VOLVO PENTA TAD1152VE	Document No **22451720**	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 ⚠ nsidered 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, counterclockwise viewed towards flywheel

Number of cylinders			6
Displacement, total		liters in^3	10,84 661
Firing order			1-5-3-6-2-4
Bore		mm in	123 4,84
Stroke		mm in	152 5,98
Compression ratio			17,0:1
Wet weight	Engine only (Estimated) (excl after treatment comp.)	kg lb	1072 2363
	Power pac	kg lb	1351 2978

Performance				**rpm**	**1200**	**1500**	**1700**	**2000**
IFN Power 285 kW		without fan		kW hp	239 325	272 370	285 388	271 369
		with fan 890 mm		kW hp	235 319	259 352	273 371	254 346
Torque at:		IFN Power		Nm lbf ft	1900 1401	1730 1276	1600 1180	1295 955
Max torque at engine speed	IFN Power	rpm	1260 rpm	Nm lbf ft	1938 1429			
Power tolerance				%	±2			
Mean piston speed				m/s ft/sec	6,1 19,9	7,6 24,9	8,6 28,3	10,1 33,2
Effective mean pressure at:		IFN Power		MPa psi	2,20 320	2,01 291	1,86 269	1,50 218
Max combustion pressure at:		IFN Power		MPa psi	15,9 2298	15,6 2265	15,8 2284	13,0 1889
Total mass moment of inertia, J (mR^2) (not including flywheel)				kgm^2 $lbft^2$	1,034 24,5			
Friction Power				kW hp	20 27	30 41	38 52	52 71
Derating see Technical Diagrams								

Engine brake performance (only engines with VCB)		rpm	1200	1500	1700	2000
Brake power:	without fan	kW hp	N/A	N/A	N/A	N/A
Brake torque:	without fan	Nm lbf ft	N/A	N/A	N/A	N/A
Engine speed range for VCB activation:		rpm	1000-2200			
Min engine speed with VCB still active:		rpm	900			
Min oil temperature for VCB activation:		°C	55			

Cold start performance

*Cold start limit temperature	without starting aid	°C °F	-15 5	
	with manifold heater 3.5 kW	°C °F	-25 -13	
	with manifold heater 3.5 kW and block heater	°C °F	-30 -22	
*Specify oil and fuel quality	T>-15°C Oil VDS3 or VDS4 15W/40 T<-15°C Oil VDS3 or VDS4 5W/40			
Heater type	Make	Power kW	Engaged hours (-30°C)	Cooling water temp engine block
Self circulating	Volvo	1,2	12	-1°C 30°F

* See also general section in the sales guide

Lubrication system

Lubricating oil consumption (average)			l/hr	0,02
Oil system capacity including filters			liter US gal	37 9,77
Oil pan capacity: (both variants)		Max	liter US gal	32 8,45
		Min	liter US gal	27 7,13
Oil change intervals/specifications	VDS3		h	500*
	VDS4		h	500*
Engine angularity limits:		front up	°	30
		front down	°	30
		side tilt	°	30
Oil pressure at rated speed			kPa psi	350 - 600 51 - 87

**** Oil change intervals vary, depending on oil grade, sulfur content of the fuel and running conditions. Oil sample analysis is recommended to determine application specific oil change interval.***

Lubrication system

Lubrication oil temperature in sump:	max	°C °F	127 261
Oil filter filtration efficiency (in accordance with ISO 4548-12)	99%	µ	38
	50%	µ	14

Fuel system

System supply flow at max. Speed		liter/h US gal/h	108 28,5
Fuel supply line max. restriction (measured at fuel inlet connection)		kPa psi	10 1,5
Fuel supply line max. pressure, during engine stand still (meassured at fuel inlet connection)		kPa psi	16,5 2,4
Fuel supply line min. pressure, during engine stand still (meassured at fuel inlet connection)		kPa psi	-12,5 -1,8
System return flow at max. Speed		liter/h US gal/h	30,0 7,9
Fuel return line max. restriction (measured at fuel return connection)		kPa psi	20 2,9
Max. allowable inlet fuel temp (Measured at fuel inlet connection)		°C °F	60 140
Prefilter / Water separator micron size		µ	10
Fuel filter filtration efficiency	96%	µ	6
	75%	µ	4
Governor type/make, standard			Volvo/EMS2.3
Specific UREA consumption in Nonroad Transient Cycle (NRTC)		Vol%	N/A
Fuel to conform to			Fuel corresponding to EN590:1999 or ASTM D 975-No or JIS KK2204:2004

Intake and exhaust system		**rpm**	**1200**	**1500**	**1700**	**2000**
Charge air consumption at: (+25°C and 100kPa)	IFN Power	m³/min cfm	14,1 498	17,2 607	19,1 675	20,4 720
⚠ **See front page for important information** Max allowable air intake restriction including piping		kPa psi	5 0,7			
Heat rejection to exhaust at:	IFN Power	kW BTU/min	158 8978	190 10782	207 11755	227 12889
Exhaust gas temperature after turbine at:	IFN Power	°C °F	521 969	516 961	510 949	524 975
⚠ **See front page for important information** Max allowable back pressure in exhaust line (after turbine) Pipe dimension Ø: 125 mm		kPa psi	- -	-	-	15 2,2
⚠ **See front page for important information** Max allowable temperature drop between turbine and SCR muffler inlet.		Δ°C Δ°F	N/A	N/A	N/A	N/A
SCR muffler pressure drop (at exhaust gas flow and exhaust temp given)		kPa psi	N/A	N/A	N/A	N/A
Exhaust gas flow at: (temp and pressure after turbine at the corresponding power setting)	IFN Power	m³/min cfm	38,1 1346	44,6 1575	47,8 1688	50,9 1798

Cooling system			rpm	1200	1500	1700	2000
Heat rejection radiation from engine at:		IFN Power	kW	10,5	10,4	10,3	10,8
			BTU/min	597	589	588	611
Heat rejection to coolant at:		IFN Power	kW	127	141	146	158
			BTU/min	7228	8030	8292	9008
Coolant			Volvo Penta coolant "ready mix" or Volvo Penta coolant mixed with clean fresh water 40 / 60				
Radiator cooling system type				Closed circuit			
Standard radiator core area			m²	0,8			
			foot²	8,61			
Fan diameter	890 mm		mm	890			
			in	35,04			
Fan power consumption	890 mm		kW	4,3	13,4	12,4	16,6
			hp	6	18	17	23
Fan drive ratio	fan Ø890			0,9:1 ccw			
Coolant capacity:	engine		liter	17			
			US gal	4,5			
	std. 0,8m² radiator with hoses		liter	21			
			US gal	5,5			
Coolant pump			drive/ratio	belt/1,41:1 cw			
Coolant flow with standard system			l/s	4,8	6,0	6,8	8
			US gal/s	1,3	1,6	1,8	2,1
Minimum coolant flow			l/s	1,9	2,2	2,5	2,8
			US gal/s	0,5	0,6	0,7	0,7
Maximum outer circuit restriction incl. piping			kPa	55,0			
			psi	8,0			
Thermostat:		start to open	°C	82			
			°F	180			
		fully open	°C	92			
			°F	198			
Maximum static pressure head (expansion tank height + pressure cap setting)			kPa	100			
			psi	14,5			
Minimum static pressure head (expansion tank height + pressure cap setting)			kPa	70			
			psi	10,2			
Standard pressure cap setting			kPa	75			
			psi	10,9			
Maximum top tank temperature			°C	107			
			°F	225			
Recommended Draw down capacity. The difference between min coolant level in the expansion tank and the lowest level where the engine's coolant system still are functioning			liter	2			
			US gal	0,5			

Charge air cooler system		rpm	1200	1500	1700	2000
Heat rejection to charge air cooler	IFN Power	kW	38,0	44,3	49,7	49,0
		BTU/min	2158	2517	2828	2784
Charge air mass flow	IFN Power	kg/s	0,27	0,33	0,36	0,39
Charge air inlet temp.	IFN Power	°C	184	181	185	175
(Charge air temp after turbo compressor)		°F	362	357	365	346
⚠ **See front page for important information** Max allowable Charge air outlet temp. (Charge air temp after charge air cooler)		°C	45	50	50	50
		°F	113	122	122	122
⚠ **See front page for important information** Maximum pressure drop over charge air cooler incl. piping		kPa	12			
		psi	1,74			
Charge air pressure		kPa	203	209	216	195
(Relative, after charge air cooler)		psi	29,40	30,28	31,30	28,31
Standard charge air cooler core area		m²	0,8			
		foot²	8,61			

Cooling performance: 0.8 m² radiator and pull 890 fixed fan standard drive ratio 0.9

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	kg/s	lb/s	Pa	psi
1700	285	63,3	146	6,98	15,40	0	
(fix 0.9)	388	59,5	139	6,21	13,69	150	0,022
		53,7	129	5,28	11,65	300	0,044
		45,6	114	4,33	9,54	450	0,065

Cooling performance: 0.8 m² radiator and push 890 fixed fan standard drive ratio 0.9

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	kg/s	lb/s	Pa	psi
1700	285	70,2	158	9,46	20,85	0	
(fix 0.9)	388	68,9	156	8,93	19,69	150	0,022
		67,3	153	8,37	18,46	300	0,044
		65,3	150	7,73	17,05	450	0,065

Cooling performance: 0,8 m² radiator and pull 890 Visco fan standard drive ratio 0.9

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	hp	°C	°F	kg/s	lb/s	Pa	psi
1700	285	60,1	140	6,81	15,00	0	
	388	54,6	130	6,03	13,29	150	0,022
		46,2	115	5,08	11,19	300	0,044
		30,4	87	4,09	9,03	450	0,065

Cooling performance: **0,8 m² radiator and** **push 890** **Visco fan standard drive ratio 0.9**

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	kg/s	lb/s	Pa	psi
1700	285	63,4	146	7,65	16,86	0	
	388	59,8	140	6,91	15,23	150	0,022
		54,9	131	6,09	13,44	300	0,044
		48,6	119	5,26	11,60	450	0,065

Engine management system

Functionality	Alternatives			Default setting
Governor mode		Isochronous		
Governor droop		0		
Governor response	Adjustable PI-constants			1
Idle speed		600-900		700
Stop function	Ignition off stop engine			
Preheating function		On/Off		
Lamp test		On/Off		

Engine sensors and switch settings			Warning Level (Yellow Lamp)		Engine protection (Red Lamp)	
Parameter		**Unit**	**Setting range**	**Default setting**	**Level**	**Action. Default/Alternative**
Oil temp		°C	125-130	125	130	Soft derate
Oil pressure	Low idle	kPa	N/A	50	25	Shut down, ON/OFF
	Rated speed	kPa	N/A	300	275	Shut down, ON/OFF
Oil level						
Piston cooling pressure >1000 rpm		kPa				
Coolant temp		°C	105-107	105	107	Soft derate
Coolant level			See cooling system	On		
Fuel feed pressure	1200rpm	kPa		100		
Water in fuel			Alarm When Closed			
Crank case pressure		kPa	N/A	Rapid Pres	Rapid pres incr	Shut down, ON/OFF
Air filter pressure drop				5		
Altitude, above sea		m				Automatic derating, see section derating
Charge air temp		°C	N/A	80	85	Soft derate
Charge air pressure		kPa	N/A	Demand value + 35kPa	Demand value + 40kPa	Soft derate VE/Shutdown Powerpack
Engine speed		rpm	x % of rated speed	135% of rated speed	Alarm level	Alarm only

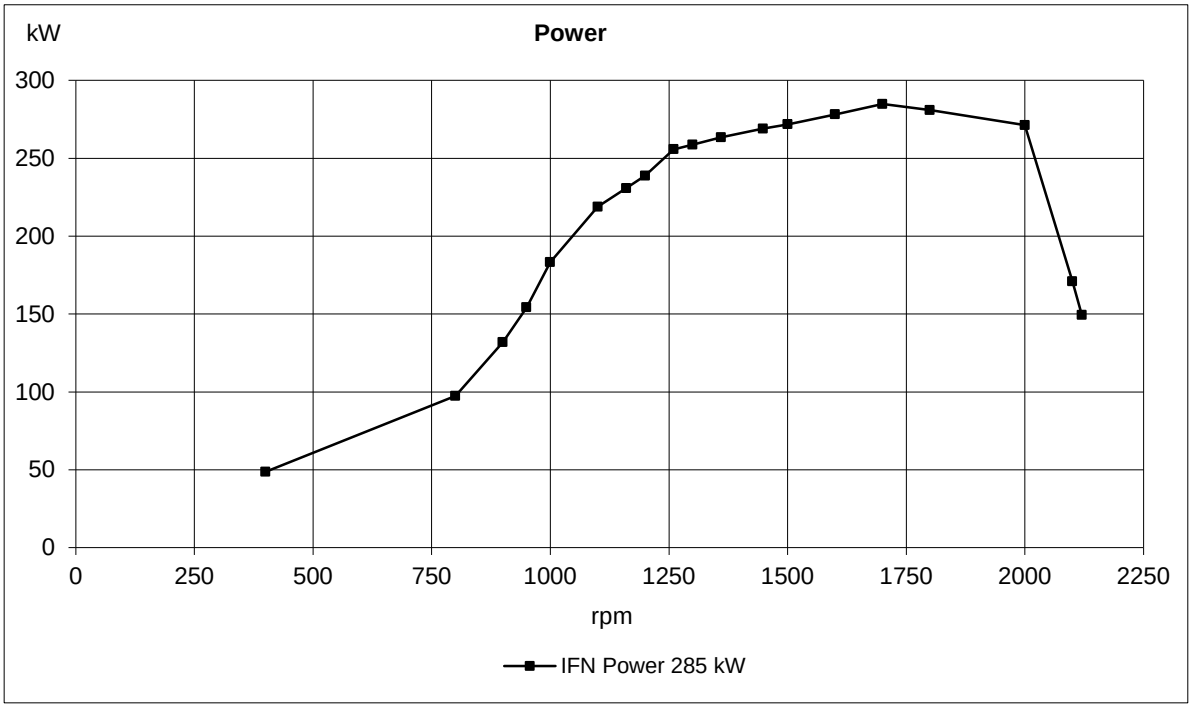
Parameter	Warning Yellow Lamp	Alarm Red Lamp	Derated 0% to engine protection map	Derated 100% to engine protection map	Forced idle after sec	Forced shut down after 2 sec
Coolant temp	105°C	107°C	107°C	108°C	N/A	N/A
Oil temp	125°C	130°C	130°C	132°C	N/A	N/A
Low oil pressure	Warning map value	Alarm map value	N/A	N/A	N/A	Alarm map value
High charge air temp	80°C	85°C	85°C	86°C	N/A	N/A
High charge air pressure	Warning map value	Alarm map value	Alarm map value	Alarm map value	N/A	N/A

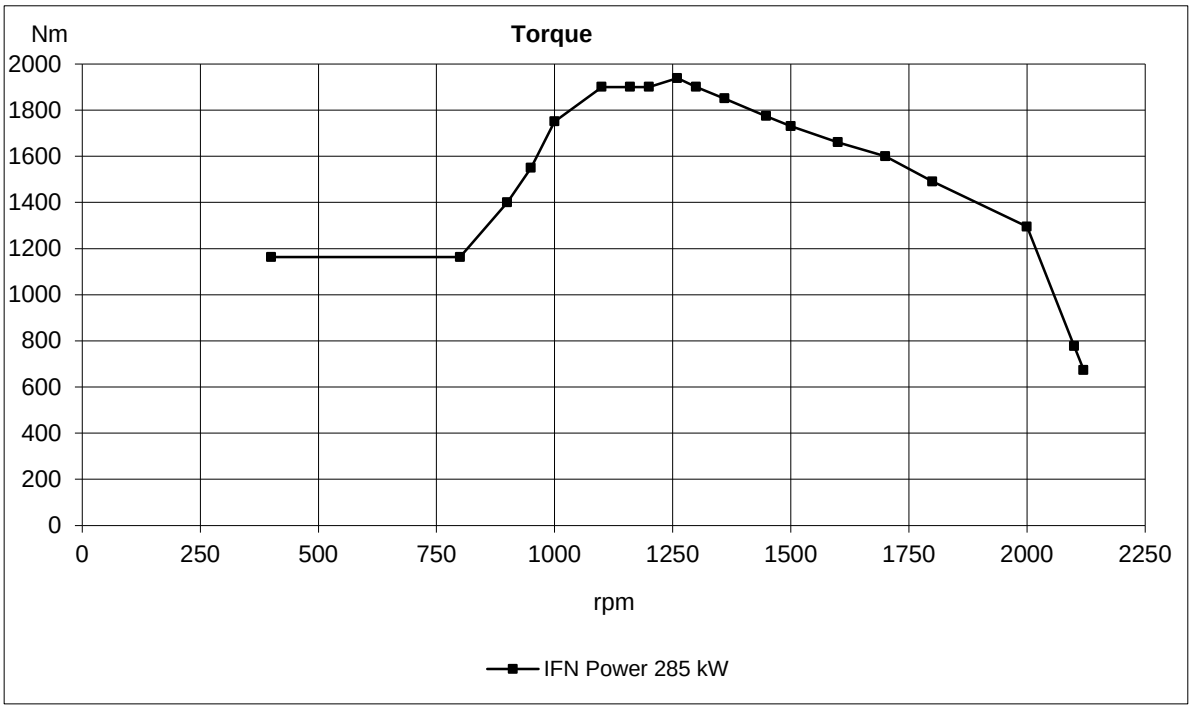
Electrical system

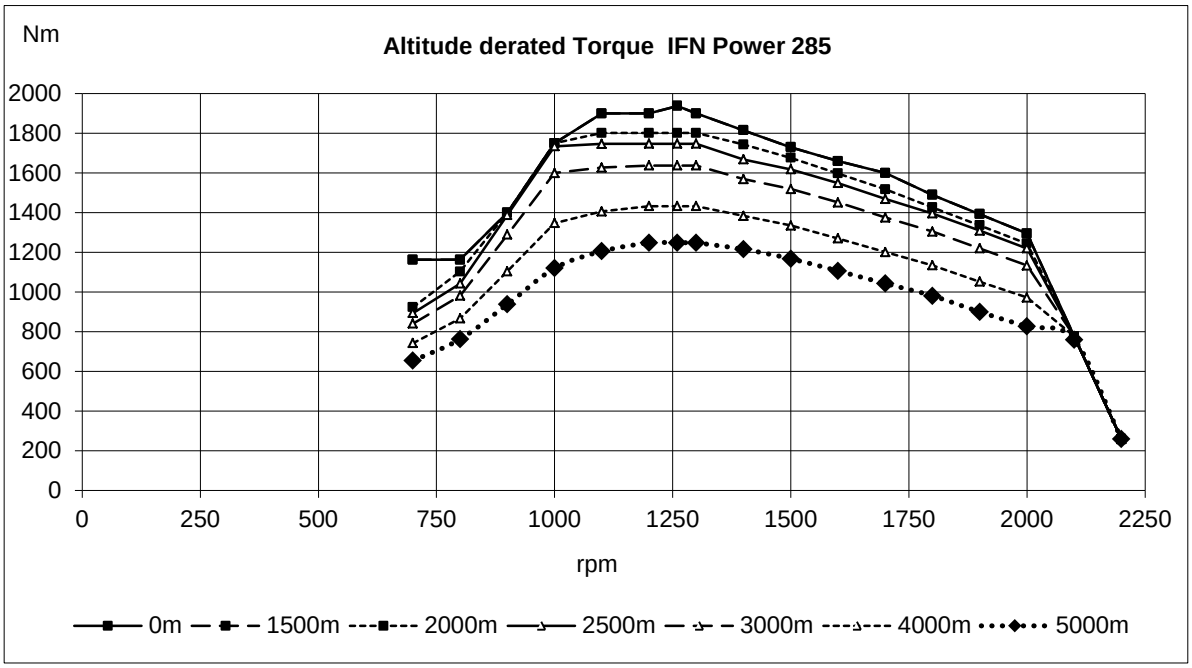
Voltage and type					24V		
Alternator:	output	A			110/150		
	tacho output	Hz/alternator rev.			6		
	drive ratio				5,25		
Starter motor:	type				90P55 / (105P70 ISS för start/stop)		
	output	kW hp			5.5 / (7.0)		
Number of teeth on:	flywheel				153		
	starter motor				11		
Inlet manifold heater (at 20 V)		kW			3.5		
Power relay for the manifold heater		A			1		
Conditions:	**Temperature**	**°C**		**25**	**0**	**-15**	
(4 mΩ main circuit resistance@ 20°C)	**Battery**	**Ah / CCA**		**140 / 800**	**140 / 800**	**145 / 1050**	
Crank speed		rpm		165	150	100	
Crank current		A		240	310	370	
Starter input power during crank		kW		5	6,1	6,3	
Battery power during crank		kW		5,3	6,5	6,8	
Min battery @ 0°C		Ah / CCA		140/800			

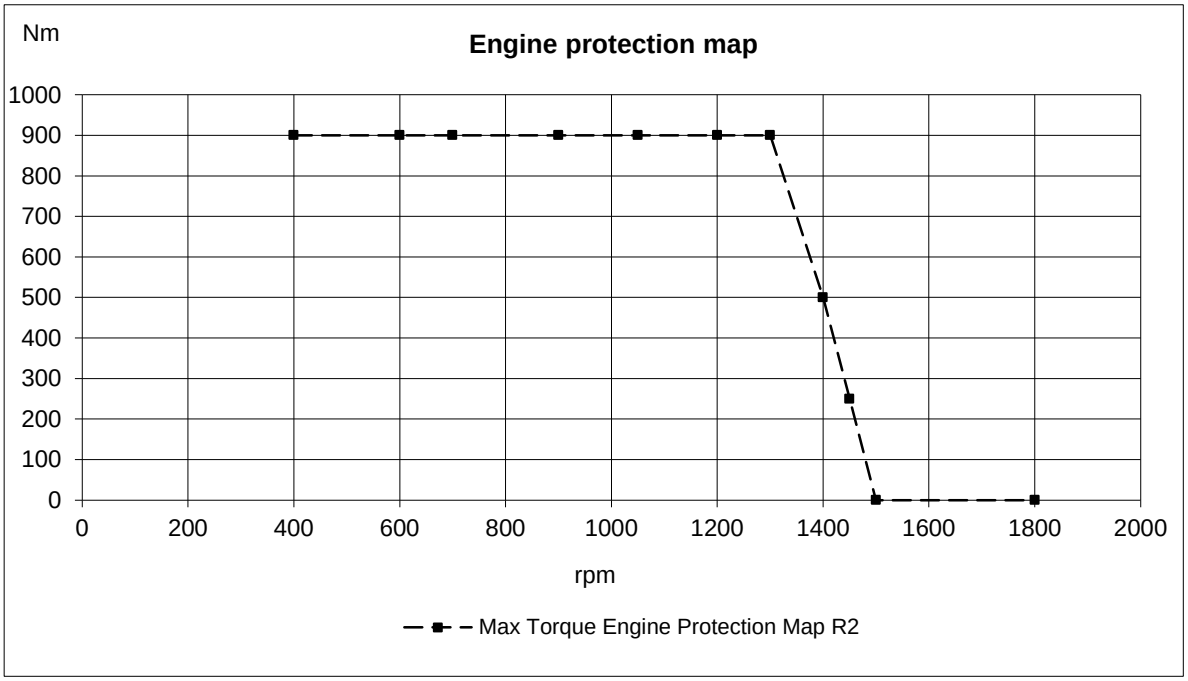
Power take off - Front		**rpm**	**1200**	**1500**	**1700**	**2000**
Front end in line with crank shaft max:* (with a total added mass moment of inertia, J (mR2)≤ 0,05 kgm²)		Nm lbf ft	Very restricted use, each application needs to be evaluated			
Front end belt pulley load. Direction of load viewed from flywheel side:	max left	kW hp	n/a	n/a	n/a	n/a
	max down	kW hp	n/a	n/a	n/a	n/a
	max right	kW hp	n/a	n/a	n/a	n/a
Power take off - Rear with Flywheel housing Standard						
Timing gear at servo pump PTO max:*****		Nm lbf ft	100 74			
Speed ratio direction of rotation viewed from flywheel side			1,08:1/ccw			
Continuous torque on timing gear at rear PTO*, SAE B spline		Nm lbf ft	300 221			
Continuous torque on timing gear at rear PTO*, DIN 5462 spline		Nm lbf ft	650 221			
Speed ratio direction of rotation viewed from flywheel side, all rear PTO's			1,08:1/ccw			
Continuous torque on timing gear at compressor PTO* SAE B spline		Nm lbf ft	300 221			
Speed ratio direction of rotation viewed from flywheel side			1,29:1/ccw			
Max allowed bending moment in flywheel housing		Nm lbf ft	7000 5163			
Max. rear main bearing load		N lbf	3000 674,4			

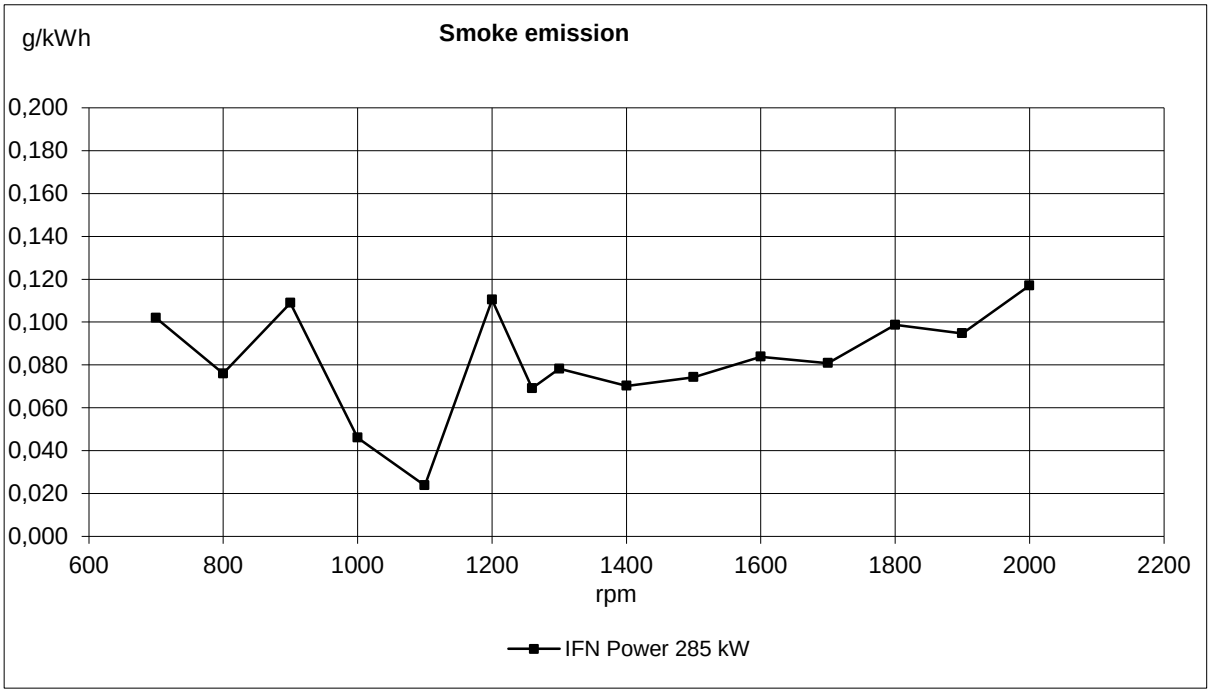
**** Maximum allowed torque at individual PTO´s.***
If more than one PTO output is used simultaneously, calculations needs to be performed to determine available maximum.
Available torque depends on application inertia.

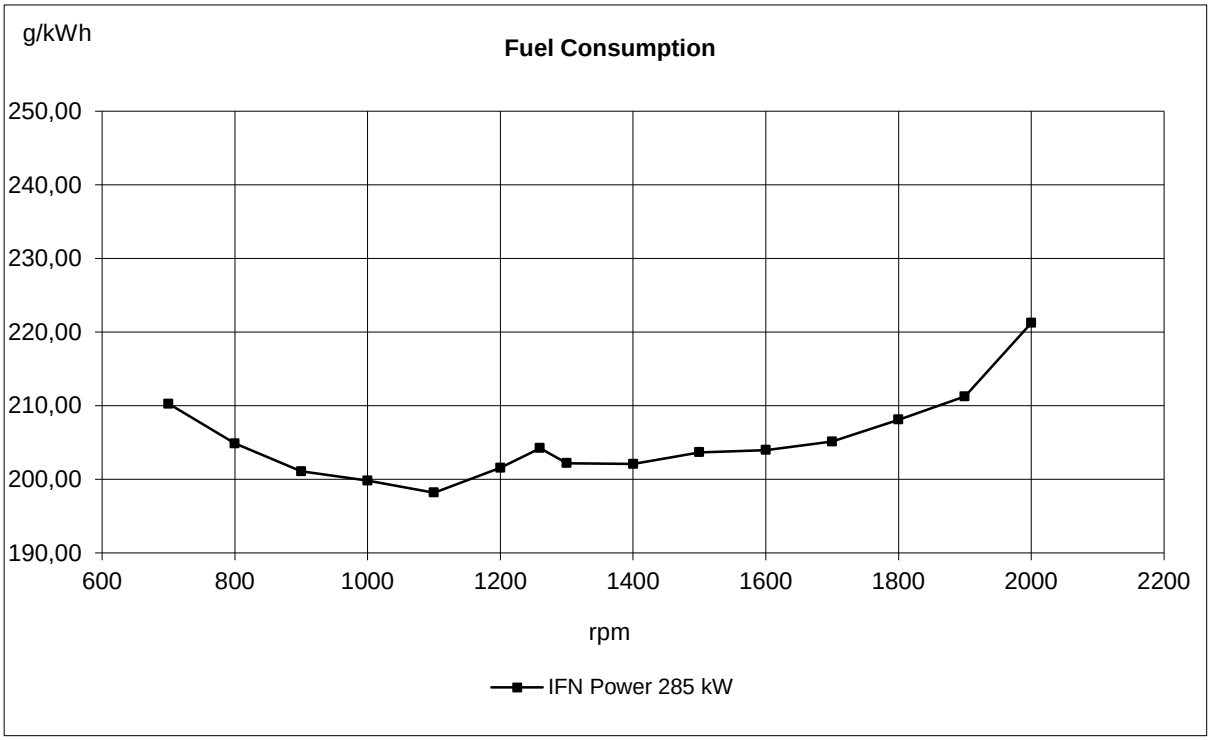

kW
Power
300
250
200
150
100
50
0
0
250
500
750
1000
1250
1500
1750
2000
2250
rpm
IFN Power 285 kW

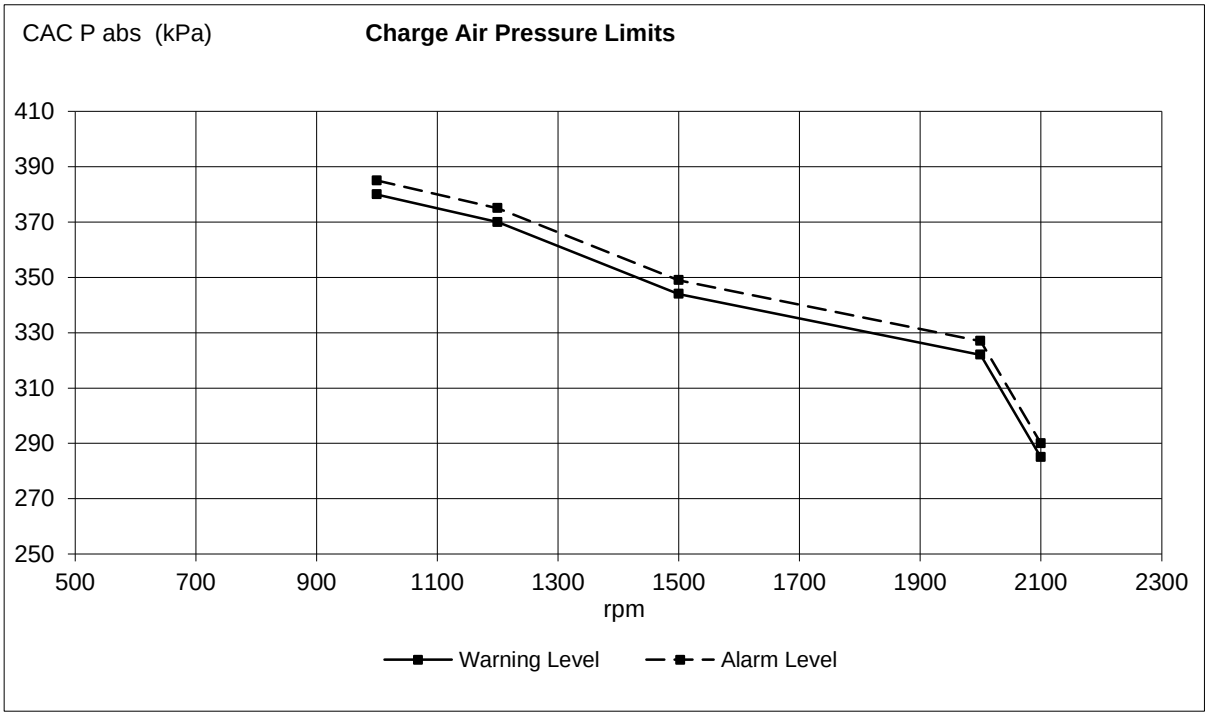

Nm
Torque
2000
1800
1600
1400
1200
1000
800
600
400
200
0
0
250
500
750
1000
1250
1500
1750
2000
2250
rpm
IFN Power 285 kW

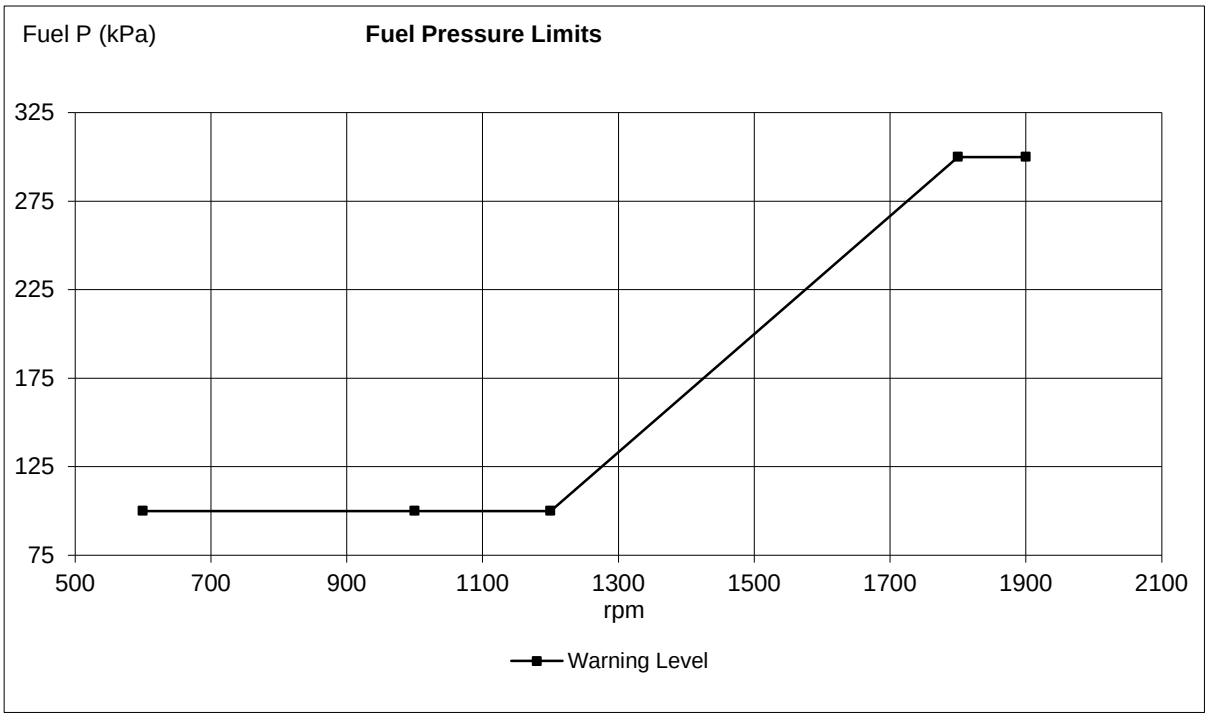

Nm
Altitude derated Torque IFN Power 285
2000
1800
1600
1400
1200
1000
800
600
400
200
0
0
250
500
750
1000
1250
1500
1750
2000
2250
rpm
0m
1500m
2000m
2500m
3000m
4000m
5000m

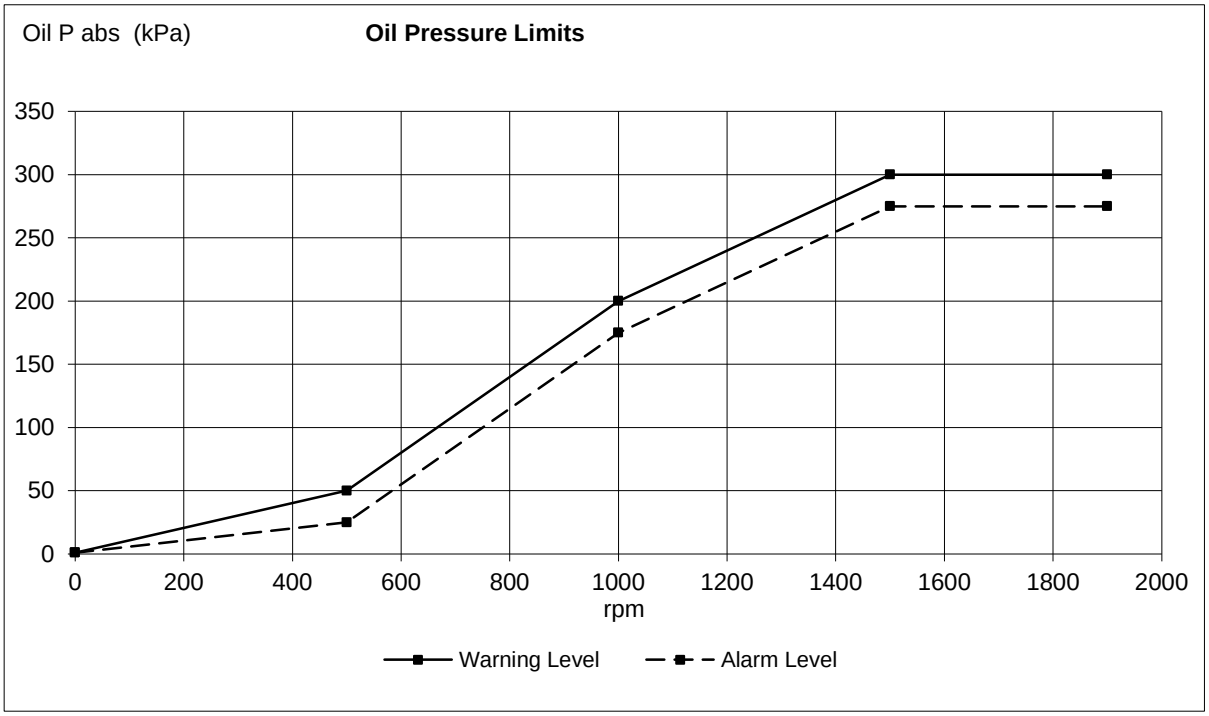

Nm
Engine protection map
1000
900
800
700
600
500
400
300
200
100
0
0
200
400
600
800
1000
1200
1400
1600
1800
2000
rpm
Max Torque Engine Protection Map R2

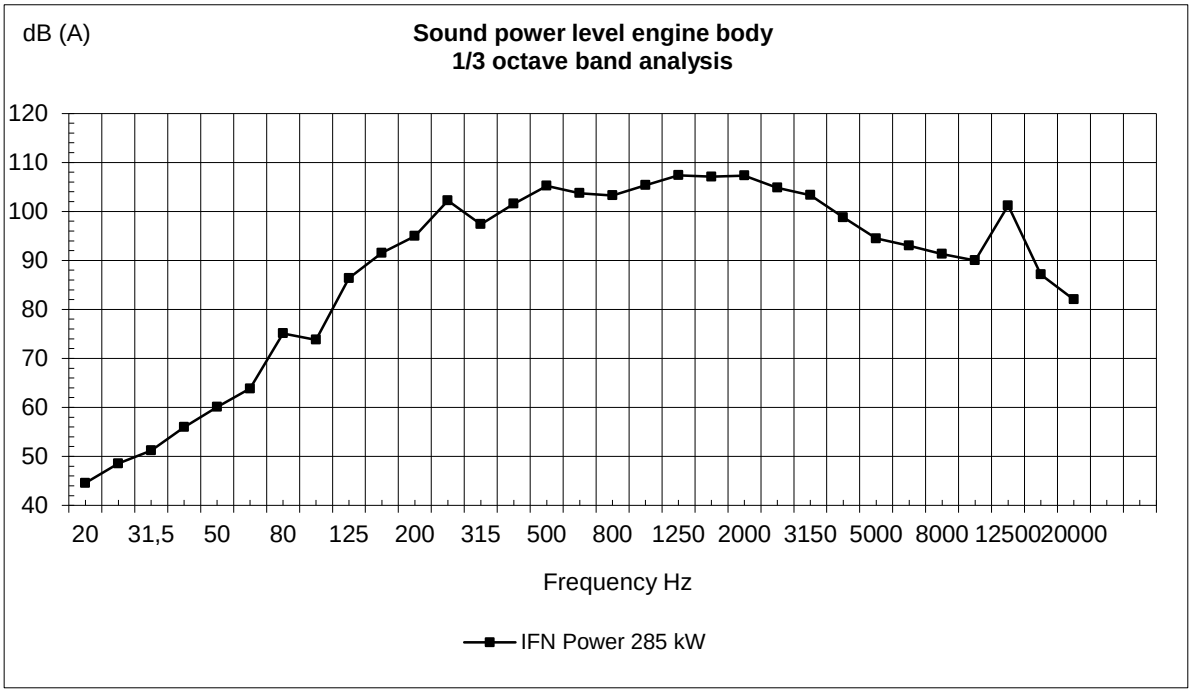

Smoke emission
g/kWh
0,200
0,180
0,160
0,140
0,120
0,100
0,080
0,060
0,040
0,020
0,000
600
800
1000
1200
1400
1600
1800
2000
2200
rpm
IFN Power 285 kW

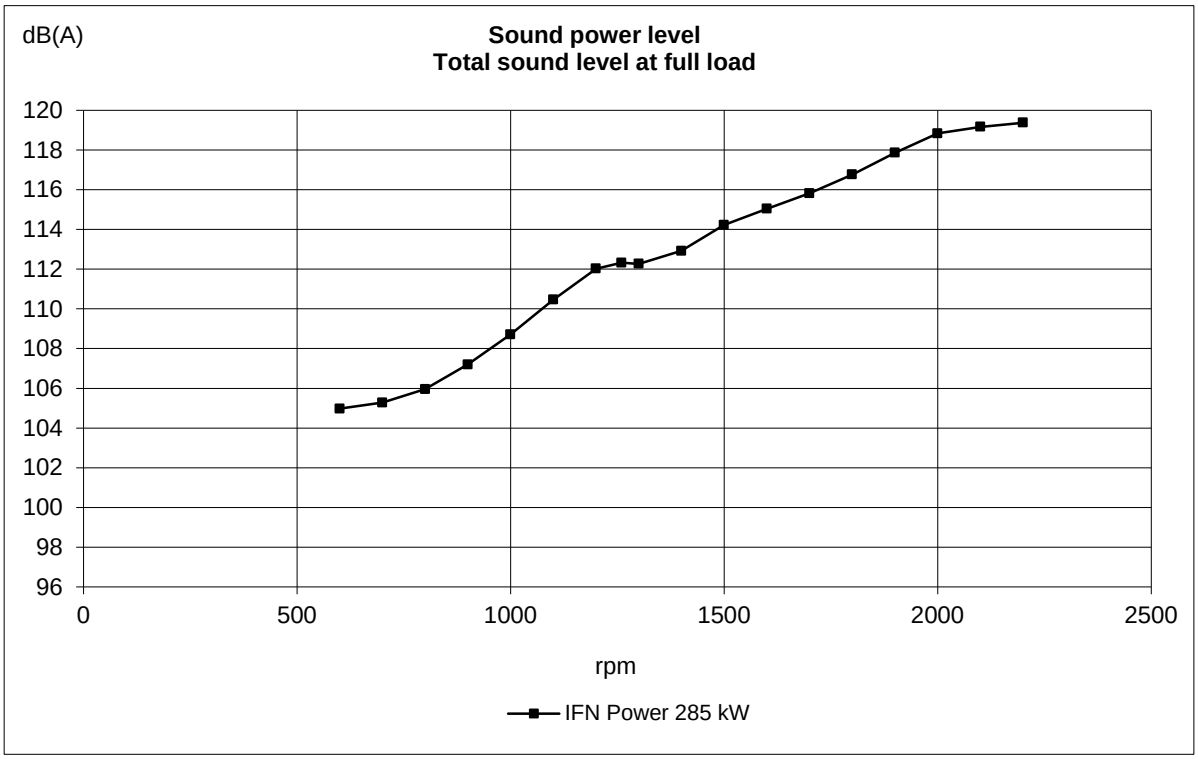

Fuel Consumption
g/kWh
250,00
240,00
230,00
220,00
210,00
200,00
190,00
600
800
1000
1200
1400
1600
1800
2000
2200
rpm
IFN Power 285 kW

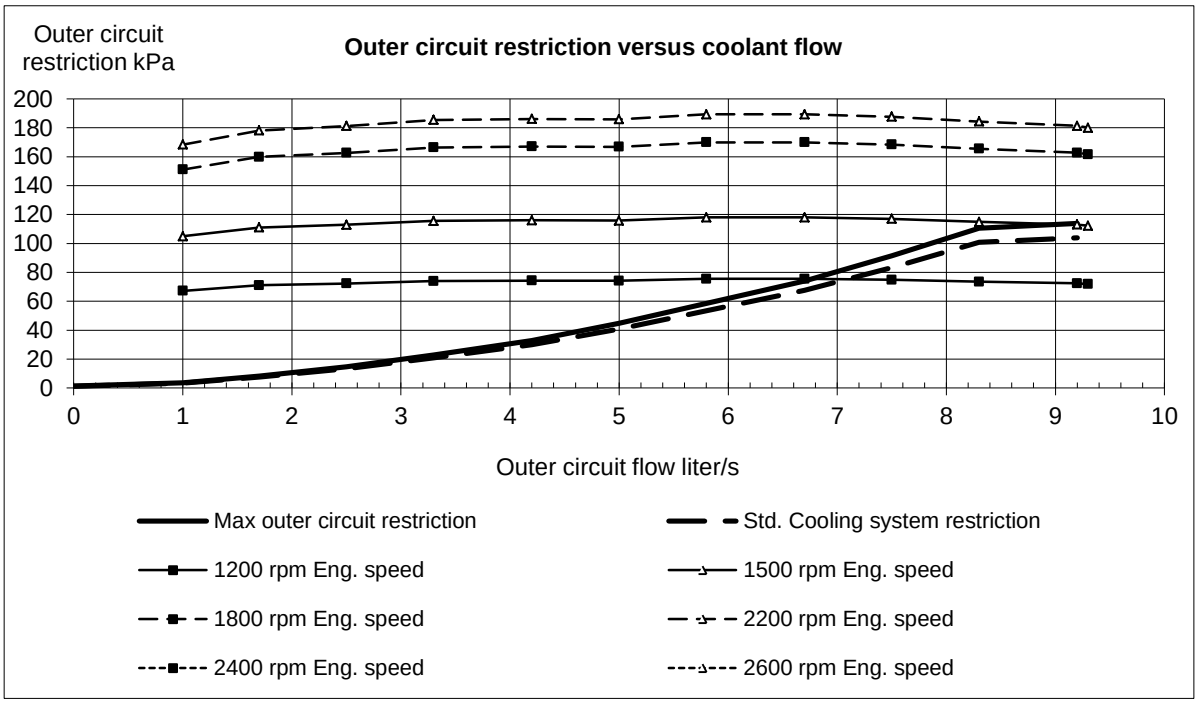

CAC P abs (kPa)
Charge Air Pressure Limits
410
390
370
350
330
310
290
270
250
500
700
900
1100
1300
1500
1700
1900
2100
2300
rpm
Warning Level
Alarm Level

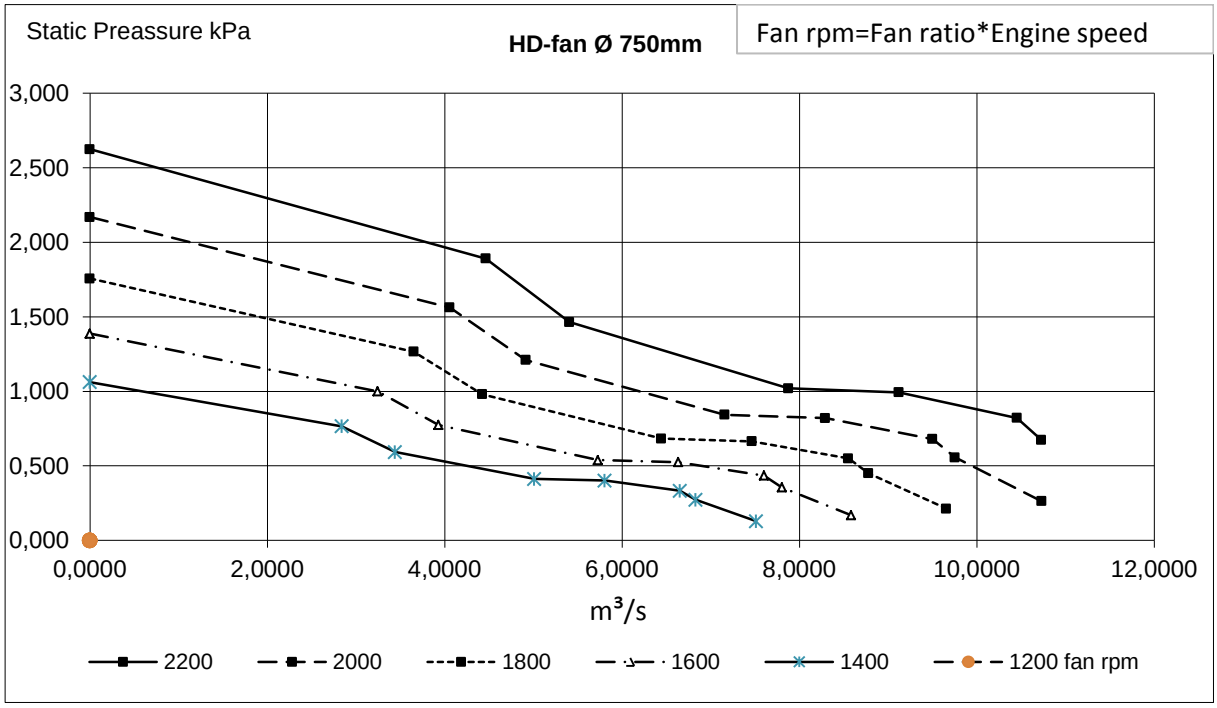

Fuel P (kPa)
Fuel Pressure Limits
325
275
225
175
125
75
500
700
900
1100
1300
1500
1700
1900
2100
rpm
Warning Level

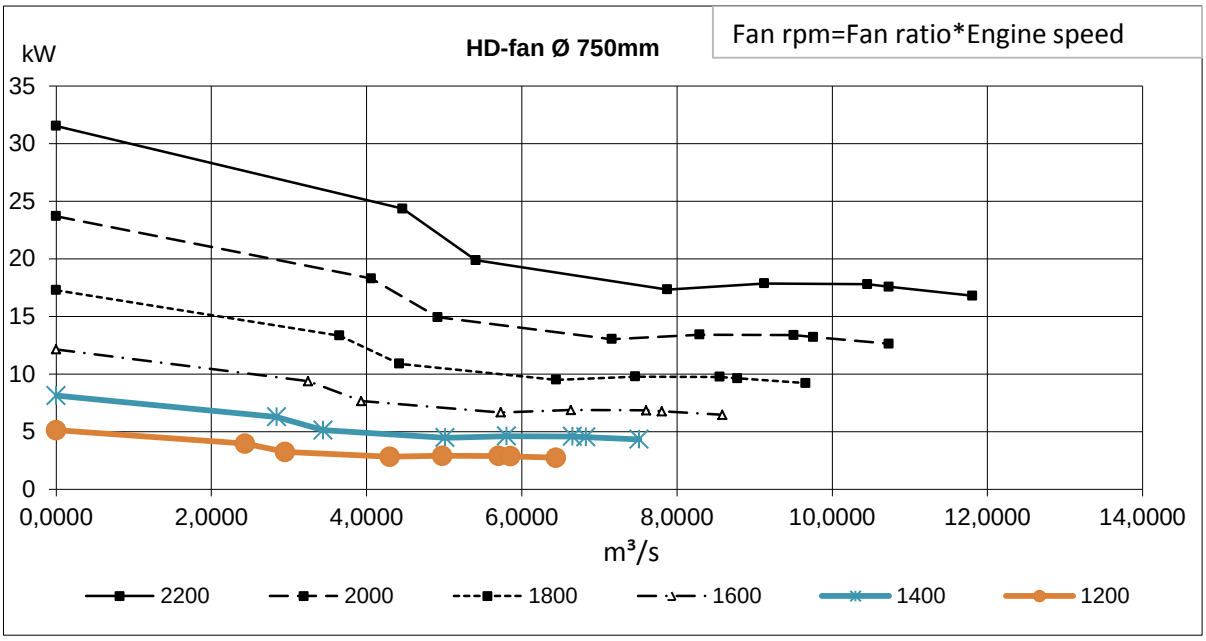

Oil P abs (kPa)
Oil Pressure Limits
350
300
250
200
150
100
50
0
0
200
400
600
800
1000
1200
1400
1600
1800
2000
rpm
Warning Level
Alarm Level

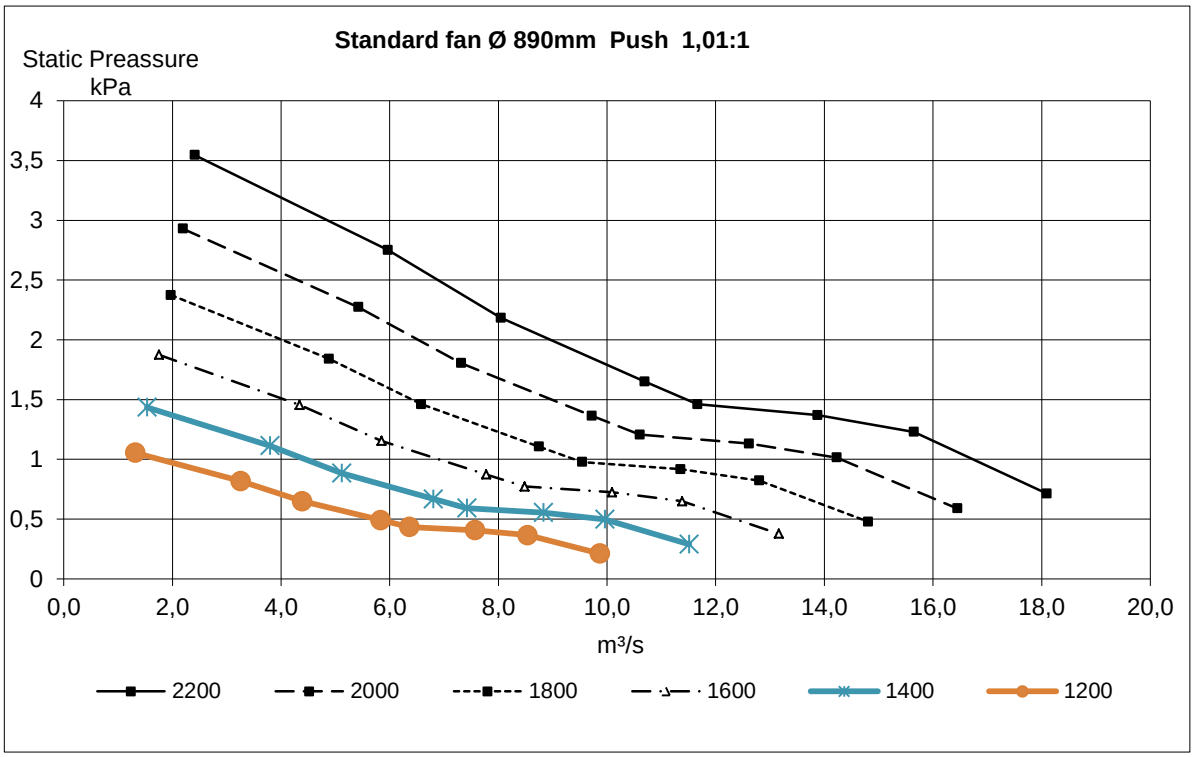

dB (A)
Sound power level engine body
1/3 octave band analysis
120
110
100
90
80
70
60
50
40
20
31,5
50
80
125
200
315
500
800
1250
2000
3150
5000
8000
12500
20000
Frequency Hz
IFN Power 285 kW

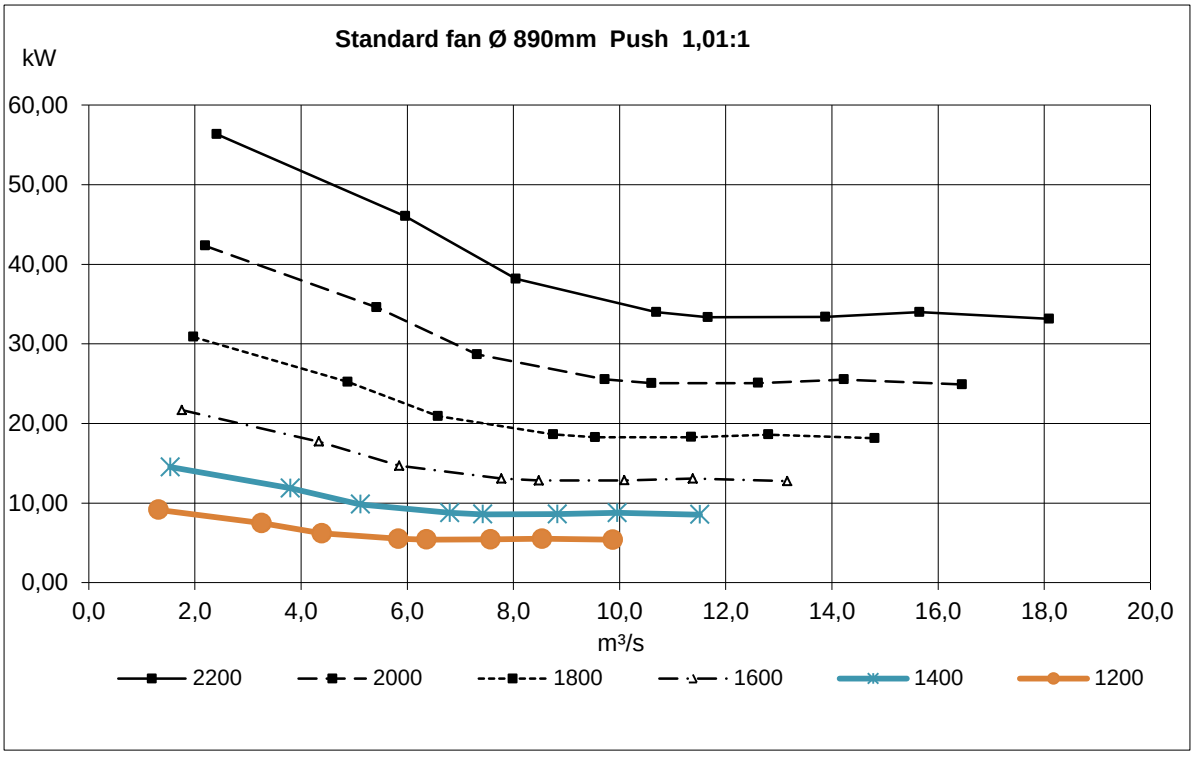

dB(A)
Sound power level
Total sound level at full load
120
118
116
114
112
110
108
106
104
102
100
98
96
0
500
1000
1500
2000
2500
rpm
IFN Power 285 kW


Outer circuit restriction kPa
Outer circuit restriction versus coolant flow
200
180
160
140
120
100
80
60
40
20
0
0
1
2
3
4
5
6
7
8
9
10
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

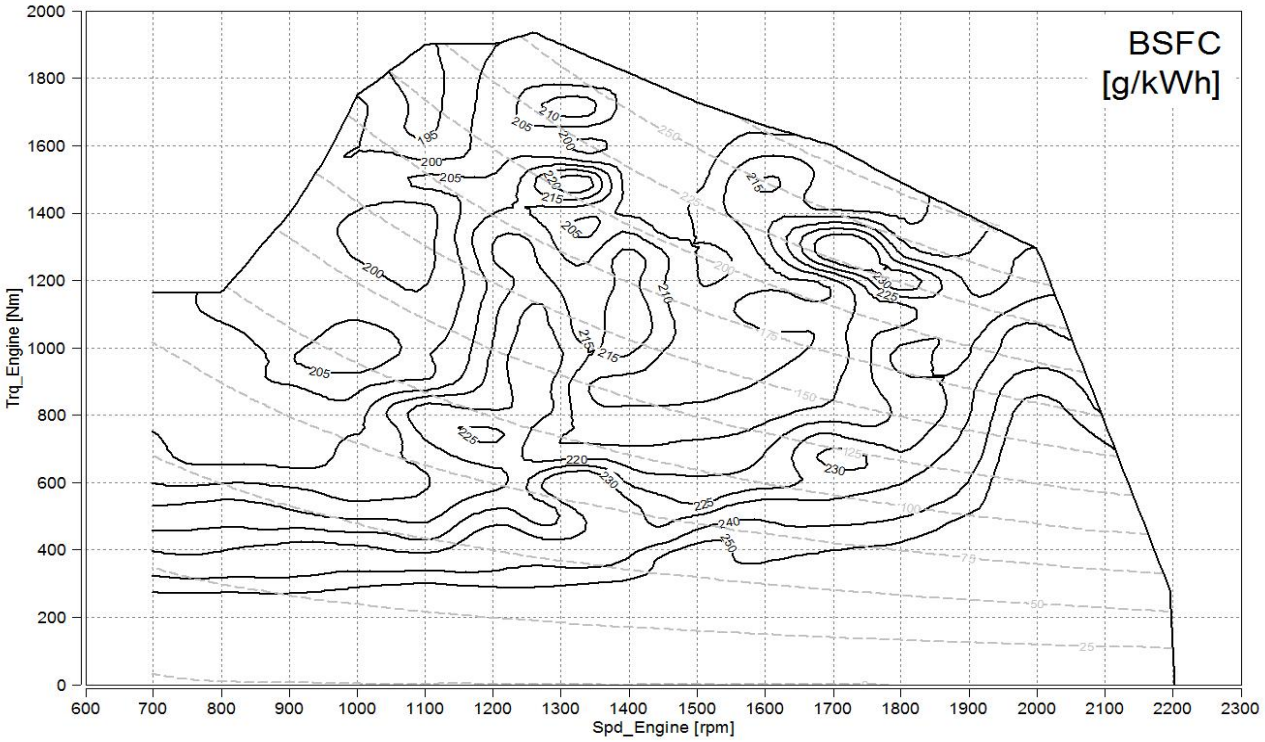

Static Preassure kPa
HD-fan Ø 750mm
Fan rpm=Fan ratio*Engine speed
3,000
2,500
2,000
1,500
1,000
0,500
0,000
0,0000
2,0000
4,0000
6,0000
8,0000
10,0000
12,0000
m³/s
2200
2000
1800
1600
1400
1200 fan rpm


kW
HD-fan Ø 750mm
Fan rpm=Fan ratio*Engine speed
35
30
25
20
15
10
5
0
0,0000
2,0000
4,0000
6,0000
8,0000
10,0000
12,0000
14,0000
m³/s
2200
2000
1800
1600
1400
1200


Standard fan Ø 890mm Push 1,01:1
Static Preassure
kPa
4
3,5
3
2,5
2
1,5
1
0,5
0
0,0
2,0
4,0
6,0
8,0
10,0
12,0
14,0
16,0
18,0
20,0
m³/s
2200
2000
1800
1600
1400
1200


Standard fan Ø 890mm Push 1,01:1
kW
60,00
50,00
40,00
30,00
20,00
10,00
0,00
0,0
2,0
4,0
6,0
8,0
10,0
12,0
14,0
16,0
18,0
20,0
m³/s
2200
2000
1800
1600
1400
1200

BSFC [g/kWh]



Fuel consumption [l/h]