VOLVO PENTA **TAD1342VE**	Document No **22186974**	Issue Index **05**

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 penalities as described in the Clean Air Act.

General

In-line four stroke diesel engine with direct injection. Rotation direction, anti-clockwise viewed towards flywheel

Number of cylinders			6
Displacement, total		liters in^3	12,78 780
Firing order			1-5-3-6-2-4
Bore		mm in	131 5,16
Stroke		mm in	158 6,22
Compression ratio			18.1:1
Wet weight (Not including after treatment system)	Engine only	kg lb	1325 2921
	Power pac	kg lb	1790 3946

Performance		**rpm**	**1500**	**1800**	**2000**	**2100**
310 kW	without fan	kW hp	310 422	310 422	310 422	310 422
	with fan 890 mm	kW hp	304 413	300 408	296 403	294 400
Torque at:	ICFN Power 310 kW	Nm lbf ft	1974 1455	1645 1213	1480 1092	1410 1040
Max torque at engine speed	1260 rpm	Nm lbf ft	2000 1475			
Power tolerance		%	±2%			
Mean piston speed		m/s ft/sec	7,9 25,9	9,5 31,1	10,5 34,6	11,1 36,3
Effective mean pressure at:	ICFN Power 310 kW	MPa psi	1,94 281	1,62 235	1,46 211	1,39 201
Max combustion pressure at:	ICFN Power 310 kW	MPa psi	13,7 1987	16 2320	14,7 2132	14 2030
Total mass moment of inertia, J (mR^2) (not including flywheel)		kgm^2 $lbft^2$	3,43 81,4			
Friction Power		kW hp	30 41	43 58	54 73	60 82
Derating see Technical Diagrams						

Cold start performance

*Cold start limit temperature	without starting aid	°C / sec °F / sec	20 68	3
	with manifold heater 4 kW	°C / sec °F / sec	-5 23	4
	with manifold heater 4 kW and block heater	°C / sec °F / sec	-15 5	4.5
*Specify oil and fuel quality	Mk1 fuel, VDS2 oil, 15w40 above -15°C, 10w30 below -15°C			

Block heater type	Make	Power kW	Engaged hours	Cooling water temp engine block
	Volvo	2	12	10°C

* See also general section in the sales guide

Lubrication system

Lubricating oil consumption at max rpm at:	ICFN Power 310 kW		liter/h US gal/h	0,02 0,005
			liter/h US gal/h	0,02 0,005
Oil system capacity including filters			liter US gal	Std sump 36 / Aluminium sump 52 Std sump 9,51 / Aluminium sump 13,74
Plastic Oil sump capacity (Std):		Max	liter US gal	30 7,93
		Min	liter US gal	19 5,02
Aluminium Oil sump capacity:		Max	liter US gal	46 12,15
		Min	liter US gal	36 9,51
Oil change intervals/specifications	VDS 3		h	600
	VDS 2		h	400
Engine angularity limits:		front up	°	Std sump: 11 / Aluminium sump: 35
		front down	°	Std sump: 11 / Aluminium sump: 35
		side tilt	°	Std sump: 11 / Aluminium sump: 35
Oil pressure at rated speed			kPa psi	300 - 650 44 - 94
Oil pressure shut down switch setting			kPa psi	130 19

Lubrication system

Lubrication oil temperature in sump:	max	°C °F	130 266
Oil filter micron size		µ	40

Fuel system		rpm	1500	1800	2000	2100
ICFN Power 310 kW	25%	g/kWh	221	246	270,7	286,3
Specific fuel consumption at:		lb/hph	0,358	0,399	0,439	0,464
	50%	g/kWh	198	212	226,9	234,8
		lb/hph	0,321	0,344	0,368	0,381
	75%	g/kWh	188	198	211,2	219,2
		lb/hph	0,305	0,320	0,342	0,355
	100%	g/kWh	188	197	208,3	216,9
		lb/hph	0,305	0,319	0,338	0,352
Fuel to conform to			ASTM-D975-No1 and 2D JIS KK 2204, EN 590			

Fuel system

System supply flow at max. speed	liter/h	100
	US gal/h	26,4
Fuel supply line max. restriction	kPa	10
(Measured at fuel inlet connection)	psi	1,5
Fuel supply line max. pressure, during engine stand still	kPa	0
(meassured at fuel inlet connection)	psi	
System return flow at max. speed	liter/h	18,0
	US gal/h	4,8
Fuel return line max. restriction	kPa	20
(Measured at fuel return connection)	psi	2,9
Max. allowable inlet fuel temp	°C	60
(Measured at fuel inlet connection)	°F	140
Fuel filter micron size	µ	5
Governor type/make, standard		Volvo / EMS 2,2
Injection pump type/make		Delphi E3

Intake and exhaust system		Inlet air temp	rpm	1500	1800	2000	2100
Air consumption at:	ICFN Power 310 kW	25°C	m³/min	24	27	28	28
(+25°C and 100kPa)		77°F	cfm	836	939	974	979
⚠ **See front page for important information**							
Max allowable air intake restriction including piping			kPa	3			
			psi	0,4			
Heat rejection to exhaust at:	ICFN Power 310 kW		kW	203	218	236	246
			BTU/min	11544	12397	13421	13990
Exhaust gas temperature after turbine at:	ICFN Power 310 kW		°C	409	388	417	450
			°F	768	730	783	842
⚠ **See front page for important information**							
Max allowable back pressure in exhaust line (after turbine)			kPa	11	14	15	15
Pipe dimension Ø:	mm		psi	1,6	2,0	2,2	2,2
Exhaust gas flow at: (temp and pressure after turbine at the corresponding power setting)	ICFN Power 310 kW		m³/min	52	55	59	62
			cfm	1848	1959	2098	2205
Exhaust gas smoke	ICFN Power 310 kW		*Bosch Units	0,08	0,09	0,25	0,49

Cooling system			rpm	1500	1800	2000	2100
Heat rejection radiation from engine at:		ICFN Power 310 kW	kW BTU/min	16 910	16 910	15,5 881	15,5 881
Heat rejection to coolant at:		ICFN Power 310 kW	kW BTU/min	114 6483	127 7222	139 7905	143 8132
Radiator cooling system type				Closed circuit			
Standard radiator core area			m² foot²	0,8 8,61			
Fan diameter	890 mm		mm in	890 35,04			
Fan power consumption	890 mm		kW hp	6,0 8	10,0 14	14,0 19	16,0 22
Fan drive ratio	fan Ø890			0,84 : 1			
Coolant capacity:	engine		liter US gal	20 5,3			
	std. 0,8m² radiator with hoses		liter US gal	24 6,3			
Coolant pump			drive/ratio	belt/1,50:1			
Coolant flow with standard system			l/s US gal/s				
Minimum coolant flow			l/s US gal/s	4,7 1,2	5,7 1,5	6,0 1,6	6,2 1,6
Maximum outer circuit restriction incl. piping			kPa psi	65,0 9,4			
Thermostat:		start to open	°C °F	82 180			
		fully open	°C °F	92 198			
Maximum static pressure head (expansion tank height + pressure cap setting)			kPa psi	100 14,5			
Minimum static pressure head (expansion tank height + pressure cap setting)			kPa psi	70 10,2			
Standard pressure cap setting			kPa psi	70 10,2			
Maximum top tank temperature			°C °F	107 225			

Charge air cooler system		rpm	1500	1800	2000	2100
Heat rejection to charge air cooler	ICFN Power 310 kW	kW	63	72	74	73
		BTU/min	3583	4095	4208	4151
Charge air mass flow	ICFN Power 310 kW	kg/s	0,47	0,53	0,54	0,55
Charge air inlet temp.	ICFN Power 310 kW	°C	175	179	179	176
(Charge air temp after turbo compressor)		°F	347	354	354	349
⚠ **See front page for important information** Max allowable Charge air outlet temp.		°C	41	43	45	44
(Charge air temp after charge air cooler)		°F	106	109	113	111
⚠ **See front page for important information** Maximum pressure drop over charge air cooler incl. piping		kPa	8			
		psi	1,16			
Charge air pressure		kPa	181			
(After charge air cooler)		psi	26,25			
Standard charge air cooler core area		m²	0,8			
		foot²	8,61			

Cooling performance: 0,8 m² radiator and 890 mm fan

Cooling air flow and maximum additional external restriction at different radiator air temperatures based on 103°C TTT and 40% coolant. Valid at 1 atm.

Engine speed	Engine power	Air on temp		Air flow		External restriction	
rpm	kW hp	°C	°F	m^3/s	ft^3/s	Pa	psi
2100	310	58	136,00				
(0,84)	422	60	140	6,5	229,5	518	0,075
		63	145	7,4	261,3	225	0,033
		65	149	7,9	279,0	0	
1800	310	58	136	5,6	197,8	322	0,047
(0,84)	422	60	140	6	211,9	210	0,030
		63	145	6,7	236,6	0	
		65	149				

Cooling performance: 0,73 m² radiator and 750 fan fan drive ratio 0.84:1
Radiator module 136232626 and kit 22113650 pusher
Cooling air flow and maximum additional external restriction at different radiator air temperatures based on 107°C TTT and 40% coolant. Valid at 1 atm.

Engine speed	Engine power	Air on temp		Air flow		External restriction	
rpm	kW hp	°C	°F	m^3/s	ft^3/s	Pa	psi
2100	310	75	167	7,6	268,4	0	
(0,84)	422	73	163	7,0	247,2	100	0,015
		71	160	6,4	226,0	200	0,029
		69	156	6,0	211,9	300	0,044
		67	153	5,6	197,8	400	0,058
1800	310	76	169	6,3	222,5	0	
(0,84)	422	74	165	5,9	208,4	100	0,015
		70	158	5,2	183,6	200	0,029
		67	153	4,7	166,0	300	0,044
		63	145	4,2	148,3	400	0,058

Cooling performance: 0,73 m² radiator and 750 fan fan drive ratio 0.84:1
Radiator module 136232627 and kit 22113651 suction
Cooling air flow and maximum additional external restriction at different radiator air temperatures based on 107°C TTT and 40% coolant. Valid at 1 atm.

Engine speed	Engine power	Air on temp		Air flow		External restriction	
rpm	kW hp	°C	°F	m^3/s	ft^3/s	Pa	psi
2100	310	72	162	6,9	243,7	0	
(0,84)	422	70	158	6,4	226,0	100	0,015
		68	154	6,1	215,4	200	0,029
		66	151	5,7	201,3	300	0,044
		64	147	5,3	187,2	400	0,058
1800	310	70	158	6,0	211,9	0	
(0,84)	422	67	153	5,4	190,7	100	0,015
		65	149	4,9	173,0	200	0,029
		61	142	4,5	158,9	300	0,044
		57	135	4,0	141,3	400	0,058

Engine management system

Functionality	Alternatives	Default setting
Governor mode	Isochronus / Droop	
Governor droop	0-8%	
Governor response	Adjustable PID-constants (VODIA)	Standard
Idle speed	550-900	
Stop function	Energized to Run / Stop	
Preheating function	On / Off	
Lamp test	On / Off	

Engine sensors and switch settings			Alarm level		Engine protection	
Parameter		Unit	Setting range	Default setting	Level	Action. Default/Alternative
Oil temp		°C	120 - 130	125	Setting +5	Derate. ON/OFF*
Oil pressure	Low idle	kPa		140,0	165	Derate. ON/OFF*
	Rated speed	kPa		300	325	Derate. ON/OFF*
Oil level					Low level	Alarm.
Piston cooling pressure >1000 rpm		kPa		150	150	Alarm. ON/OFF*
Coolant temp		°C	95 - 103	102	Setting +5	Derate. ON/OFF*
Coolant level			See cooling system	On	Low level	Alarm.
Fuel feed pressure	Low idle	kPa		0		Alarm.
	Rated speed			200		Alarm.
Water in fuel				High level		Alarm.
Crank case pressure		kPa			Rapid pres inc	Derate. ON/OFF*
Air filter pressure drop				5		Alarm.
Altitude, above sea		m				Automatic derating, see section derating
Charge air temp		°C		82	87	Derate. ON/OFF*
Charge air pressure		kPa		310**	320**	Derate. ON/OFF*
Engine speed		rpm	100 - 120% of rated speed	120% of rated speed	Alarm level	

* Off means no shut down, alarm only

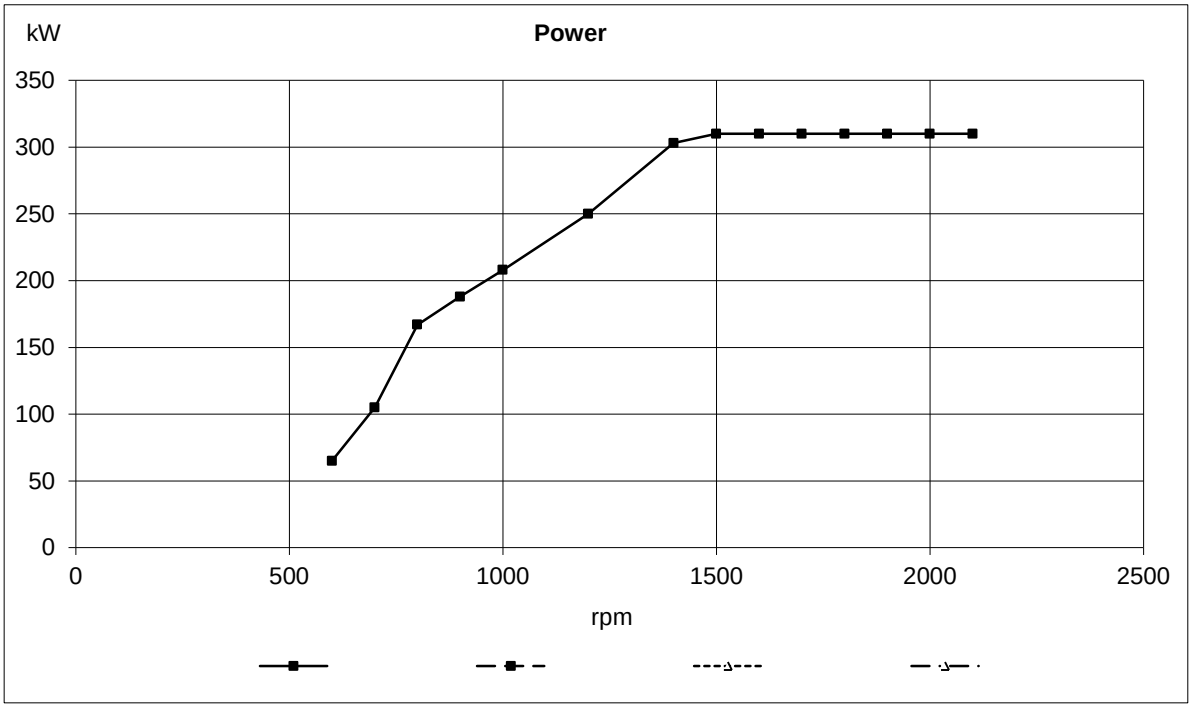
**Pabs, 2100 rpm at sea level.

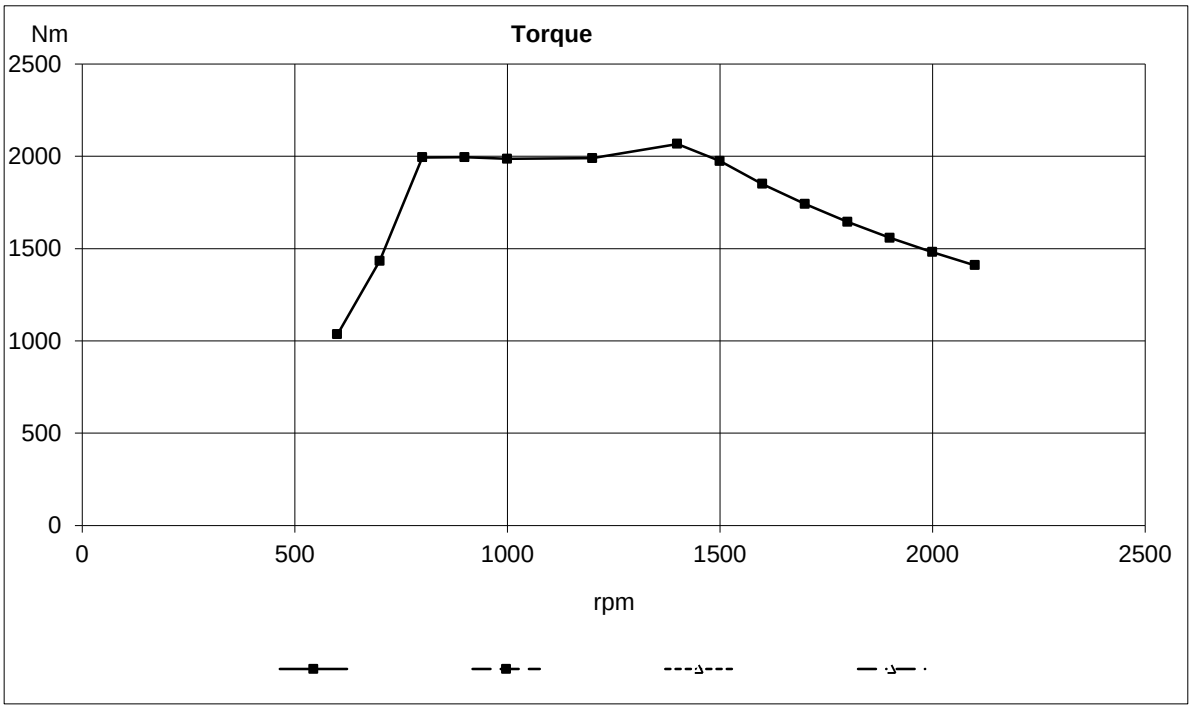
Electrical system

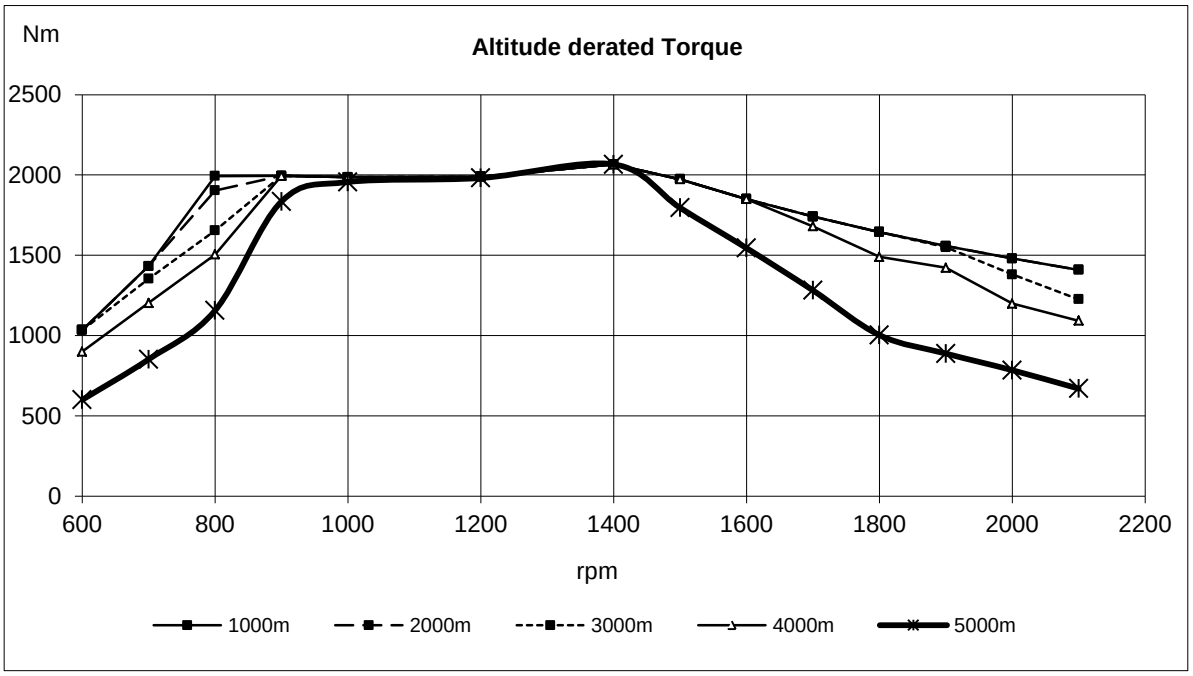
Voltage and type				24V / insulated from earth
Alternator:	make			Bosch
	output	A		80
	tacho output	Hz/alternator rev.		6
	drive ratio			5.3:1
Starter motor:		make		Melco
		type		105P70
		output	kW	7
			hp	9,5
Number of teeth on:		flywheel		10
		starter motor		12
Max wiring resistance main circuit			mΩ	2
Cranking current at +20°C			A	180
Crank engine speed at 20°C			rpm	155
Starter motor battery capacity		max	Ah/A	2x225
		min at +5°C	Ah/A	-
Inlet manifold heater (at 20 V)			kW	4
Power relay for the manifold heater			A	1

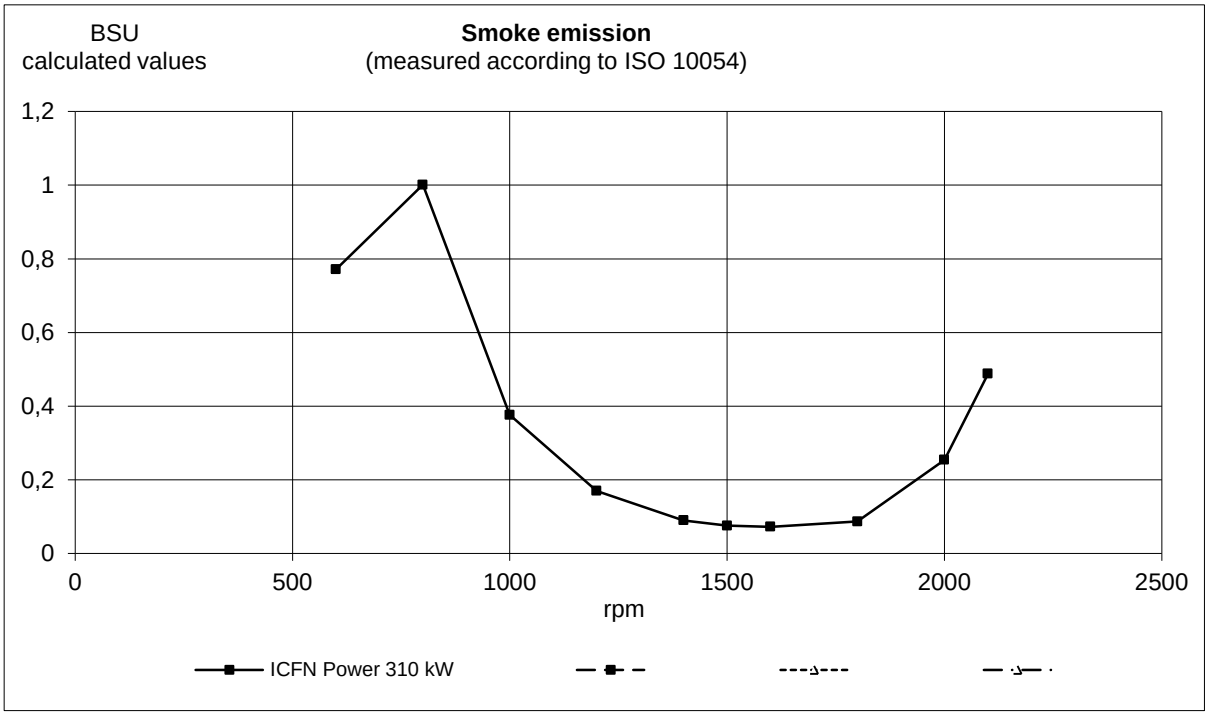
Power take off

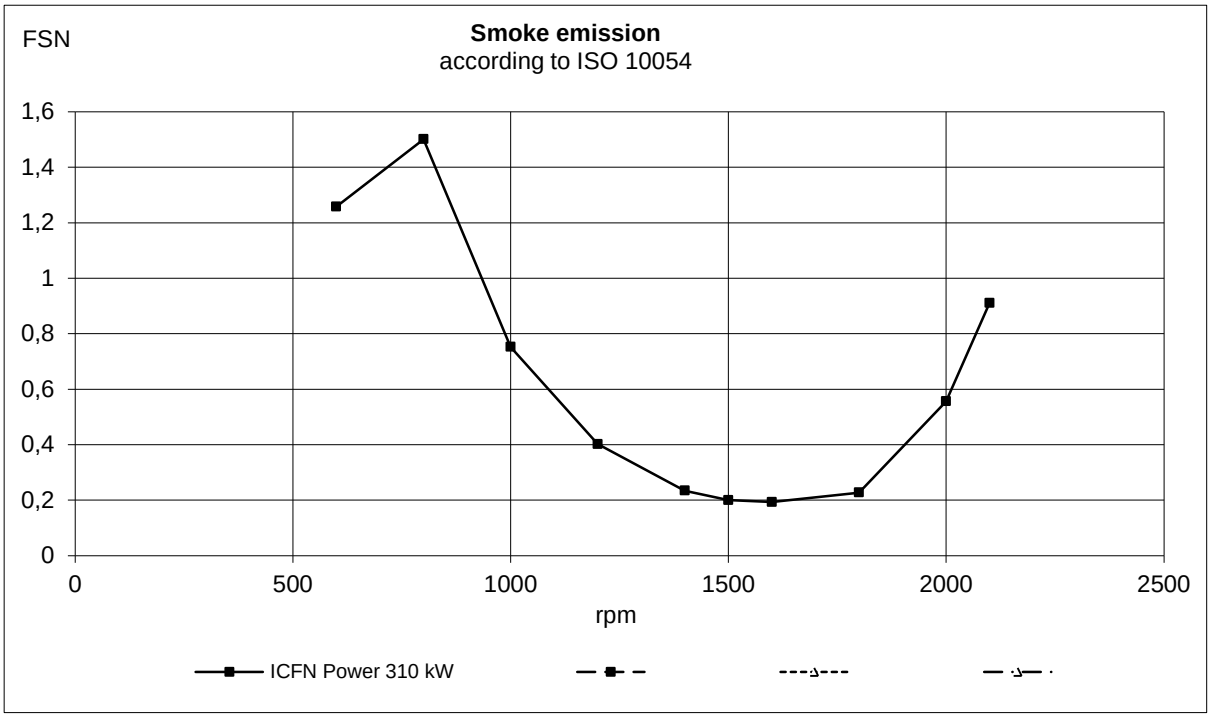
Timing gear at compressor PTO max:	Nm	160
	lbf ft	118
Speed ratio direction of rotation viewed from flywheel side		1.31:1/ccw
Timing gear at servo pump PTO max:	Nm	100
	lbf ft	74
Speed ratio direction of rotation viewed from flywheel side		1.75:1/ccw
Max allowed bending moment in flywheel housing	Nm	15000
	lbf ft	11063
Max. rear main bearing load	N	4000
	lbf	899,2

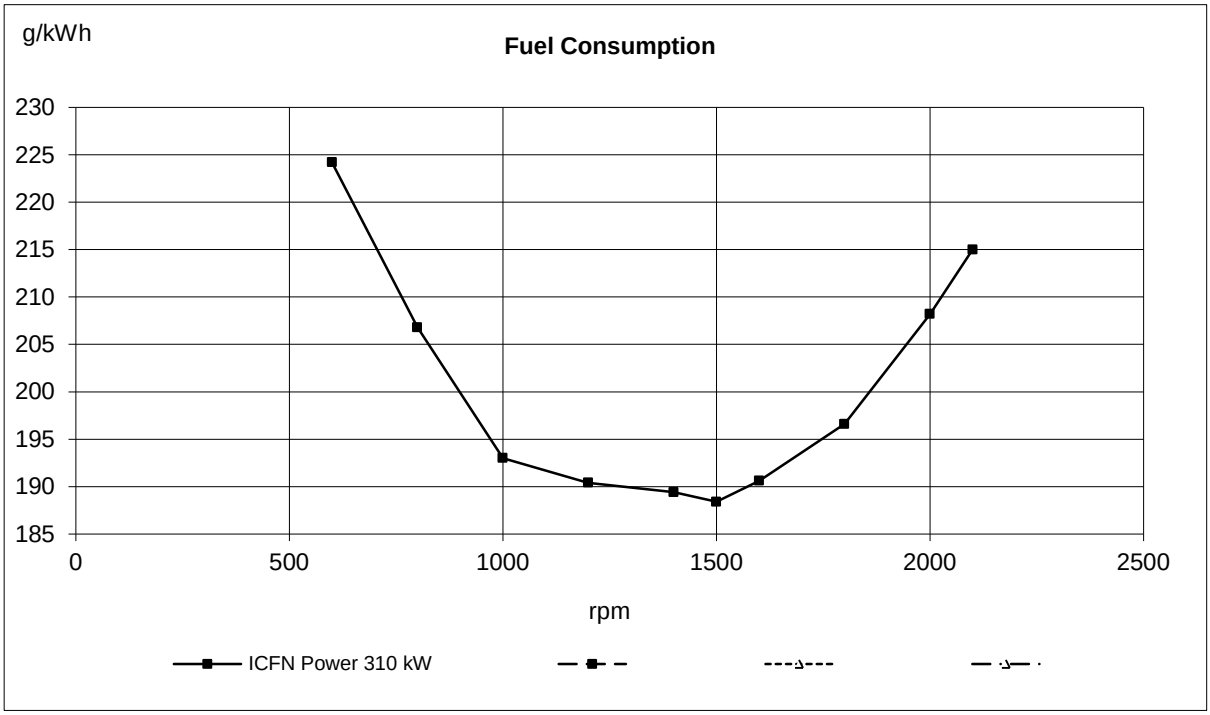

kW
Power
350
300
250
200
150
100
50
0
0
500
1000
1500
2000
2500
rpm

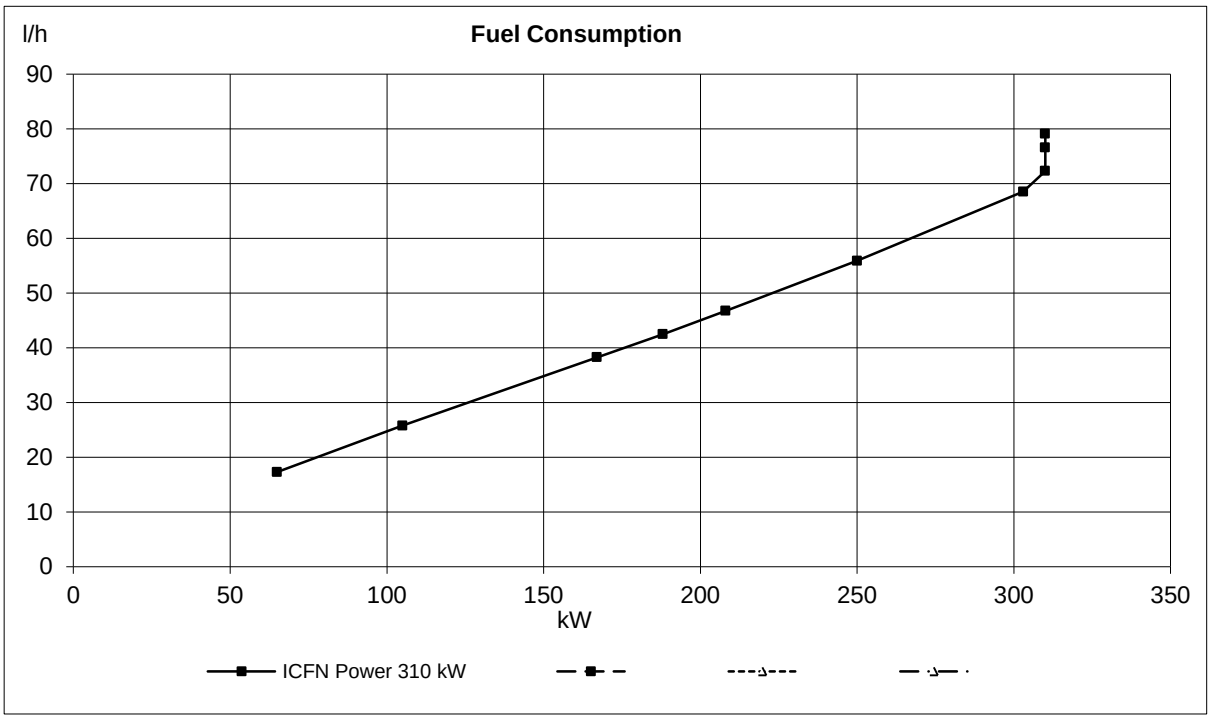

Nm
Torque
2500
2000
1500
1000
500
0
0
500
1000
1500
2000
2500
rpm

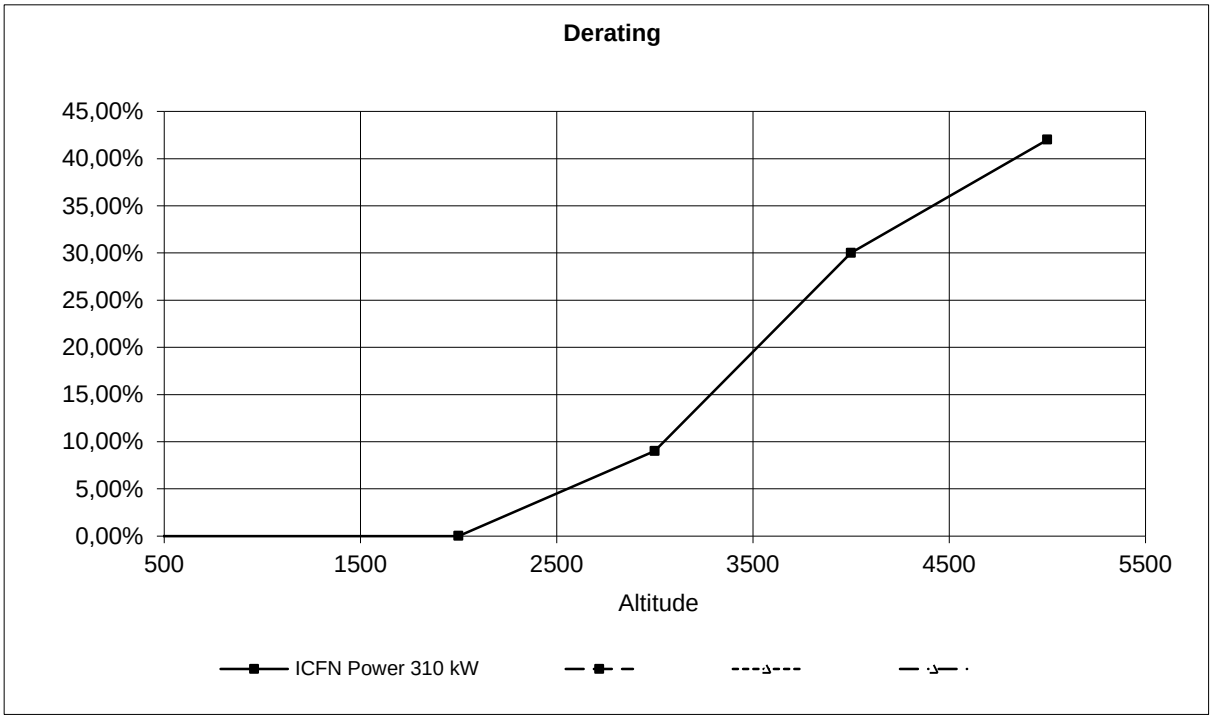

Nm
Altitude derated Torque
2500
2000
1500
1000
500
0
600
800
1000
1200
1400
1600
1800
2000
2200
rpm
1000m
2000m
3000m
4000m
5000m

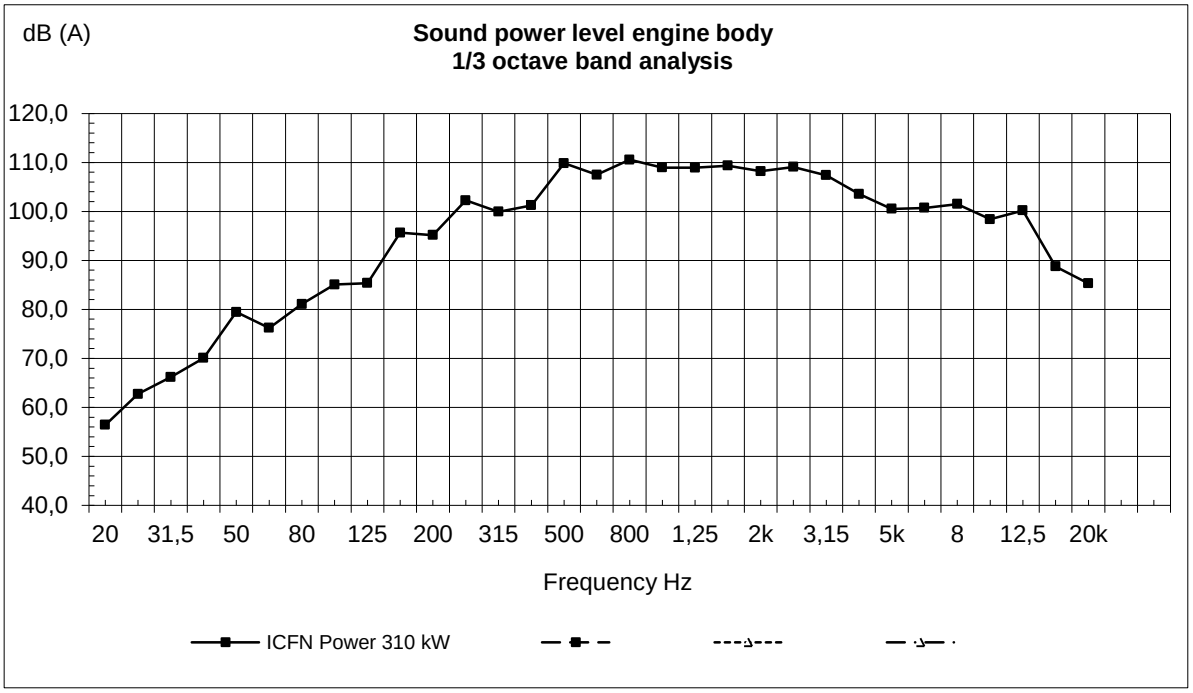

BSU
calculated values
Smoke emission
(measured according to ISO 10054)
1,2
1
0,8
0,6
0,4
0,2
0
0
500
1000
1500
2000
2500
rpm
ICFN Power 310 kW

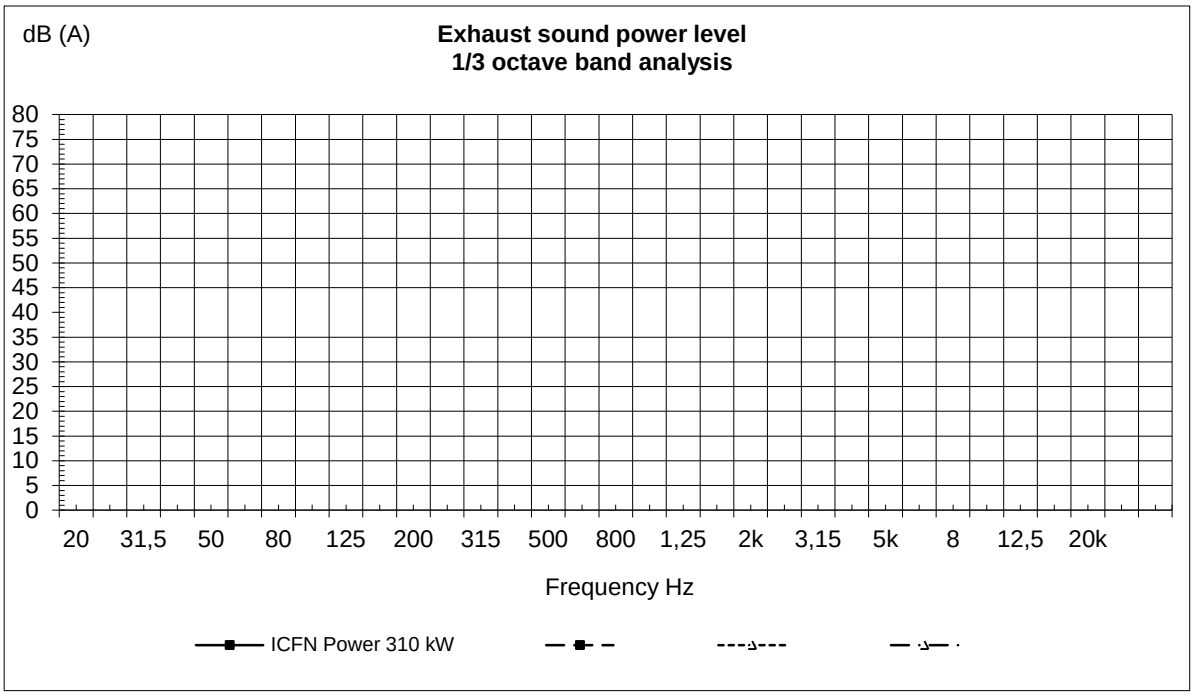

FSN
Smoke emission
according to ISO 10054
1,6
1,4
1,2
1
0,8
0,6
0,4
0,2
0
0
500
1000
1500
2000
2500
rpm
ICFN Power 310 kW

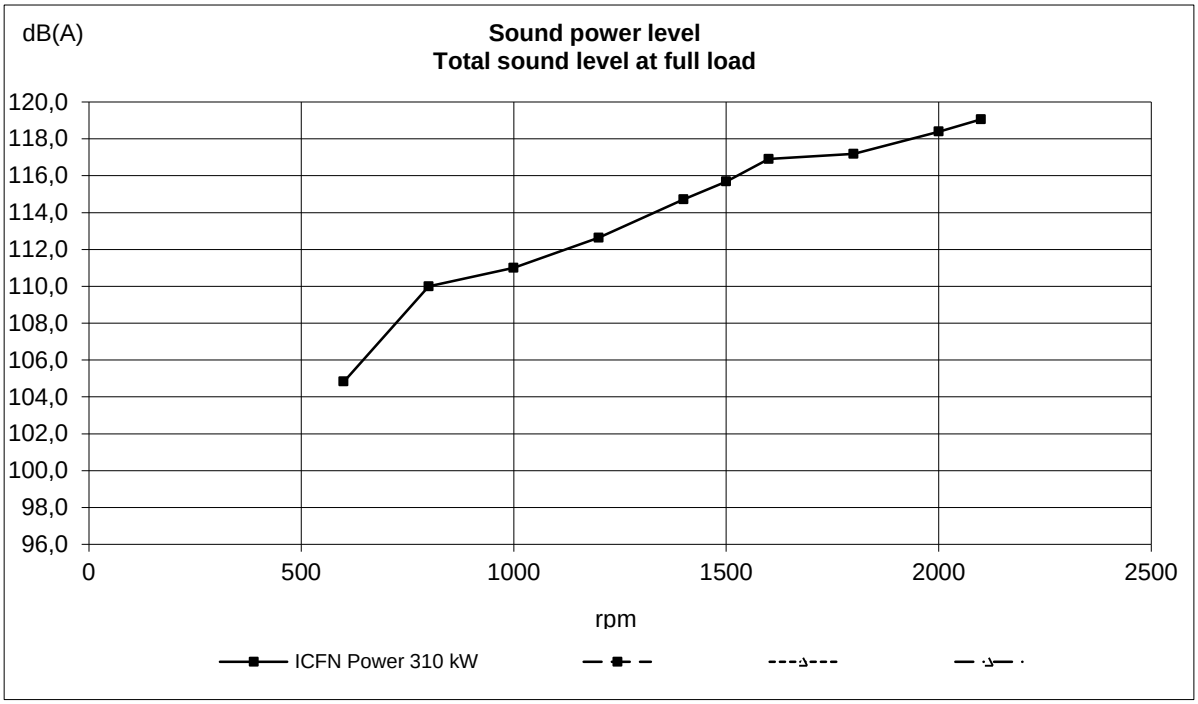

g/kWh
Fuel Consumption
230
225
220
215
210
205
200
195
190
185
0
500
1000
1500
2000
2500
rpm
ICFN Power 310 kW

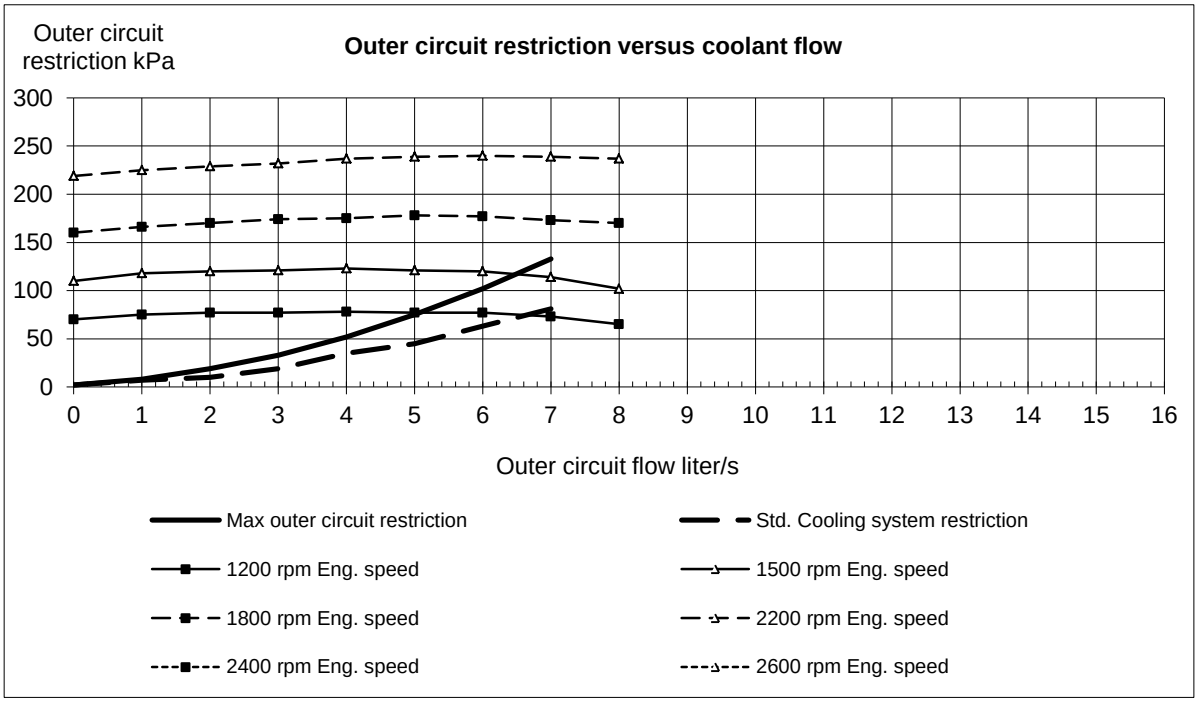

l/h
Fuel Consumption
90
80
70
60
50
40
30
20
10
0
0
50
100
150
200
250
300
350
kW
ICFN Power 310 kW

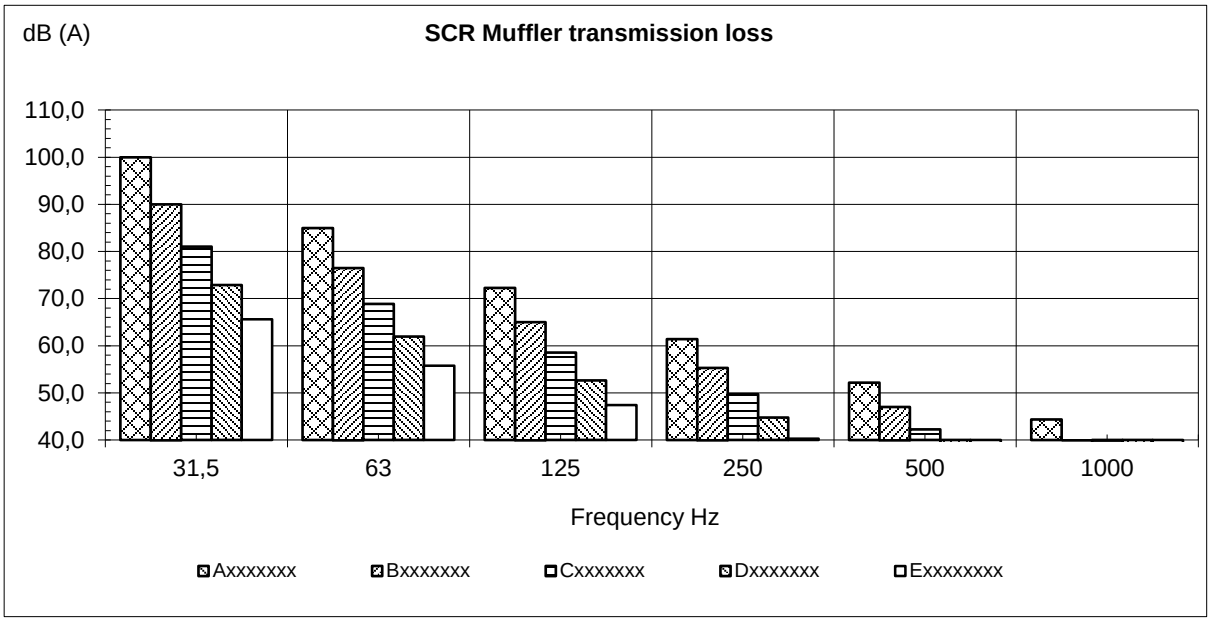

Derating
45,00%
40,00%
35,00%
30,00%
25,00%
20,00%
15,00%
10,00%
5,00%
0,00%
500
1500
2500
3500
4500
5500
Altitude
ICFN Power 310 kW

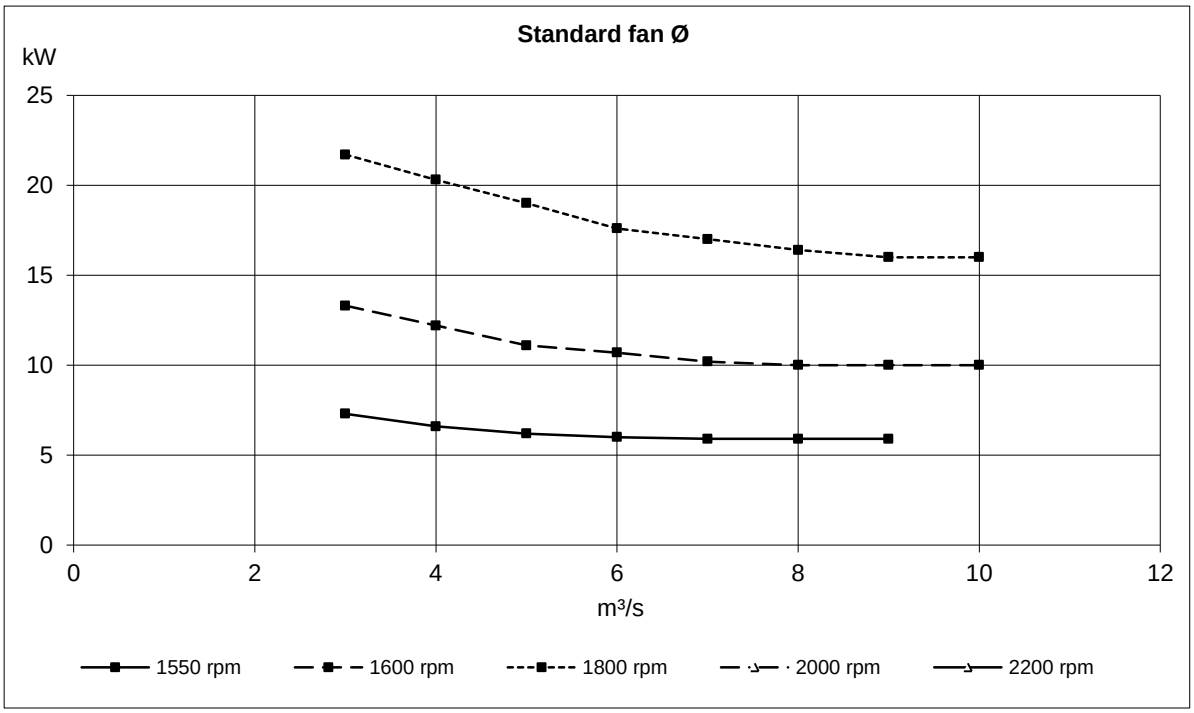

dB (A)
Sound power level engine body
1/3 octave band analysis
120,0
110,0
100,0
90,0
80,0
70,0
60,0
50,0
40,0
20 31,5 50 80 125 200 315 500 800 1,25 2k 3,15 5k 8 12,5 20k
Frequency Hz
ICFN Power 310 kW

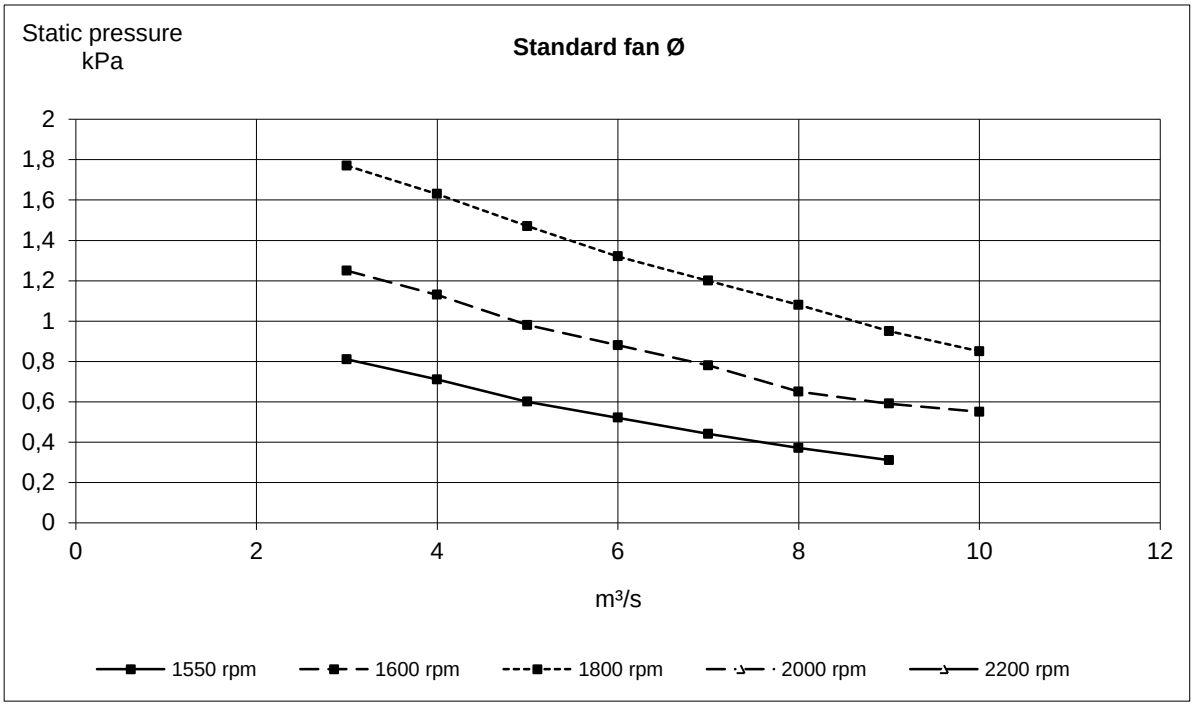

dB (A)
Exhaust sound power level
1/3 octave band analysis
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
20 31,5 50 80 125 200 315 500 800 1,25 2k 3,15 5k 8 12,5 20k
Frequency Hz
ICFN Power 310 kW


dB(A)
Sound power level
Total sound level at full load
120,0
118,0
116,0
114,0
112,0
110,0
108,0
106,0
104,0
102,0
100,0
98,0
96,0
0
500
1000
1500
2000
2500
rpm
ICFN Power 310 kW


Outer circuit restriction kPa
Outer circuit restriction versus coolant flow
300
250
200
150
100
50
0
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
Outer circuit flow liter/s
Max outer circuit restriction
Std. Cooling system restriction
1200 rpm Eng. speed
1500 rpm Eng. speed
1800 rpm Eng. speed
2200 rpm Eng. speed
2400 rpm Eng. speed
2600 rpm Eng. speed


dB (A)
SCR Muffler transmission loss
110,0
100,0
90,0
80,0
70,0
60,0
50,0
40,0
31,5
63
125
250
500
1000
Frequency Hz
Axxxxxxx
Bxxxxxxx
Cxxxxxxx
Dxxxxxxx
Exxxxxxxx


Standard fan Ø
kW
25
20
15
10
5
0
0
2
4
6
8
10
12
m³/s
1550 rpm
1600 rpm
1800 rpm
2000 rpm
2200 rpm


Static pressure
kPa
Standard fan Ø
2
1,8
1,6
1,4
1,2
1
0,8
0,6
0,4
0,2
0
0
2
4
6
8
10
12
m³/s
1550 rpm
1600 rpm
1800 rpm
2000 rpm
2200 rpm

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