VOLVO PENTA **TAD1172VE**	Document No **22294509**	Issue Index **09**

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, 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	231 314	254 345	261 355	243 330
Torque at:		IFN Power 285 kW		Nm lbf ft	1900 1401	1732 1277	1601 1181	1294 954
Max torque at engine speed		rpm	1260 rpm	Nm lbf ft	1900 1401			
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 285 kW		MPa psi	2,20 320	2,01 291	1,86 269	1,50 218
Max combustion pressure at:		IFN Power 285 kW		MPa psi	16 2320	15 2175	15 2175	13 1885
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	29 39	36 49	49 67
Derating see Technical Diagrams								

Engine brake performance (only engines with VCB)		rpm	1200	1500	1900	2200
Brake power:	without fan	kW	70	120	170	185
		hp	95	163	231	252
Brake torque:	without fan	Nm	557	764	854	803
		lbf ft	411	563	630	592
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	-15	
		°F	5	
	with manifold heater 3 kW	°C	-25	
		°F	-13	
	with manifold heater 3 kW and block heater	°C	-35	
		°F	-31	
*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)		Vol%	0,05	
Oil system capacity including filters		liter	37	
		US gal	9,77	
Oil pan capacity: (both variants)	Max	liter	32	
		US gal	8,45	
	Min	liter	27	
		US gal	7,00	
Oil change intervals/specifications	VDS3	h	1000	
	VDS4	h	1000	
Engine angularity limits:	front up	°	30	
	front down	°	30	
	side tilt	°	30	
Oil pressure at rated speed		kPa	350 - 600	
		psi	51 - 87	
Lubrication oil temperature in sump:	max	°C	130	
		°F	266	
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	20 1,0
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 inlet connection and high tank/low tank positions)	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
Governor type/make, standard		Volvo/EMS2.3
Injection pump type/make		
Specific UREA consumption in Nonroad Transient Cycle (NRTC)	Vol%	5,4
Fuel to conform to		Fuel equal to or better than EN590:2009 or ASTM D975-09 and Max sulphur 15ppm

Intake and exhaust system		**rpm**	**1200**	**1500**	**1700**	**2000**
Charge air consumption at: (+25°C and 100kPa)	IFN Power 285 kW	m³/min cfm	15,4 544	19,9 703	21,2 749	22,3 788
⚠ **See front page for important information** Max allowable air intake restriction including piping		kPa psi		6 0,9		
Heat rejection to exhaust at:	IFN Power 285 kW	kW BTU/min	162 9213	198 11260	229 13023	247 14047
Exhaust gas temperature after turbine at:	IFN Power 285 kW	°C °F	466 871	446 835	482 900	492 918
⚠ **See front page for important information** Max allowable back pressure in exhaust line (after turbine) Pipe dimension Ø: 125 mm		kPa psi	10 1,5	15 2,2	16 2,3	17 2,5
⚠ **See front page for important information** Max allowable temperature drop between turbine and SCR muffler inlet.		Δ°C Δ°F	10 18	10 18	10 18	10 18
SCR muffler pressure drop (at exhaust gas flow and exhaust temp given)		kPa psi	7 1,0	10 1,5	9 1,3	9 1,3
Exhaust gas flow at: (temp and pressure after turbine at the corresponding power setting)	IFN Power 285 kW	m³/min cfm	37,5 1324	44,8 1582	49,5 1748	52,5 1854

Cooling system			rpm	1200	1500	1700	2000
Heat rejection radiation from engine at:		IFN Power 285 kW	kW	8	8	9	9
			BTU/min	455	455	512	512
Heat rejection to coolant at:		IFN Power 285 kW	kW	108	125	139	150
			BTU/min	6142	7109	7905	8530
Coolant			Yellow Volvo Coolant Solution (VCS)				
Radiator cooling system type				Closed circuit			
Standard radiator core area			m²	0,8			
			foot²	8,61			
			m²	0,8			
			foot²	8,61			
Fan diameter	890mm		mm	890			
			in	35,04			
	890mm		mm	890			
			in	35,04			
Fan power consumption	890mm		kW	8,0	18,0	24,0	28,0
			hp	11	24	33	38
	890mm		kW				
			hp				
Fan drive ratio	fan Ø890			1,01:1 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	6,2	6,8	7,1
			US gal/s	1,3	1,6	1,8	1,9
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 285 kW	kW	39	51	52	52
		BTU/min	2218	2900	2957	2957
Charge air mass flow	IFN Power 285 kW	kg/s	0,3	0,39	0,42	0,44
Charge air inlet temp.	IFN Power 285 kW	°C	167	176	171	166
(Charge air temp after turbo compressor)		°F	333	349	340	331
⚠ **See front page for important information** Max allowable Charge air outlet temp.		°C	41	47	48	49
(Charge air temp after charge air cooler)		°F	106	117	118	120
⚠ **See front page for important information** Maximum pressure drop over charge air cooler incl. piping		kPa	12			
		psi	1,74			
Charge air pressure		kPa	188	203	190	171
(After charge air cooler)		psi	27,27	29,44	27,56	24,80
Standard charge air cooler core area		m²	0,8			
		foot²	8,61			

Cooling performance: 0,8 m² radiator and 890 fan

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	m^3/s	ft^3/s	Pa	psi
1700	285						
(fix 1,01)		71	160	7	247,2	0	0,000
		68	154	6,2	219,0	126	0,018
		64	147	5,5	194,2	250	0,036

Engine management system

Functionality	Alternatives			Default setting
Governor mode	Droop	Isochronous		Isochronous
Governor droop	10	127	Nm/rpm	
Governor response	Adjustable PI constants			
Idle speed	600	900	rpm	700
Preheating function	Ignition	Request	Request + temp	If preheat is available, preheat will be active at ignition on if temp low or demanded by driver.
Ignition off stops engine	Yes	No		No

Engine sensors and switch settings					Engine protection action		
Parameter		Unit	Warning setting (Yellow)	Alarm setting	Default	Optional (Module or
Oil temp		°C	125	130	Derate	Shut down.
Oil pressure	Low idle	kPa	80	55,0	Shut down	Shut down.
	Rated speed	kPa	300	275	Shut down	Shut down.
Oil level			Low level	N/A	Fault code only	Fault code only
Piston cooling pressure >1000 rpm		kPa	Not avaliable on this engine			
Coolant temp		°C	105	107	Derate	Shut down.
Coolant level			N/A	Low level	Derate	Shut down.
Fuel feed pressure	Low idle	kPa	See Fuel pressure limits	N/A	Fault code only	Fault code only
	Rated speed			N/A	Fault code only	Fault code only
Water in fuel			Alarm when closed	N/A	Fault code only	Fault code only
EGR temp		°C	N/A	N/A	N/A	N/A
Air filter pressure drop		kPa	5	N/A	Fault code only	Fault code only
Altitude, above sea		m	N/A	N/A	Automatic derating, see section derating	Automatic derating, see section derating
Crank case pressure			N/A	Alarm at	Shut down	Shut down.
Charge air temp		°C	120	125	Derate	Shut down.
Charge air pressure		kPa	See Charge air pressure limits		Derate	Shut down.
SCR temp		°C	N/A	N/A	Automatic derating	Automatic derating
Engine overspeed		rpm	2400	N/A	Fault code only	Fault code only

Derate parameters	Derated 0% to engine protection map	Derated 100% to engine protection map	Forced idle after 5 sec	Forced shut down after 0 sec
Oil temp	130°C	132°C	N/A	N/A
Coolant temp	107°C	108°C	N/A	N/A
Charge air temp	125°C	126°C	N/A	N/A
EGR temp	N/A	N/A	N/A	N/A
Low oil pressure	See Oil pressure limits		N/A	At alarm
Charge air pressure	See Charge air pressure limits		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	
Power relay for the manifold heater			A			1	
Max wiring resistance main circuit			mΩ			3	
Conditions:	**Temperature**		**°C**		**25**	**0**	**-15**
(4 mΩ main circuit resistance@	**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 evalueated			
Front end belt pulley load. Direction of load viewed from flywheel side:	max left	kW hp	NA	NA	NA	NA
	max down	kW hp	NA	NA	NA	NA
	max right	kW hp	NA	NA	NA	NA

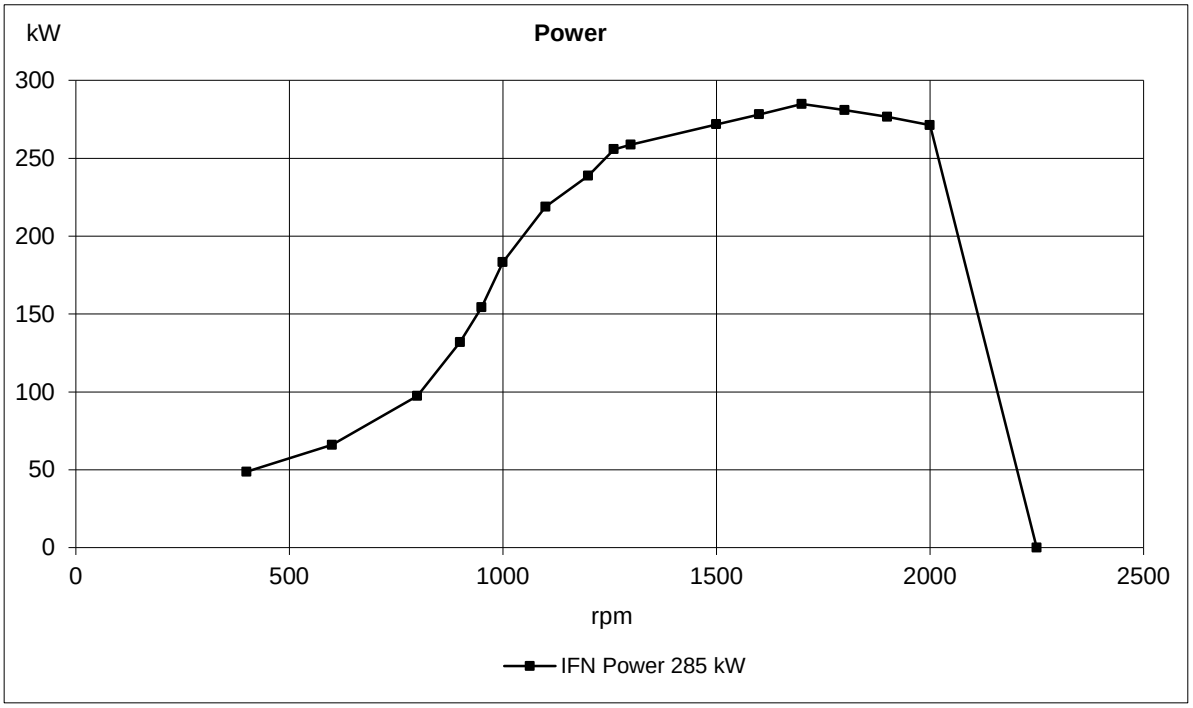
Power take off - Rear with Flywheel housing Standard

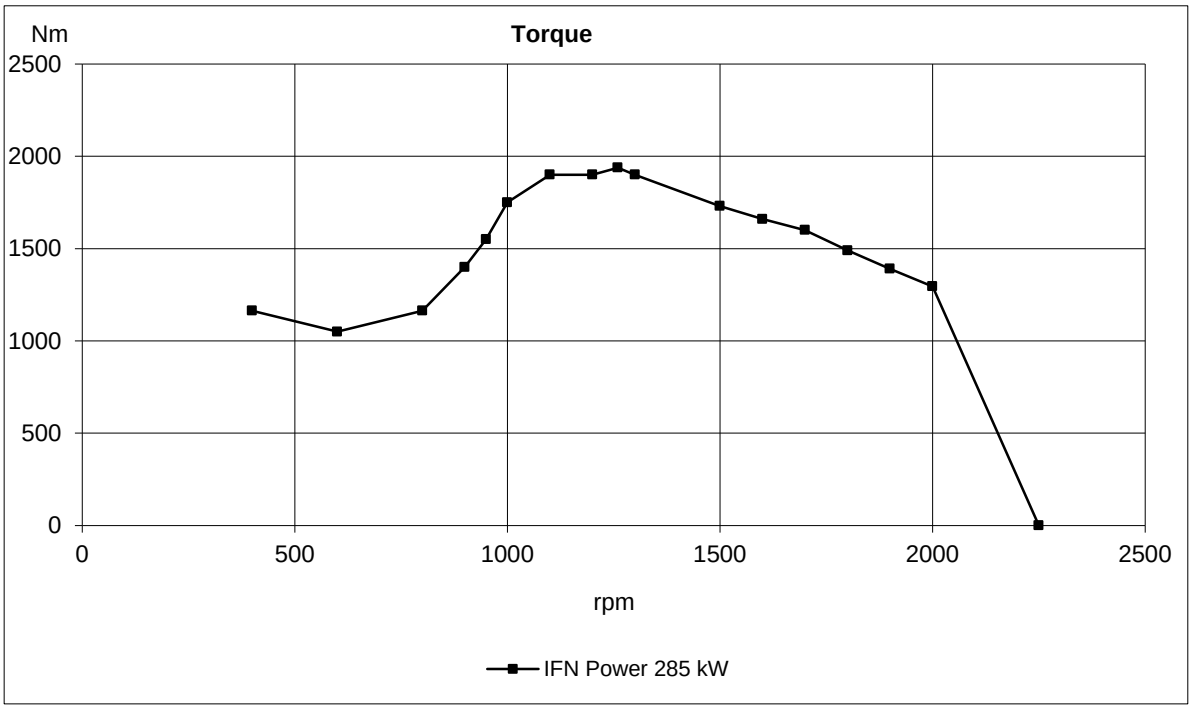
Continuous torque on timing gear at rear PTO* SAE B spline	Nm lbf ft	300 221
Continuous torque on timing gear at rear PTO* DIN 5462 spline	Nm lbf ft	650 479
Speed ratio direction of rotation viewed from flywheel side		1,08:1 / ccw
Continuous torque on timing gear at compressor PTO* SAE B spline	Nm lbf 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

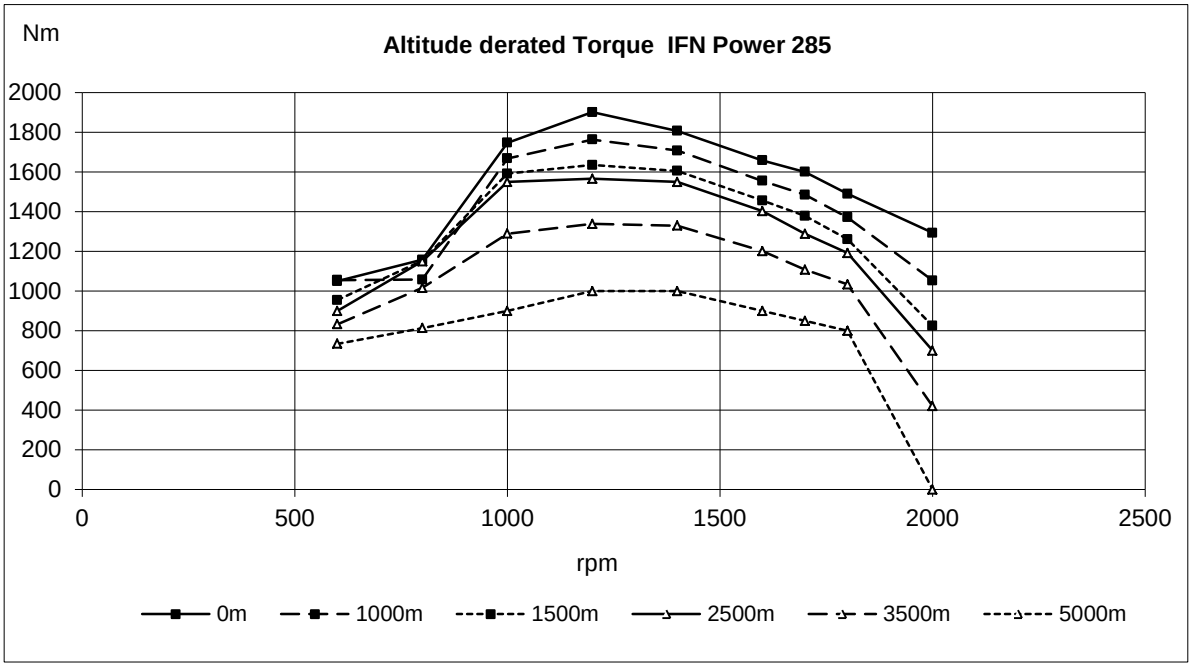
Power take off - Rear with Flywheel housing Twin PTO

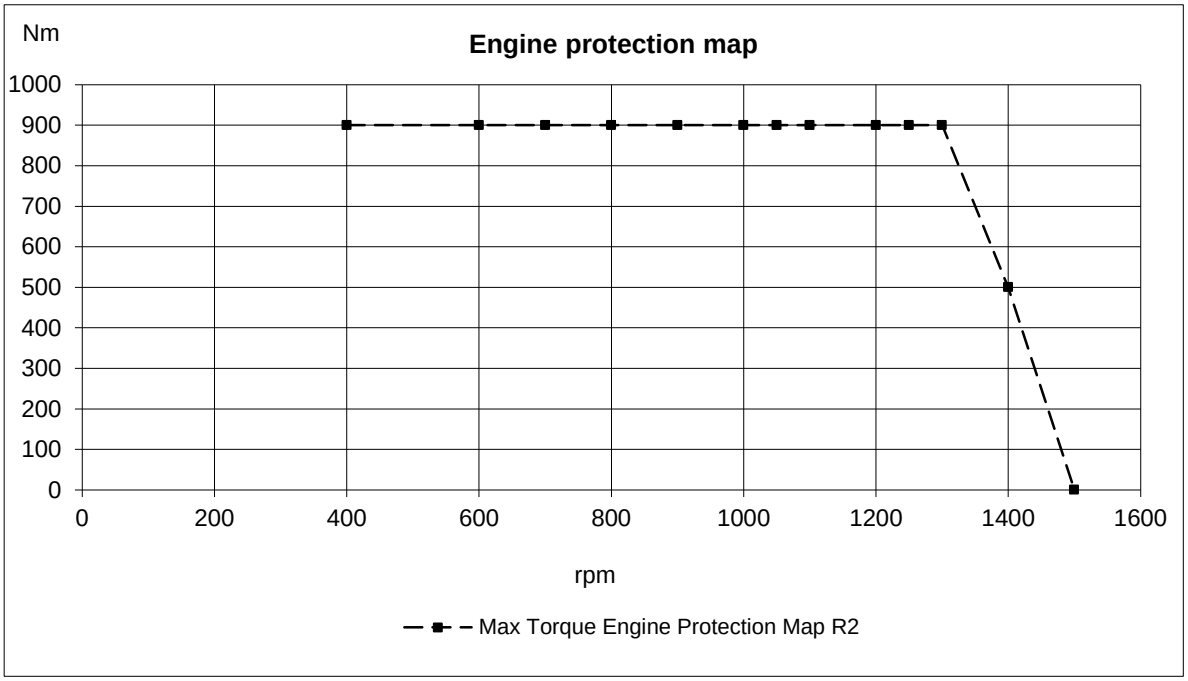
Drive front LHS / RHS		1x11031509, 1" / 1x11031017, 7/8"
Drive rear		2x11031509, 1"
Pump flange		4xSAE B
Gear ratio engine / PTO		1:1,222
Max PTO power output: **	kW / rpm	129 / 2000
Torque used at max PTO power output: *	Nm lbf ft	616 454
Continous power output : ***	kW	40,5
Torque used at 1200 rpm with allowed continuous power output	Nm lbf ft	322 237
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	650 479
Speed ratio direction of rotation viewed from flywheel side		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

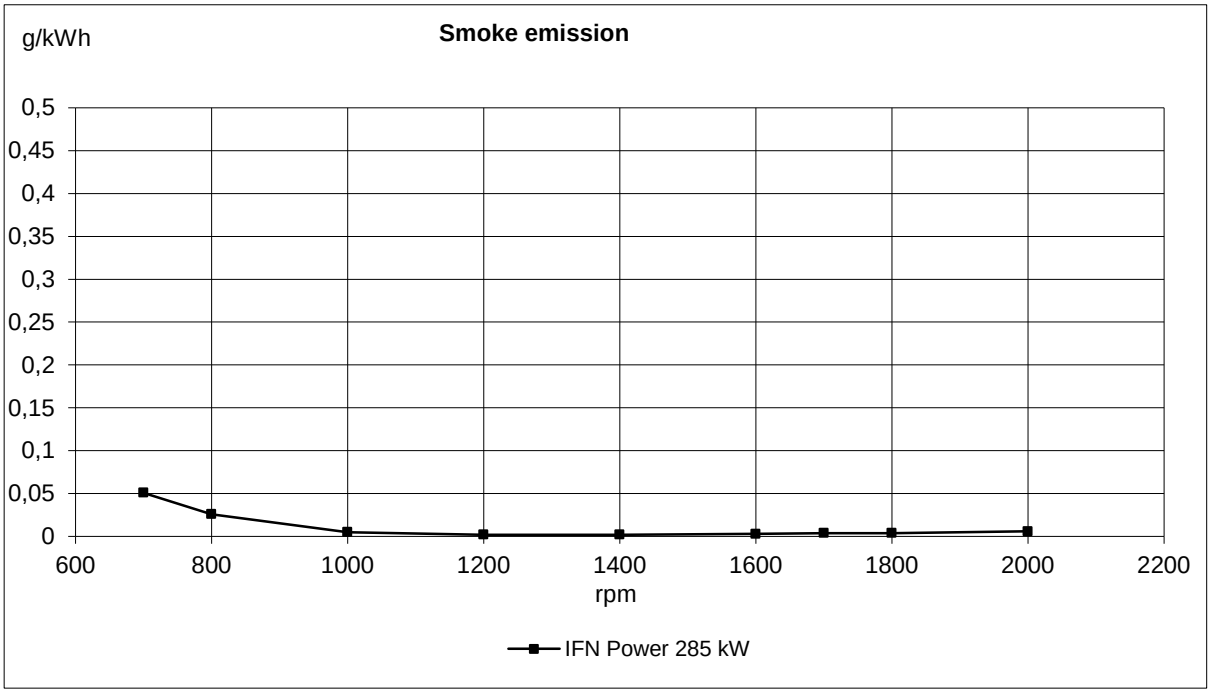
**** Maximum allowed torque at individual PTO´s.***
If more than one PTO output is used simultaneously, calculations needs to be performed to determine available maximum. Available torque depends on application inertia.
***** During maximum 5 seconds, 10 times/hour.***
****** Maximum 20,25 kW per LHS PTO´s and RHS PTO´s. The difference in output load must not exceed 15 kW between LHS PTO´s and RHS PTO´s.***

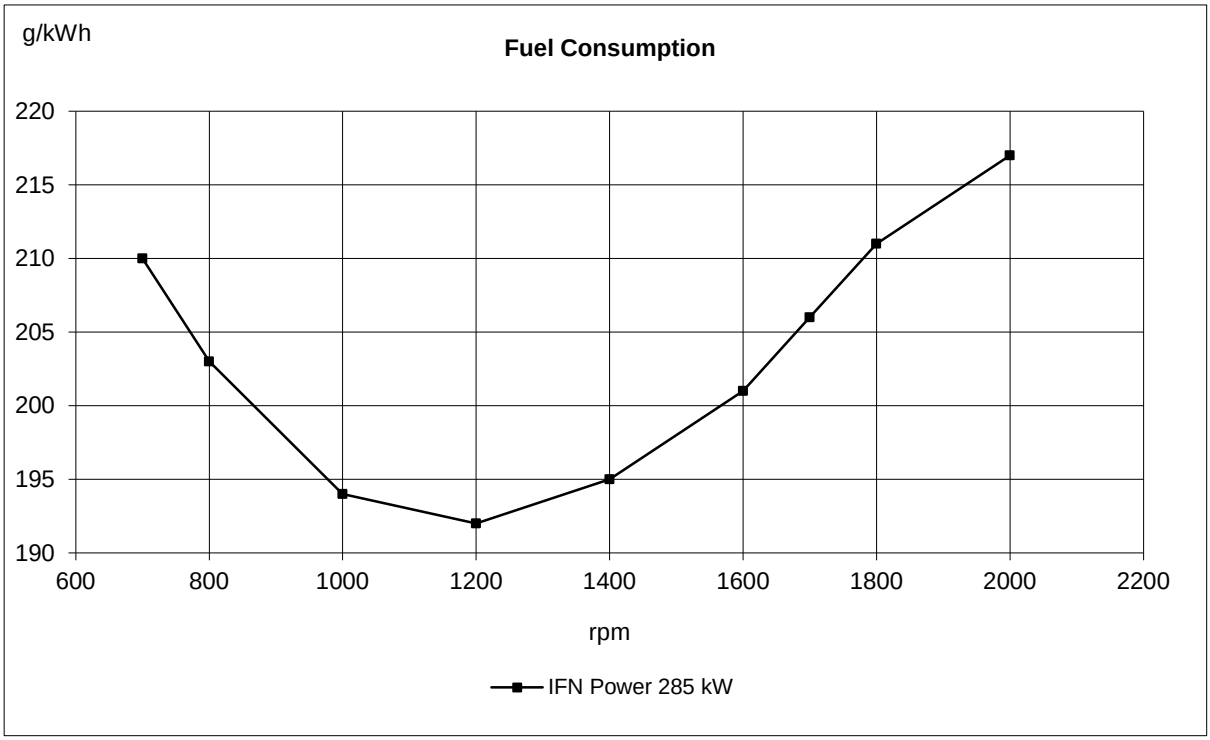

kW
Power
300
250
200
150
100
50
0
0
500
1000
1500
2000
2500
rpm
IFN Power 285 kW

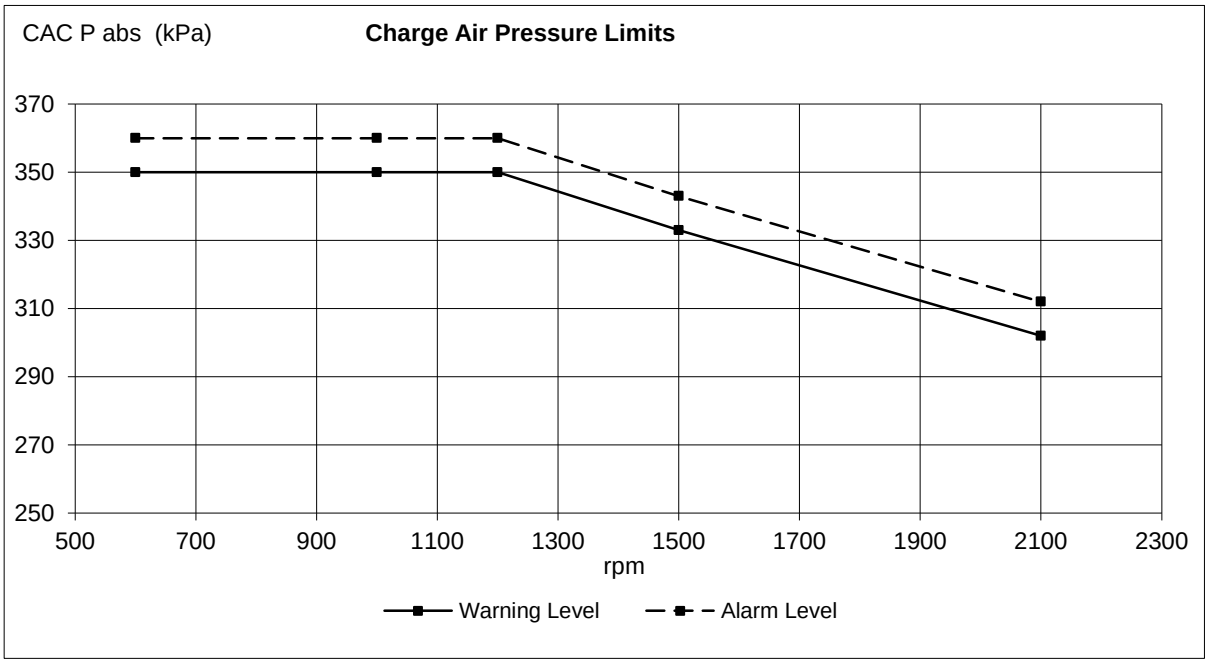

Nm
Torque
2500
2000
1500
1000
500
0
0
500
1000
1500
2000
2500
rpm
IFN Power 285 kW

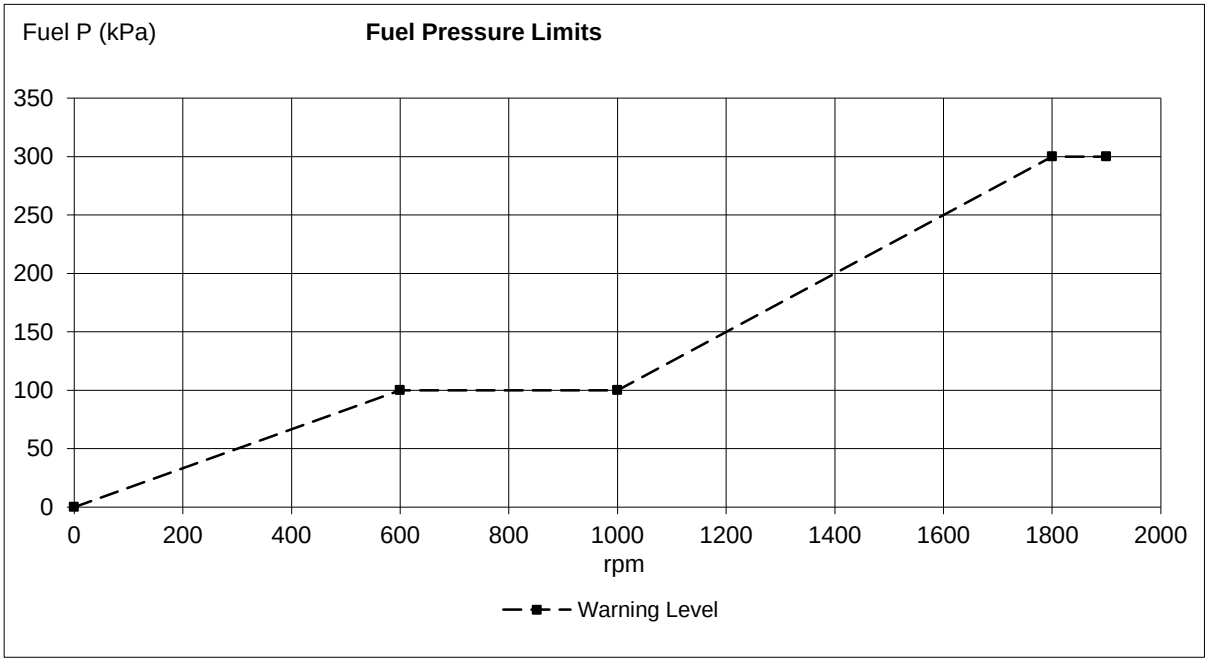

Nm
Altitude derated Torque IFN Power 285
2000
1800
1600
1400
1200
1000
800
600
400
200
0
0
500
1000
1500
2000
2500
rpm
0m
1000m
1500m
2500m
3500m
5000m

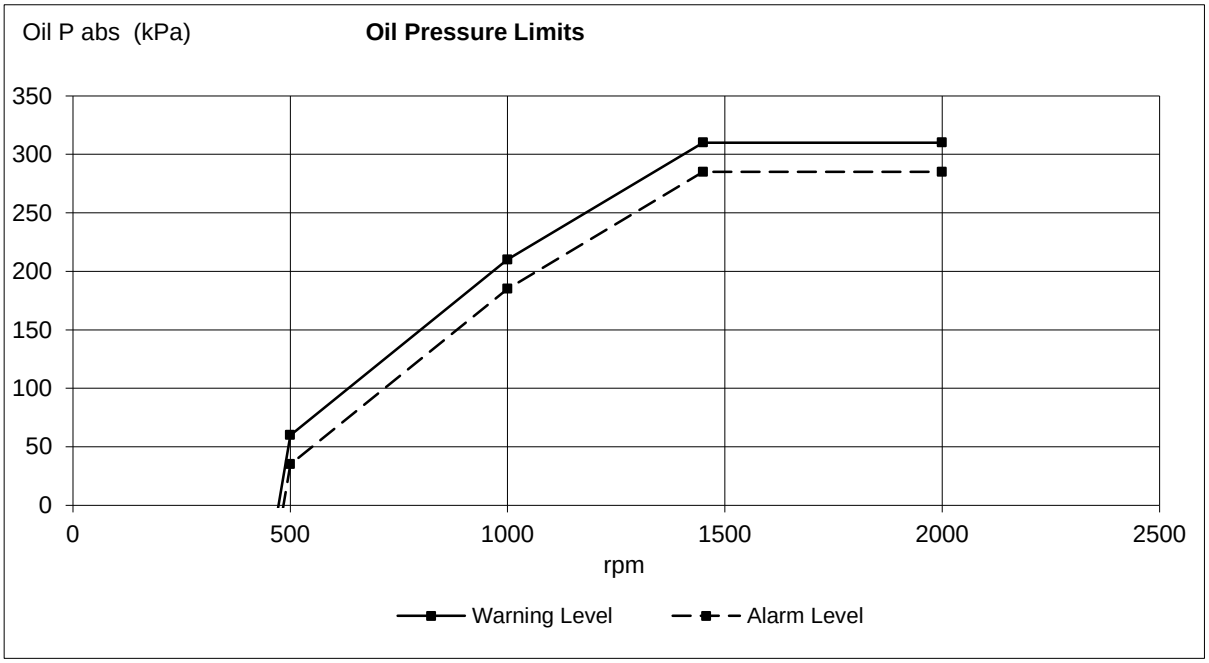

Nm
Engine protection map
1000
900
800
700
600
500
400
300
200
100
0
0
200
400
600
800
1000
1200
1400
1600
rpm
Max Torque Engine Protection Map R2

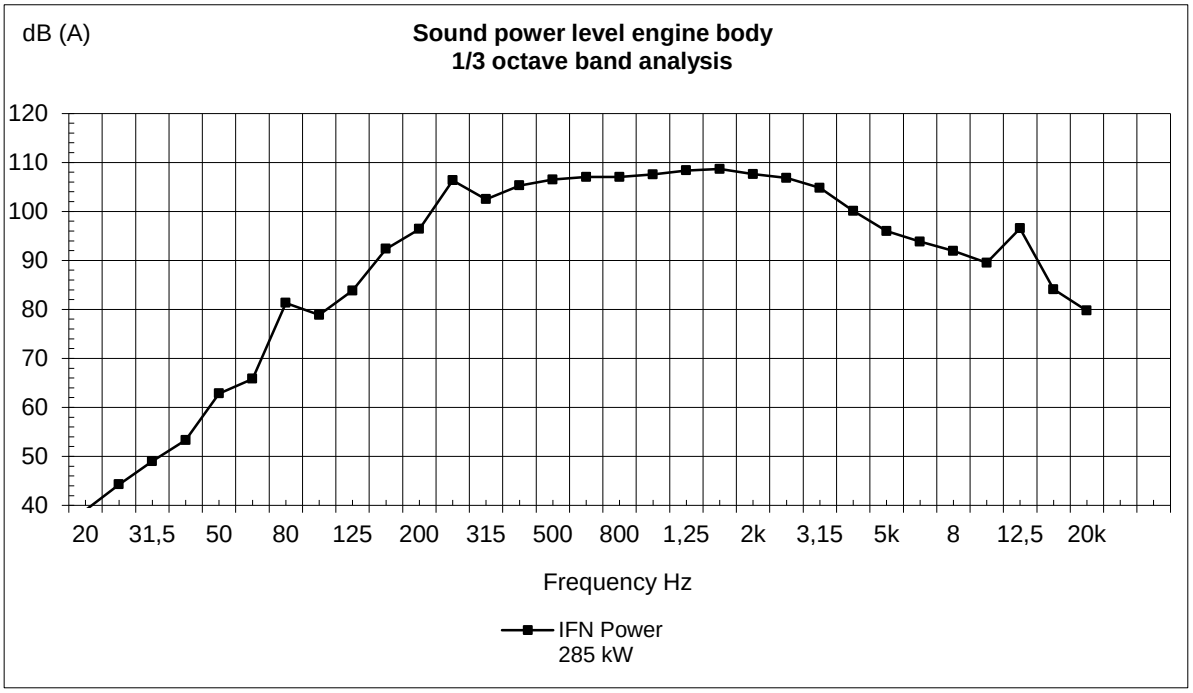

Smoke emission
g/kWh
0,5
0,45
0,4
0,35
0,3
0,25
0,2
0,15
0,1
0,05
0
600
800
1000
1200
1400
1600
1800
2000
2200
rpm
IFN Power 285 kW

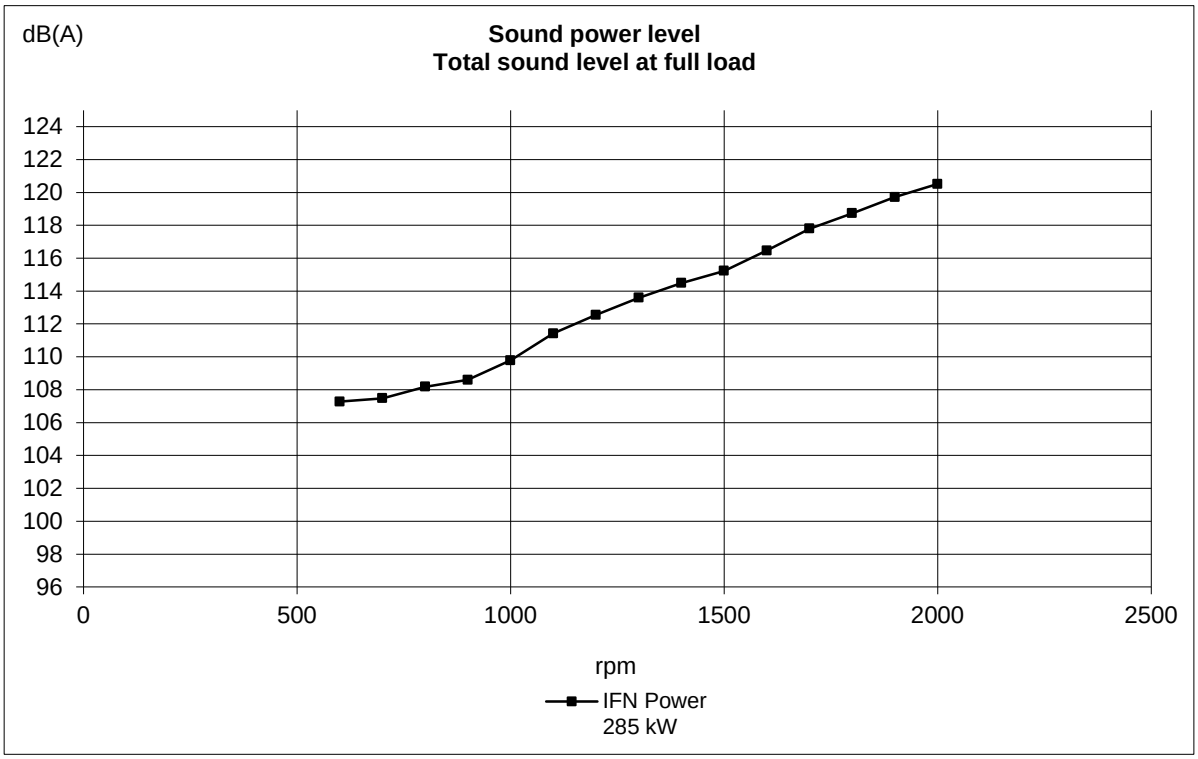

Fuel Consumption
g/kWh
220
215
210
205
200
195
190
600
800
1000
1200
1400
1600
1800
2000
2200
rpm
IFN Power 285 kW

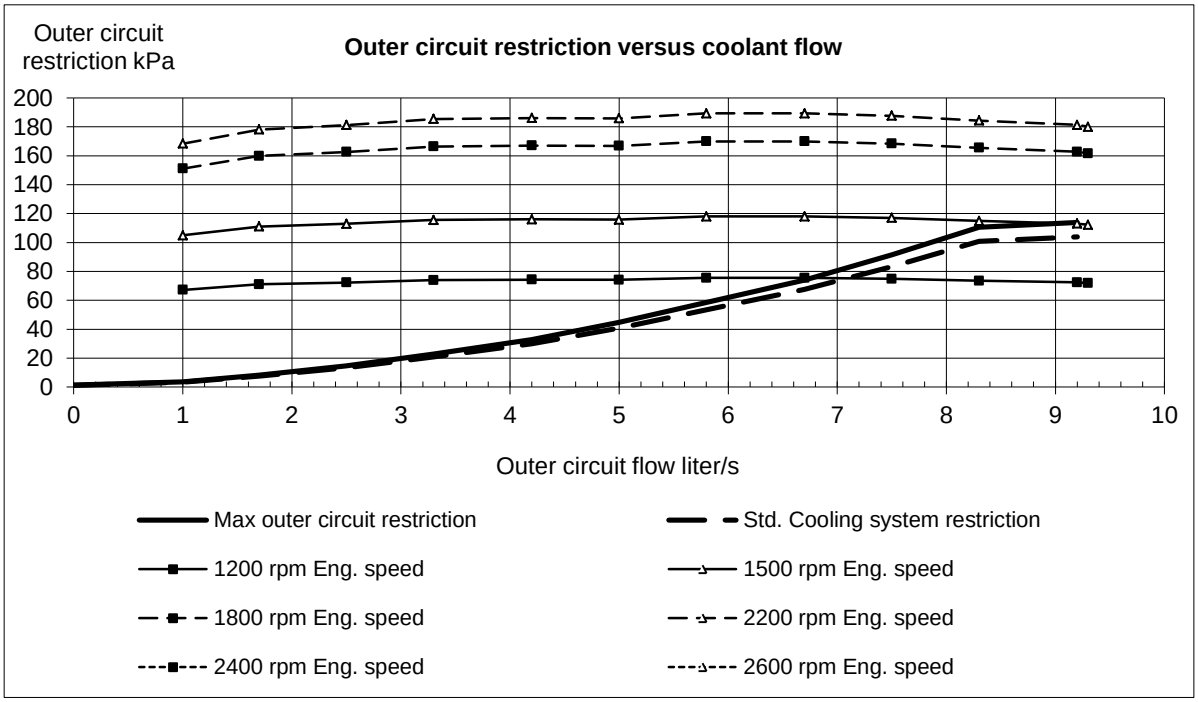

CAC P abs (kPa)
Charge Air Pressure Limits
370
350
330
310
290
270
250
500
700
900
1100
1300
1500
1700
1900
2100
2300
rpm
Warning Level
Alarm Level

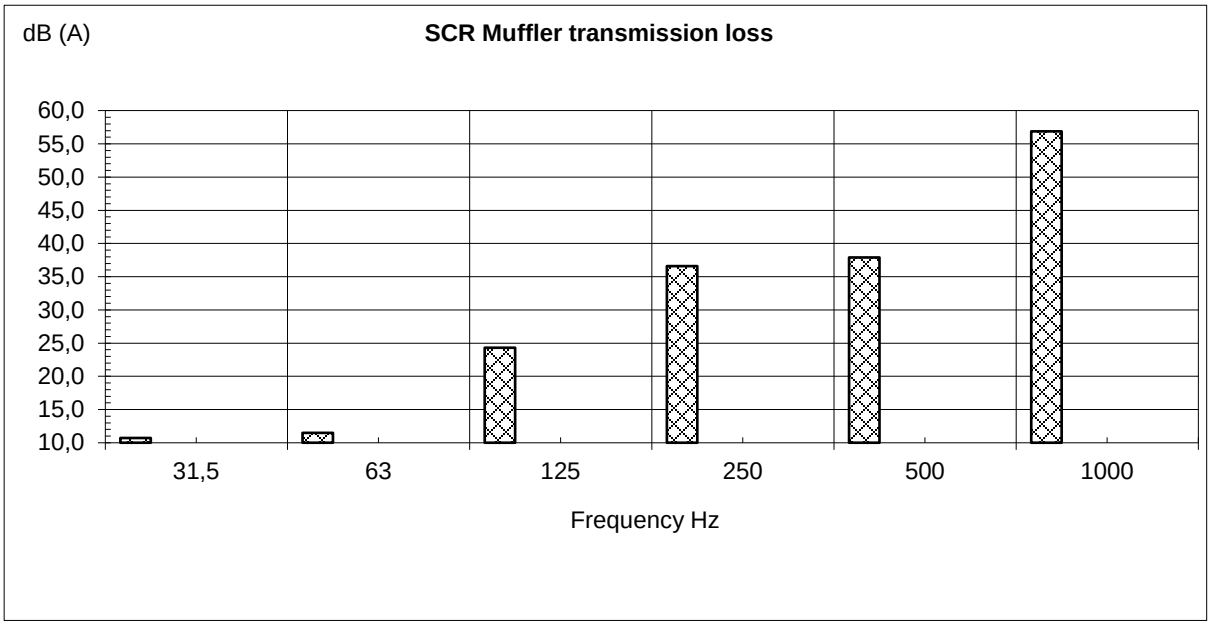

Fuel P (kPa)
Fuel Pressure Limits
350
300
250
200
150
100
50
0
0
200
400
600
800
1000
1200
1400
1600
1800
2000
rpm
Warning Level

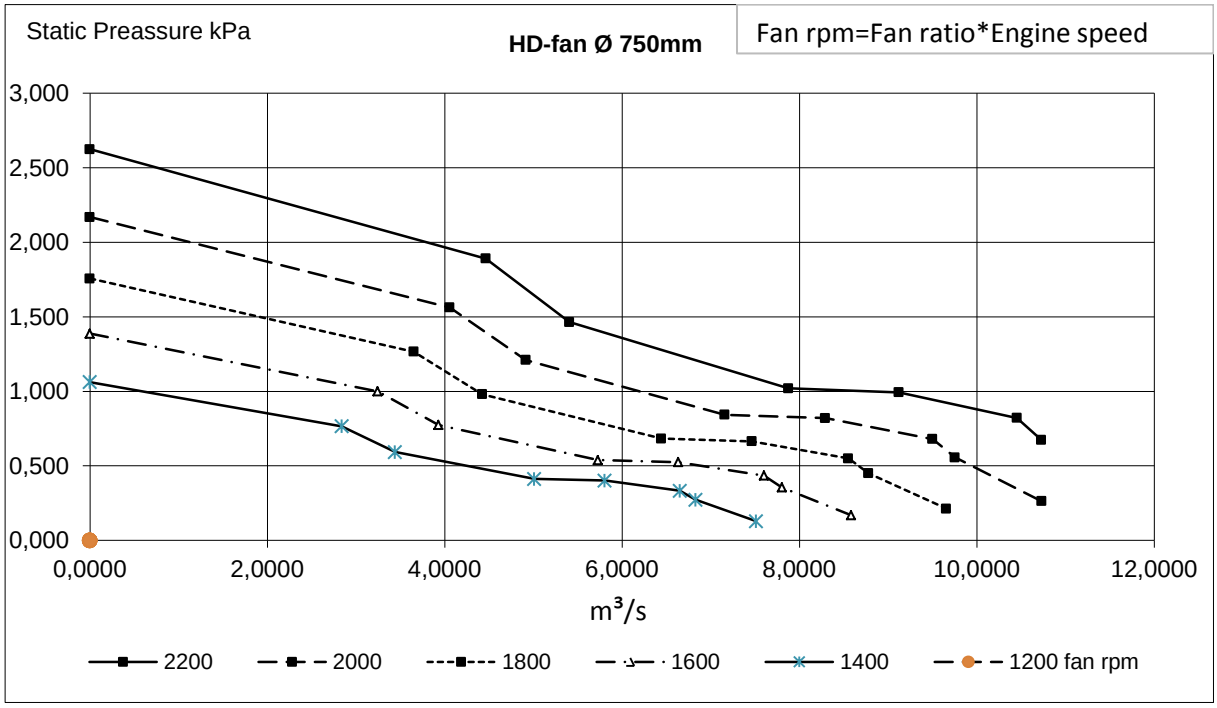

Oil P abs (kPa)
Oil Pressure Limits
350
300
250
200
150
100
50
0
0
500
1000
1500
2000
2500
rpm
Warning Level
Alarm Level

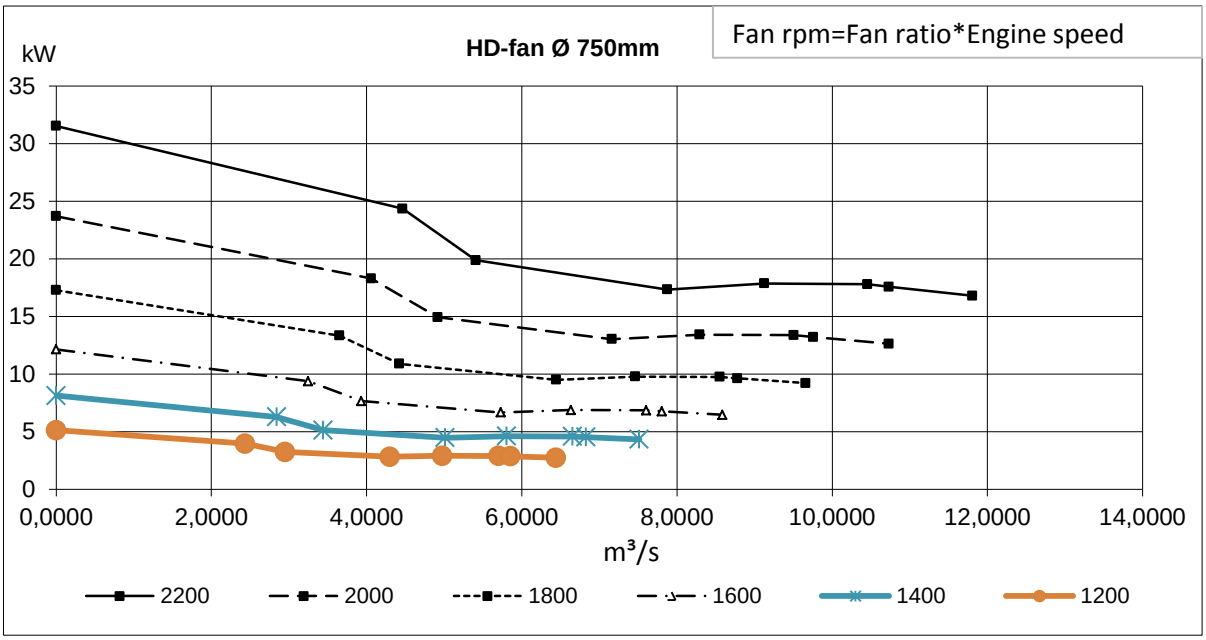

dB (A)
Sound power level engine body
1/3 octave band analysis
120
110
100
90
80
70
60
50
40
20
31,5
50
80
125
200
315
500
800
1,25
2k
3,15
5k
8
12,5
20k
Frequency Hz
IFN Power
285 kW

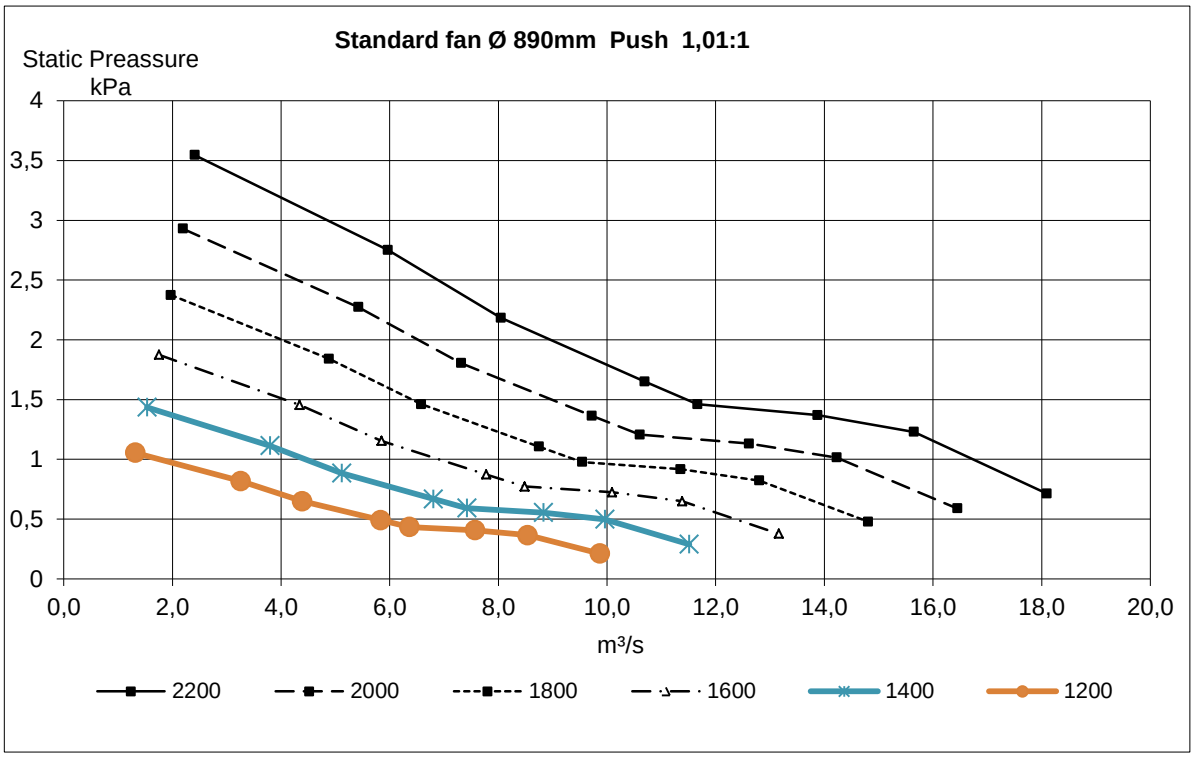

dB(A)
Sound power level
Total sound level at full load
124
122
120
118
116
114
112
110
108
106
104
102
100
98
96
0
500
1000
1500
2000
2500
rpm
IFN Power
285 kW

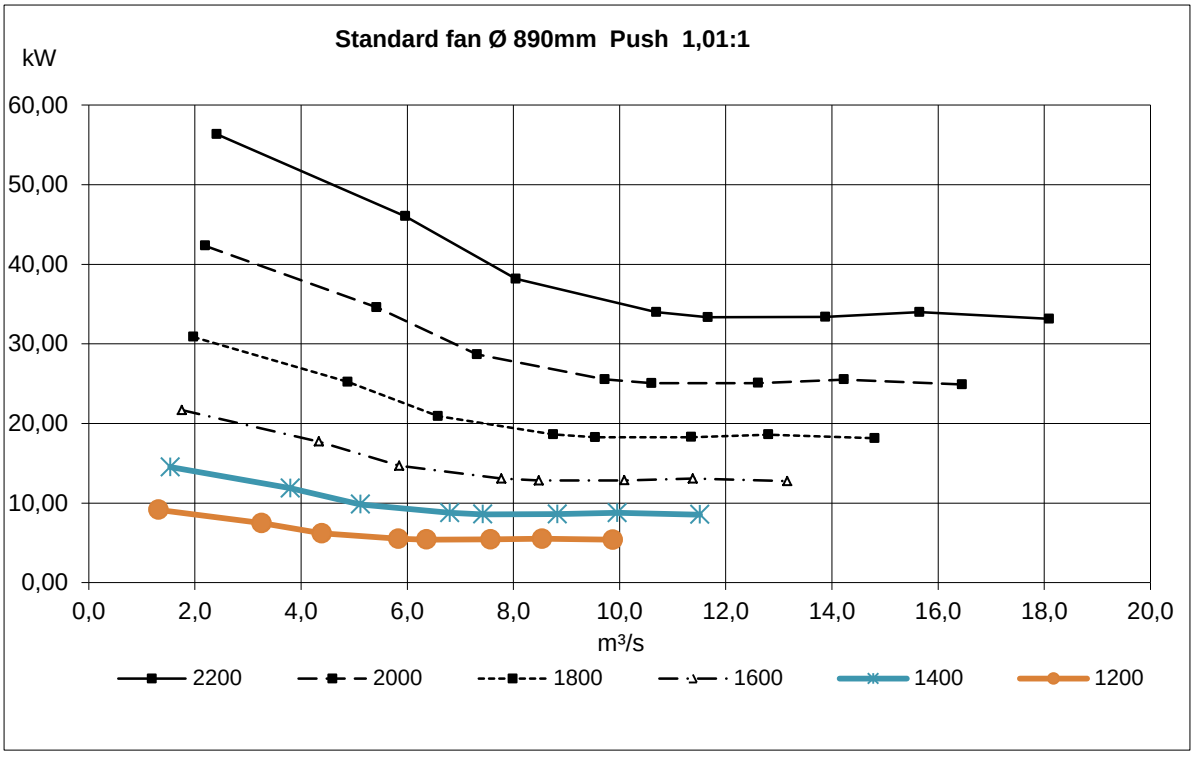

Outer circuit restriction kPa
Outer circuit restriction versus coolant flow
200
180
160
140
120
100
80
60
40
20
0
0
1
2
3
4
5
6
7
8
9
10
Outer circuit flow liter/s
Max outer circuit restriction
Std. Cooling system restriction
1200 rpm Eng. speed
1500 rpm Eng. speed
1800 rpm Eng. speed
2200 rpm Eng. speed
2400 rpm Eng. speed
2600 rpm Eng. speed


dB (A)
SCR Muffler transmission loss
60,0
55,0
50,0
45,0
40,0
35,0
30,0
25,0
20,0
15,0
10,0
31,5
63
125
250
500
1000
Frequency Hz

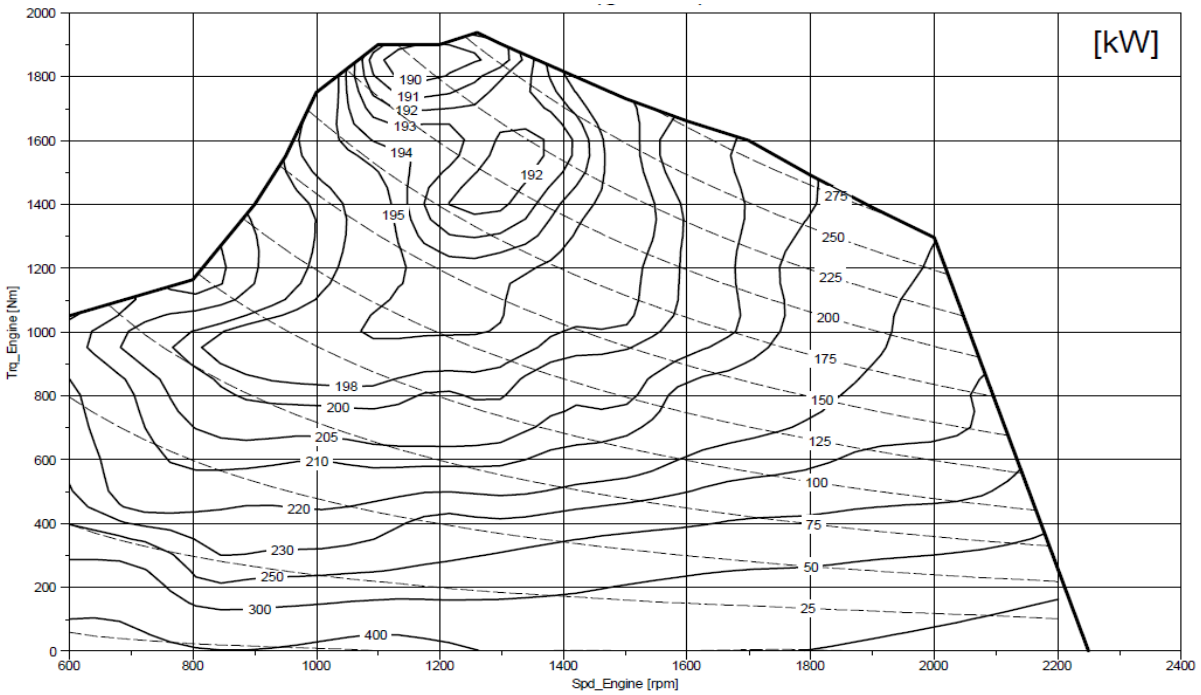

Static Preassure kPa
HD-fan Ø 750mm
Fan rpm=Fan ratio*Engine speed
3,000
2,500
2,000
1,500
1,000
0,500
0,000
0,0000
2,0000
4,0000
6,0000
8,0000
10,0000
12,0000
m³/s
2200
2000
1800
1600
1400
1200 fan rpm


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]