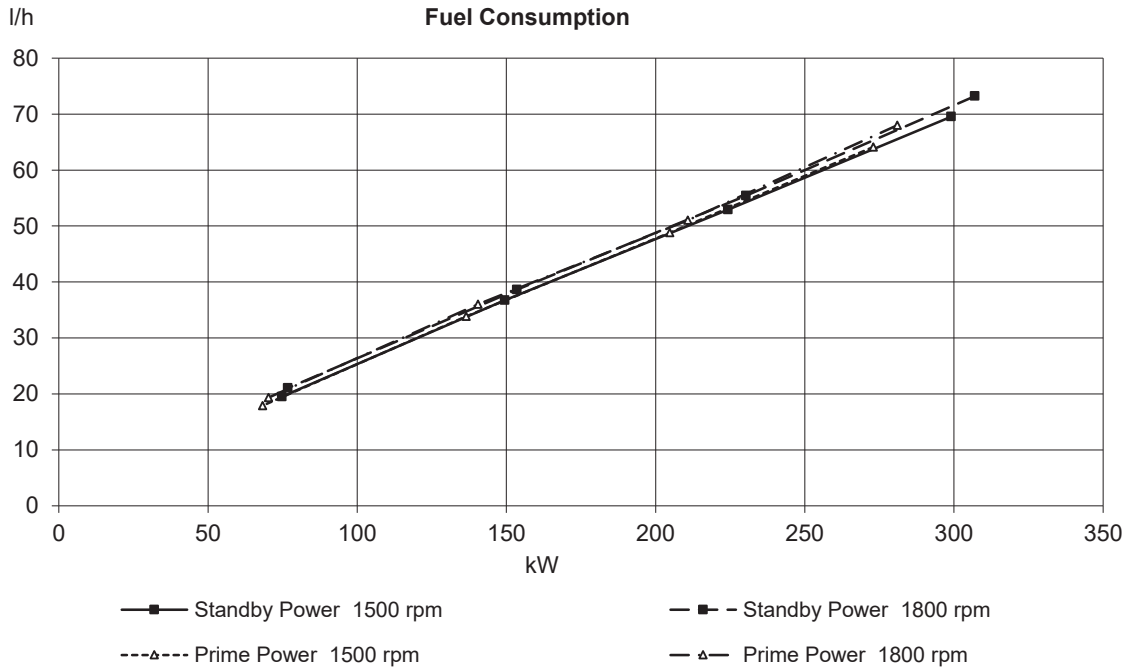
Sensors Alarm	Signal	Range	rpm Map			Condition	Derating
			900	1500	1800		
Oil pressure	0.5-4.5 V	0-700 kPa					
Warning Level			151	233	263		
Alarm Level			101	183	183		



BSU

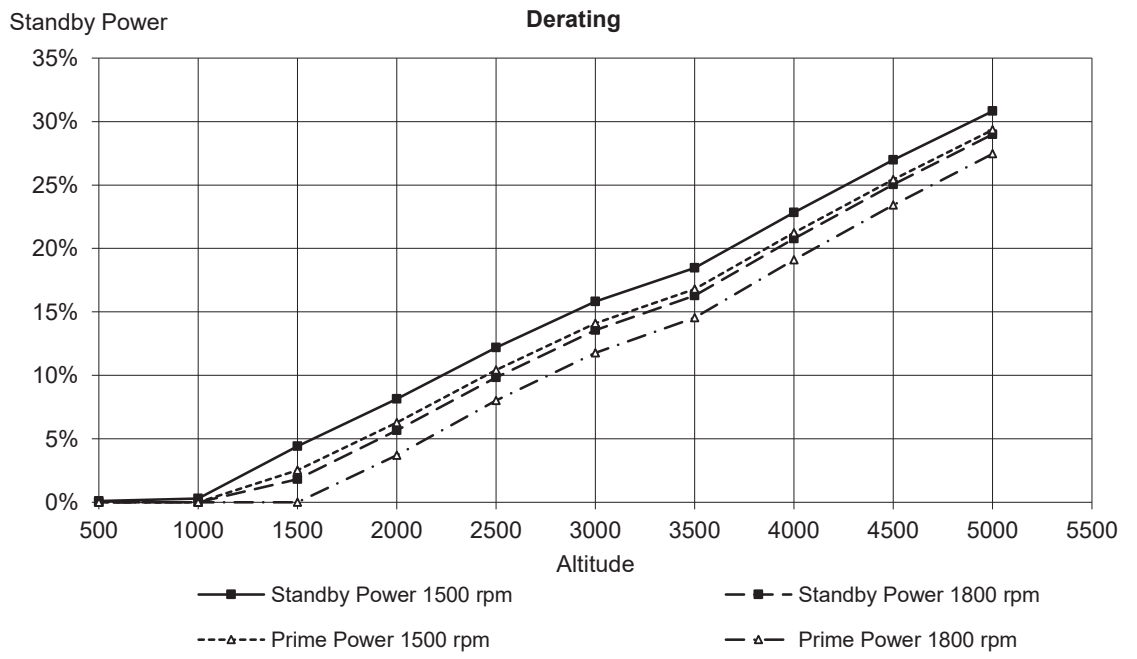
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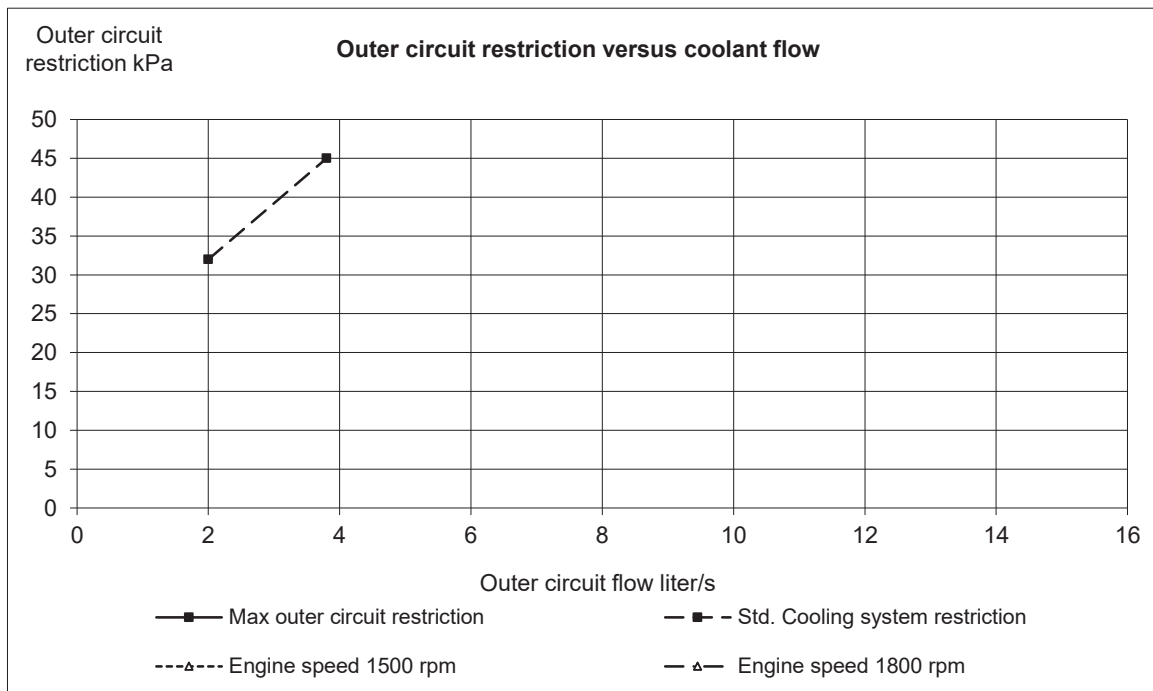
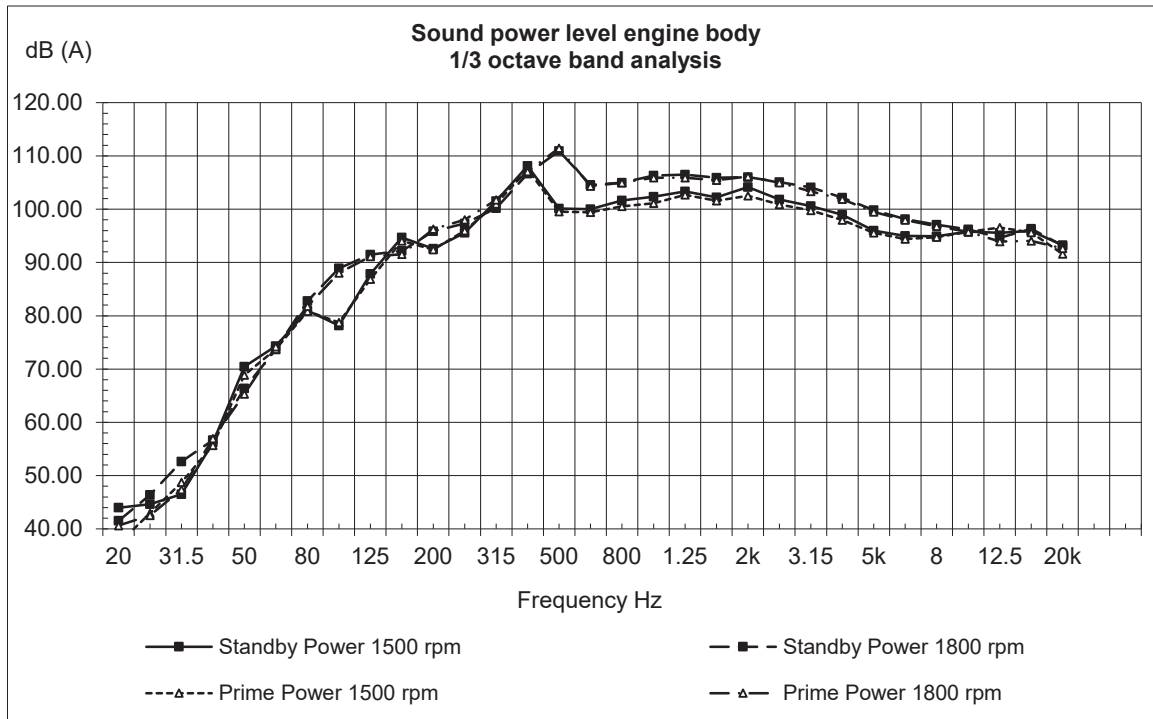
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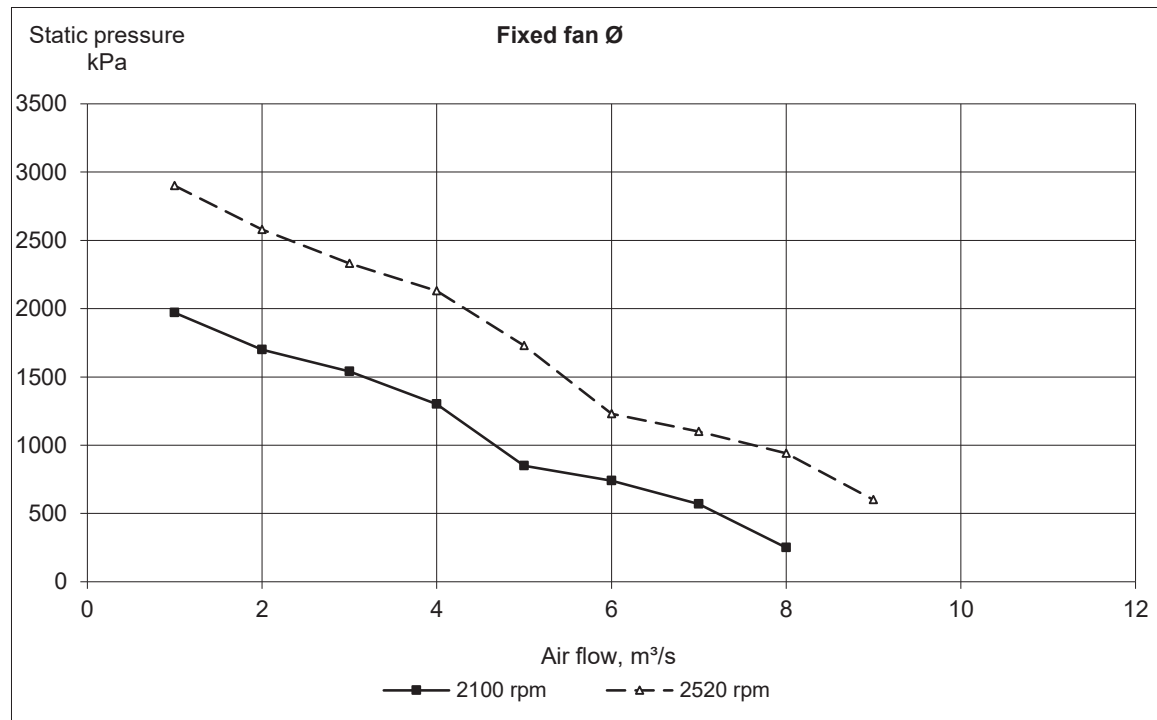
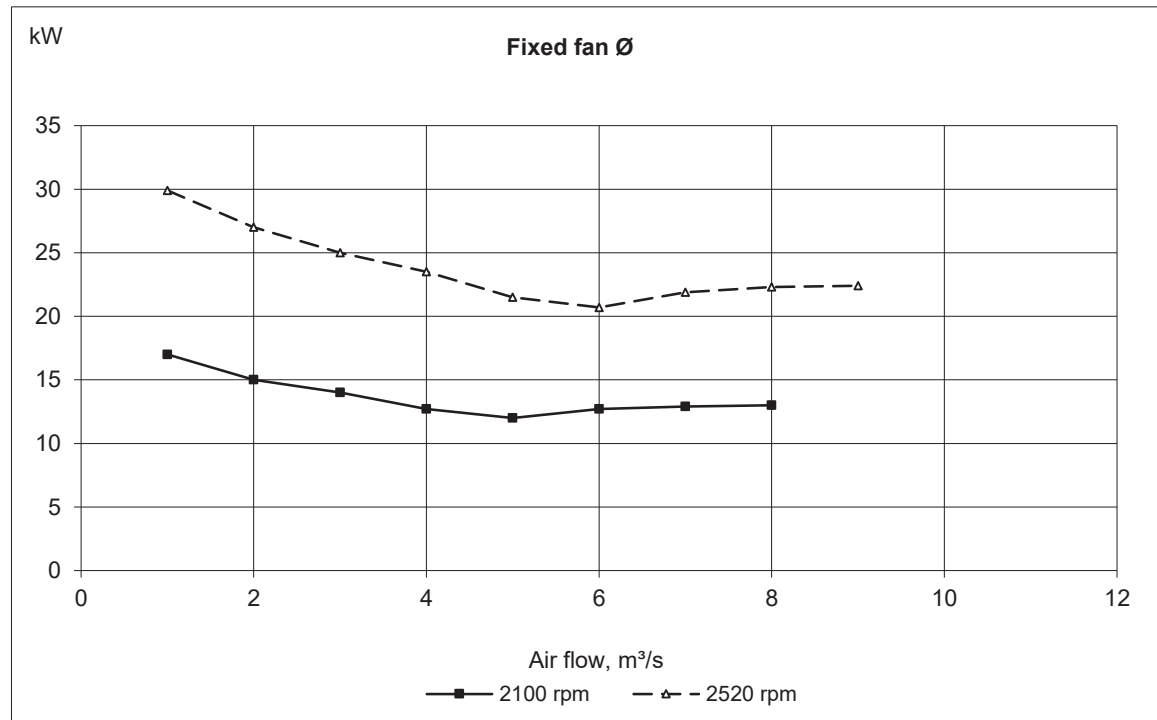


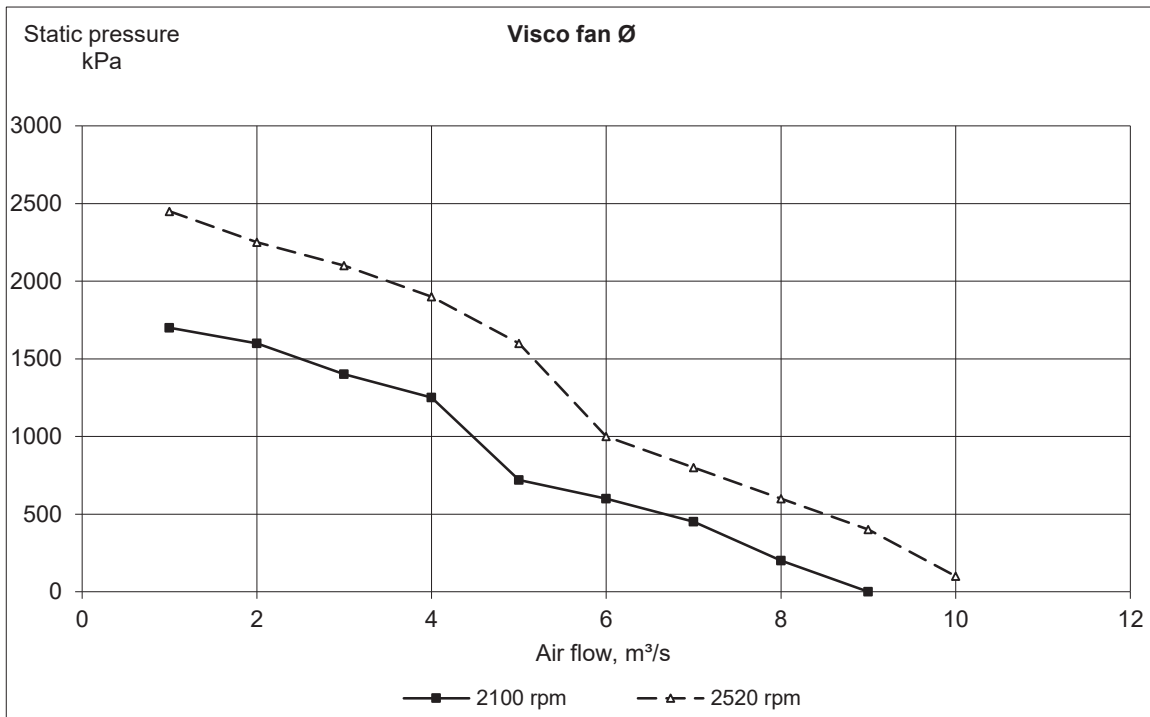
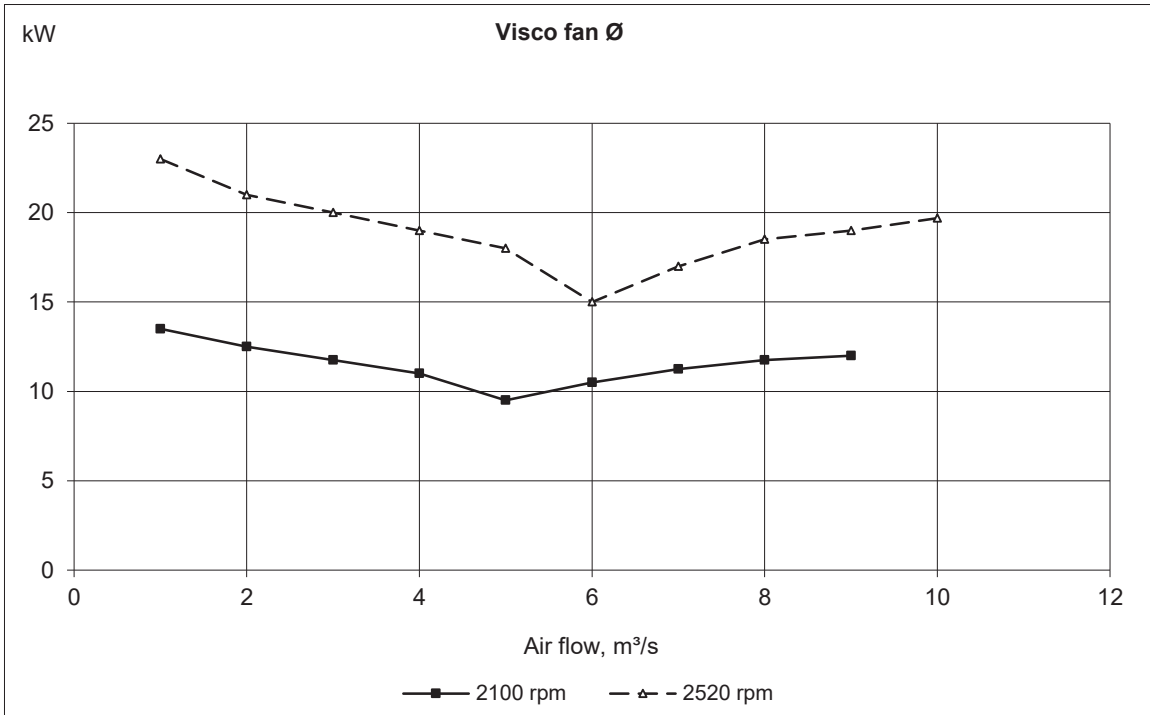
Standby Power

Derating









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Date	Sign	Information
D2 (1500 rpm)	LY17_2 020-10-20_02.x ml	Stage II, Prime
D2 (1800 rpm)	LY17_2 020-10-19_03.x ml	Stage II, Prime
D2 (1500 rpm)	LY17_2 020-11-24_06.x ml	Stand By 110%
D2 (1800 rpm)	LY17_2 020-11-24_07.x ml	Stand By 110%
		Sound test report212744
#####		High Alt derate added
		Sound A-weighted 20220216

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