


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  ; 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 diesel engine with direct injection. Rotation direction, counterclockwise viewed towards flywheel

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

Performance				rpm	1200	1500	1700	2000
IFN Power	285 kW	without fan		kW	239	272	285	271
				hp	325	370	388	369
		with fan	890 mm	kW	233	262	271	254
				hp	317	356	369	346
Torque at:	IFN Power			Nm	1900	1730	1600	1295
				lbf ft	1401	1276	1180	955
Max torque at engine speed	IFN Power	rpm	1260 rpm	Nm	1938			
				lbf ft	1429			
Power tolerance				%	±2			
Mean piston speed				m/s	6,1	7,6	8,6	10,1
				ft/sec	19,9	24,9	28,3	33,2
Effective mean pressure at:	IFN Power			MPa	2,20	2,01	1,86	1,50
				psi	320	291	269	218
Max combustion pressure at:	IFN Power			MPa	15,9	15,5	14,6	12,7
				psi	2303	2242	2121	1842
Total mass moment of inertia, J (mR ²) (not including flywheel)				kgm ²	1,034			
				lbft ²	24,5			
Friction Power				kW	20	30	38	52
				hp	27	41	52	71

Derating see Technical Diagrams

Engine brake performance (only engines with VCB)

		rpm	1200	1500	1700	2000
Brake power:	without fan	kW	68	119	155	184
		hp	93	162	211	250
Brake torque:	without fan	Nm	545	757	870	879
		lbf ft	402	559	641	649
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 3.5 kW	°C	-25		
		°F	-13		
	with manifold heater 3.5 kW and block heater	°C	-30		
		°F	-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	37		
		US gal	9,77		
Oil pan capacity: (both variants)	Max	liter	32		
		US gal	8,45		
	Min	liter	27		
		US gal	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		350 - 600		
	psi		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	127		
		°F	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	108
		US gal/h	28,5
Fuel supply line max. restriction (measured at fuel inlet connection)		kPa	10
		psi	1,5
Fuel supply line max. pressure, during engine stand still (measured at fuel inlet connection)		kPa	16,5
		psi	2,4
Fuel supply line min. pressure, during engine stand still (measured at fuel inlet connection)		kPa	-12,5
		psi	-1,8
System return flow at max. Speed		liter/h	30,0
		US gal/h	7,9
Fuel return line max. restriction (measured at fuel return connection)		kPa	20
		psi	2,9
Max. allowable inlet fuel temp (Measured at fuel inlet connection)		°C	60
		°F	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 equal to or better than EN590 or ASTM D 975 (No 1-D, No 2-D) or JIS KK2204		



Intake and exhaust system

		rpm	1200	1500	1700	2000
Charge air consumption at: (+25°C and 100kPa)	IFN Power	m³/min cfm	16,5 584	19,4 684	20,3 717	21,9 775
 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	153,9 8752	191,4 10887	218,4 12420	236,2 13430
Exhaust gas temperature after turbine at:	IFN Power	°C °F	441 825	466 870	500 933	504 940
 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	39,2 1383	45,9 1622	49,8 1759	52,9 1867

Cooling system

		rpm	1200	1500	1700	2000
Heat rejection radiation from engine at:	IFN Power	kW	7,5	8,4	9,4	9,6
		BTU/min	427	475	536	548
Heat rejection to coolant at:	IFN Power	kW	111	128	138	158
		BTU/min	6324	7256	7854	8991
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		m ²	0,8			
		foot ²	8,61			
Fan diameter	890 mm	mm	890			
		in	35,04			
Fan power consumption	890 mm	kW	6,0	9,9	14,0	16,9
		hp	8	13	19	23
Fan drive ratio	fan Ø890	0,9:1 ccw				
Coolant capacity:	engine	liter	17			
		US gal	4,5			
	std. 0,8m ² 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	42,7	46,9	46,1	48,4
		BTU/min	2426	2669	2621	2751
Charge air mass flow	IFN Power	kg/s	0,32	0,38	0,40	0,43
Charge air inlet temp. (Charge air temp after turbo compressor)	IFN Power	°C	178	173	165	163
		°F	353	343	328	325
 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 (Relative, after charge air cooler)		kPa	209	200	183	168
		psi	30,24	28,98	26,51	24,34
Standard charge air cooler core area		m ²	0,8			
		foot ²	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 rpm	Engine power kW hp	Air on temp		Air flow		External restriction	
		°C	°F	kg/s	lb/s	Pa	psi
1700 (fix 0.9)	285 388	64,4	147,8	6,98	15,40	0	
		60,6	141,1	6,21	13,69	150	0,022
		55,0	131,0	5,28	11,65	300	0,044
		47,2	116,9	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 rpm	Engine power kW hp	Air on temp		Air flow		External restriction	
		°C	°F	kg/s	lb/s	Pa	psi
1700 (fix 0.9)	285 388	66,9	152,4	7,84	17,28	0	
		64,3	147,7	7,11	15,66	150	0,022
		60,9	141,6	6,31	13,91	300	0,044
		56,4	133,4	5,49	12,09	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 rpm	Engine power hp	Air on temp		Air flow		External restriction	
		°C	°F	kg/s	lb/s	Pa	psi
1700	285 388	63,5	146,3	6,81	15,00	0	
		59,4	138,9	6,03	13,29	150	0,022
		53,2	127,7	5,08	11,19	300	0,044
		44,4	111,9	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	
		°C	°F	kg/s	lb/s	Pa	psi
1700	285	66,2	151,1	7,65	16,86	0	
	388	63,3	146,0	6,91	15,23	150	0,022
		59,6	139,3	6,09	13,44	300	0,044
		54,7	130,5	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/Shut down Powerpack	
Engine speed	rpm	x % of rated speed	135% of rated speed	Alarm level	Alarm only	

* Off means no shut down, 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:*	Nm lbf ft	Very restricted use, each application needs to be evaluated			
(with a total added mass moment of inertia, J (mR ²) ≤ 0,05 kgm ²)					
Front end belt pulley load. Direction of load viewed from flywheel side:	max left	kW hp	n/a	n/a	n/a
	max down	kW hp	n/a	n/a	n/a
	max right	kW hp	n/a	n/a	n/a

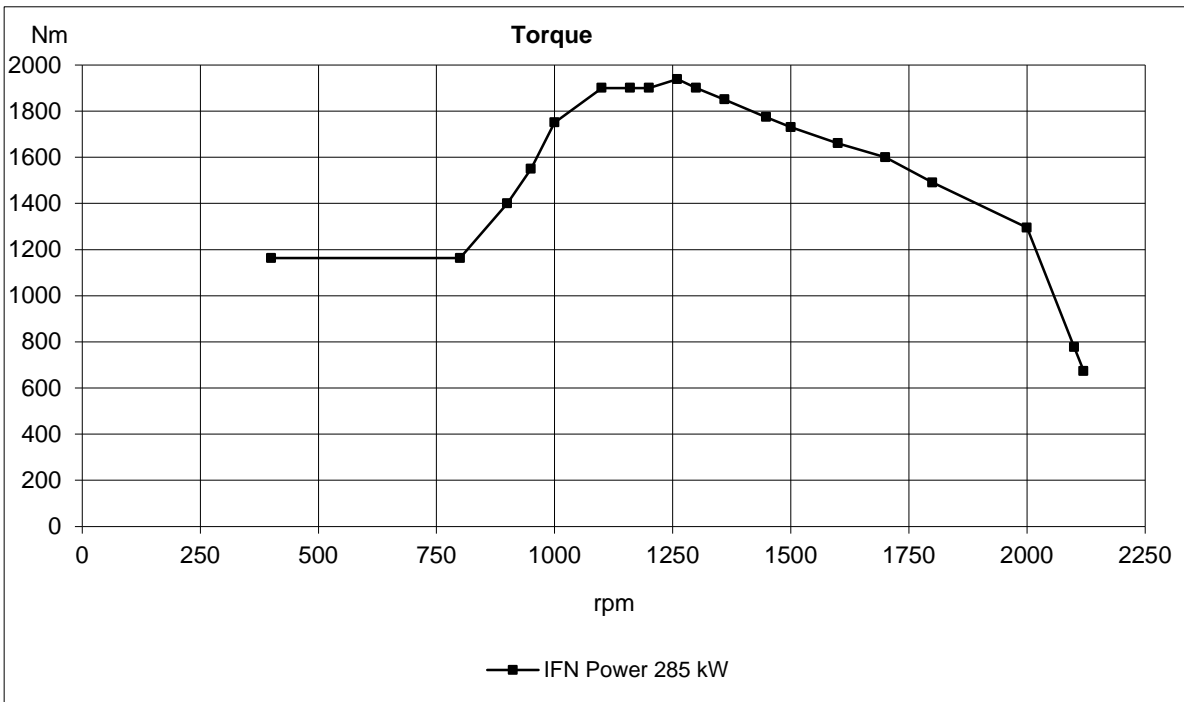
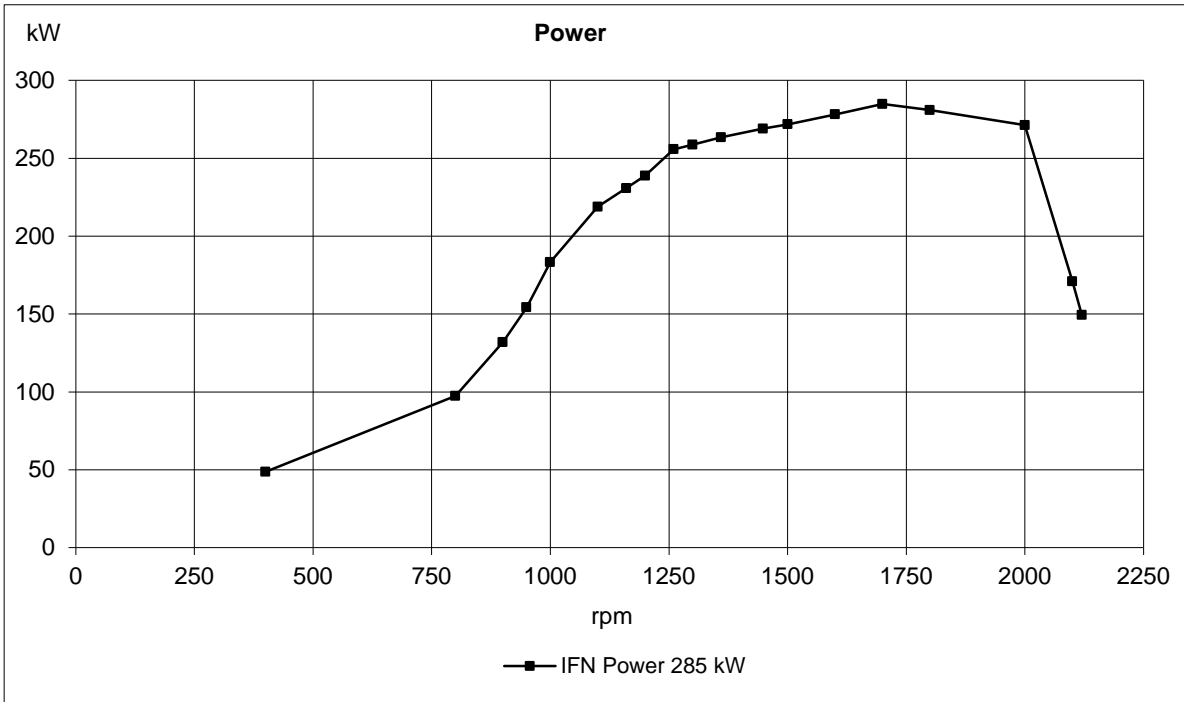
Power take off - Rear with Flywheel housing Standard

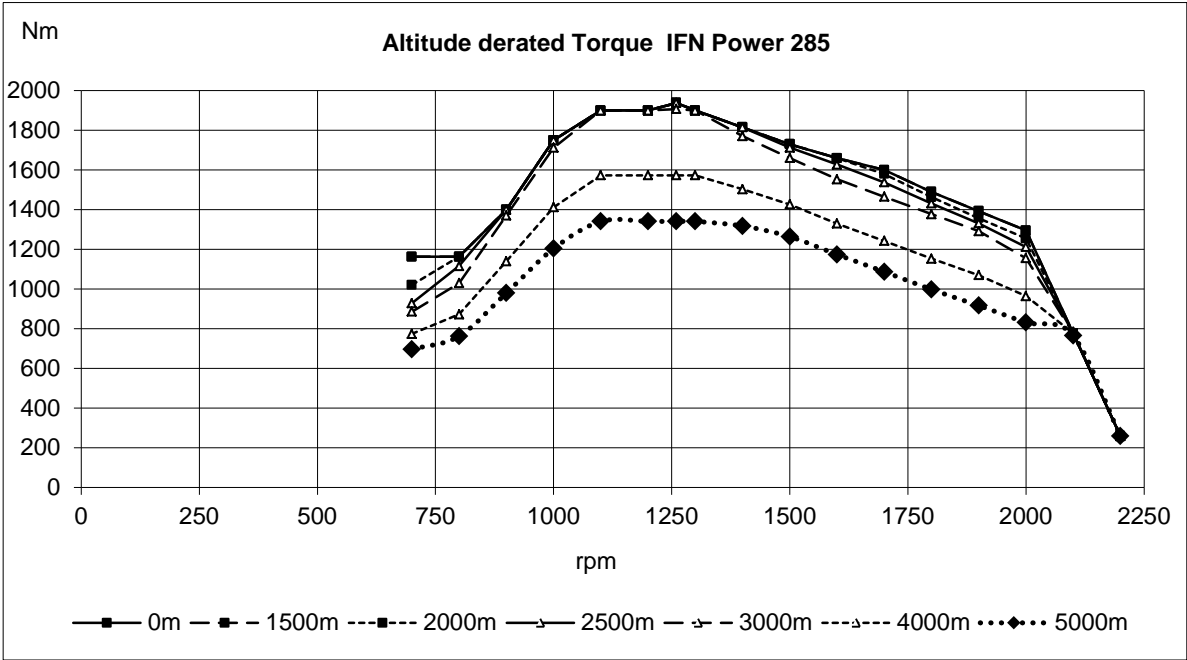
Timing gear at servo pump PTO max:*	Nm lbf ft	100 74
Speed ratio direction of rotation viewed from flywheel side		1,08:1/ccw
Continuous torque on timing gear at rear PTO*, SAE B spline	Nm lbf ft	300 221
Continuous torque on timing gear at rear PTO*, DIN 5462 spline	Nm lbf ft	650 479
Speed ratio direction of rotation viewed from flywheel side for 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

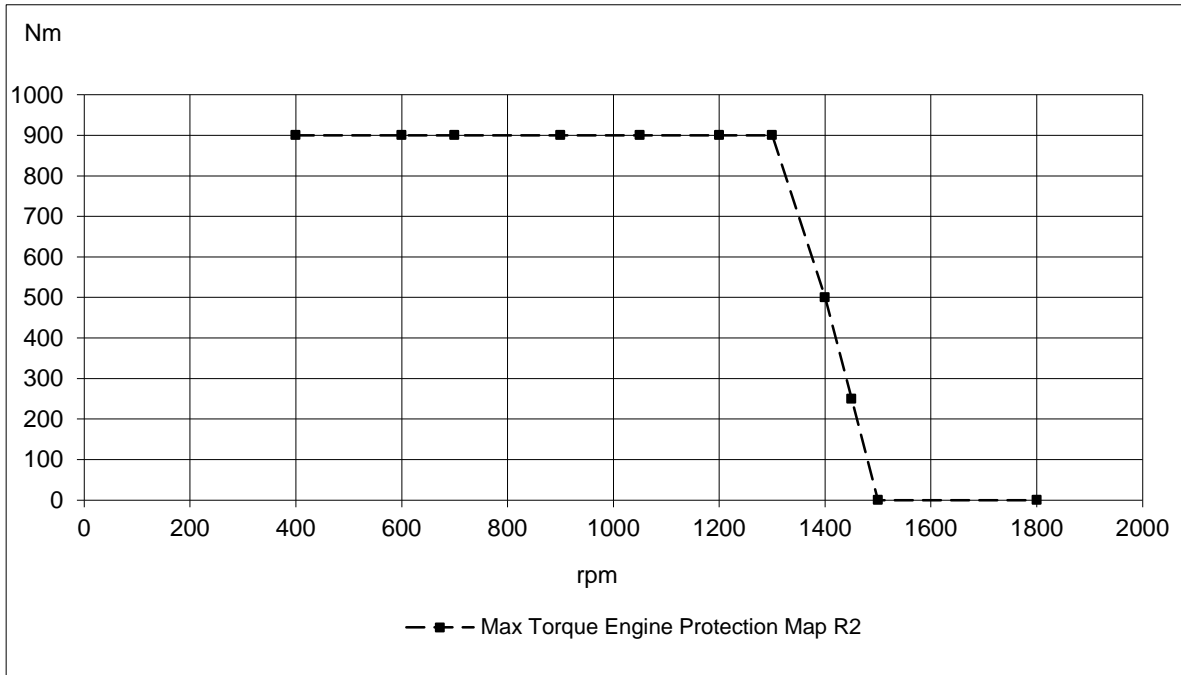
* **Maximum allowed torque at individual PTO's.**

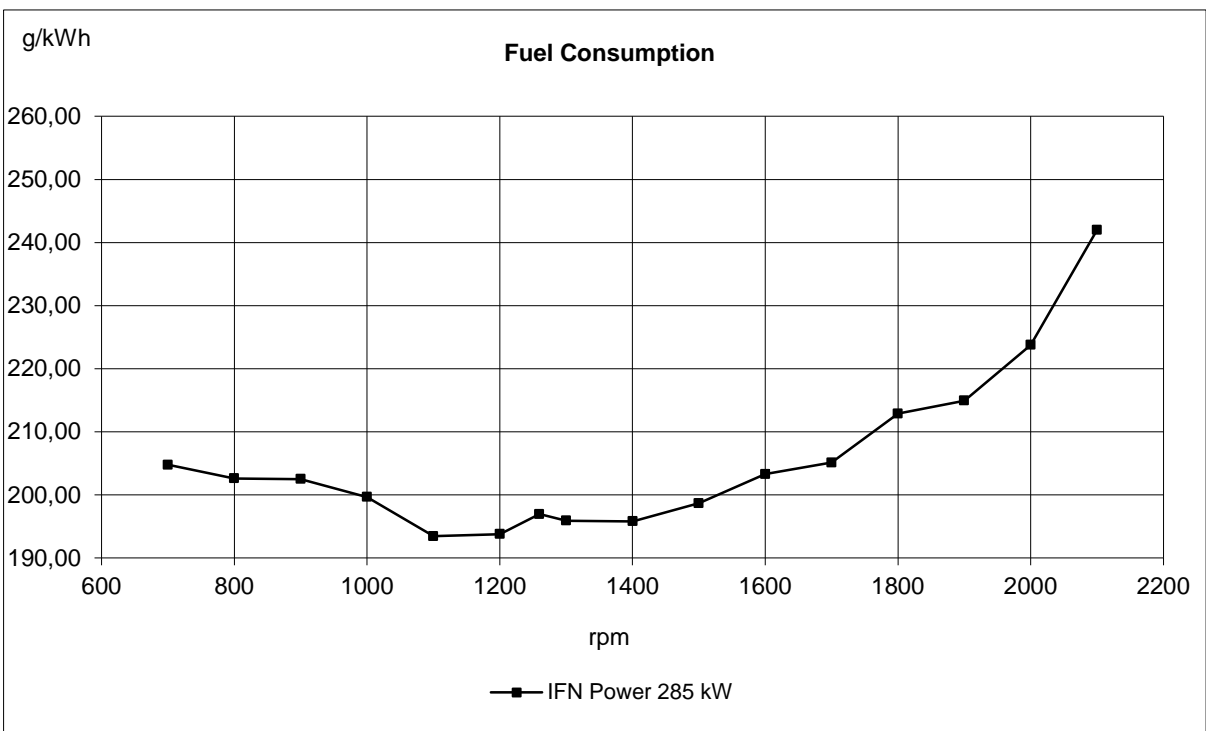
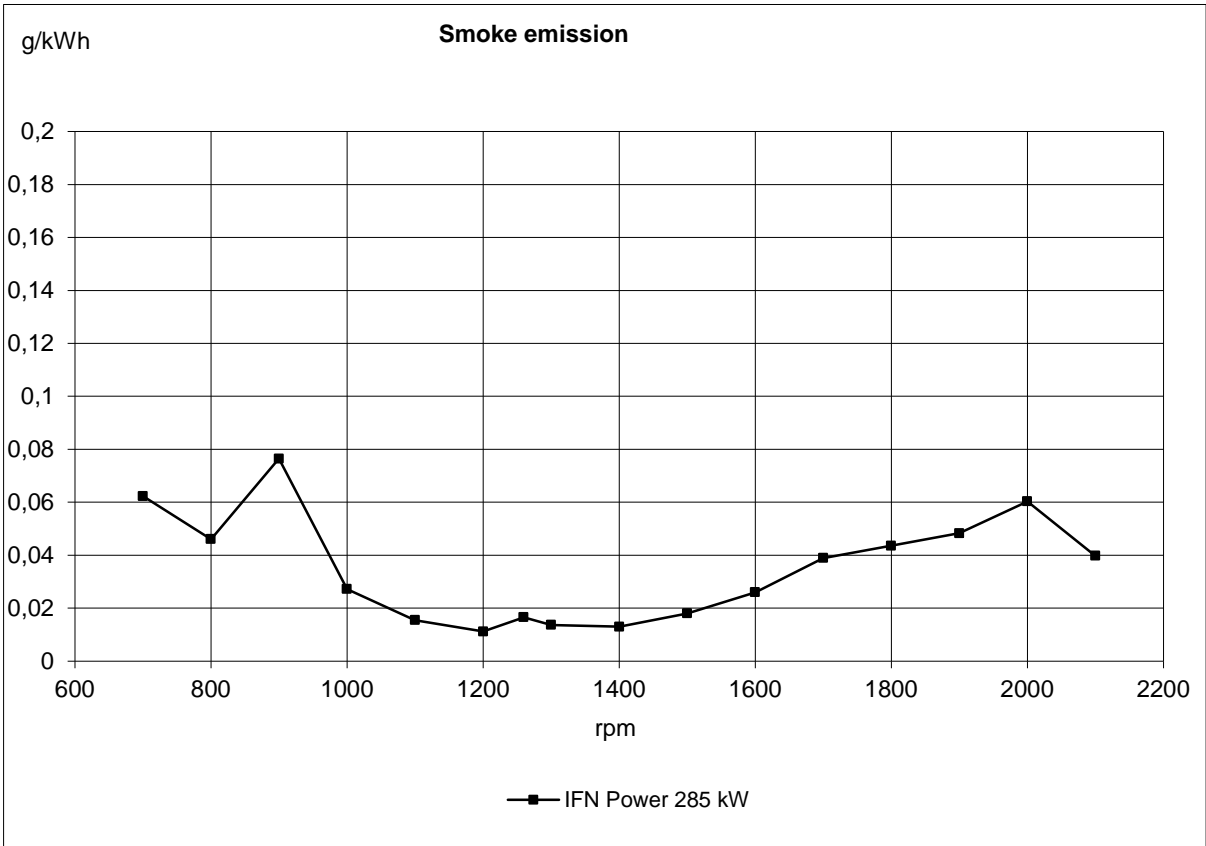
If more than one PTO output is used simultaneously, calculations needs to be performed to determine available maximum.

Available torque depends on application inertia.







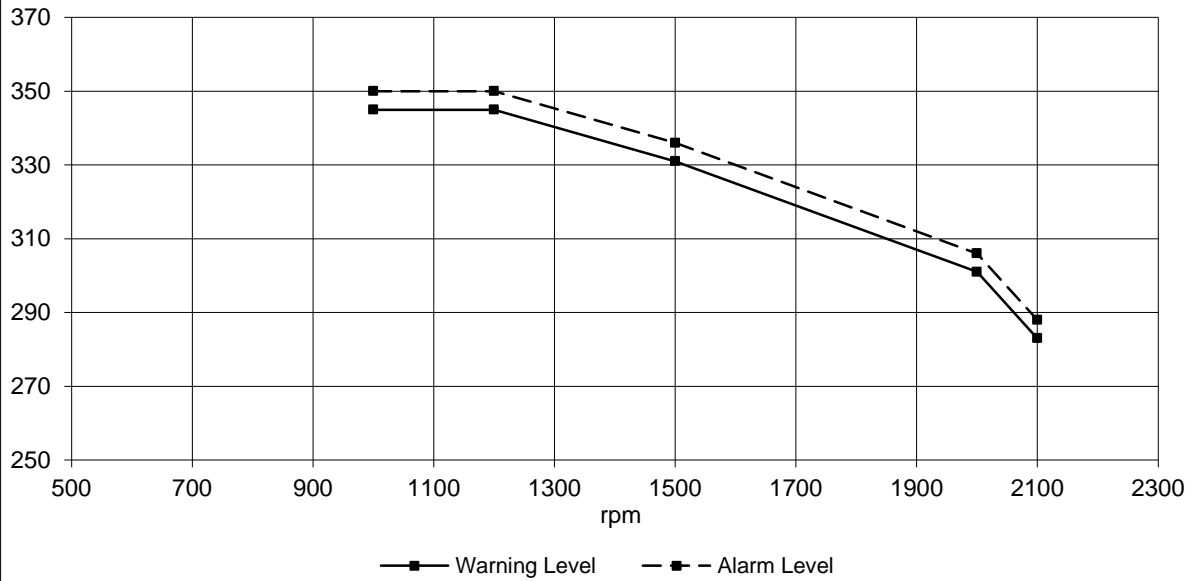


g/kWh

Smoke emission

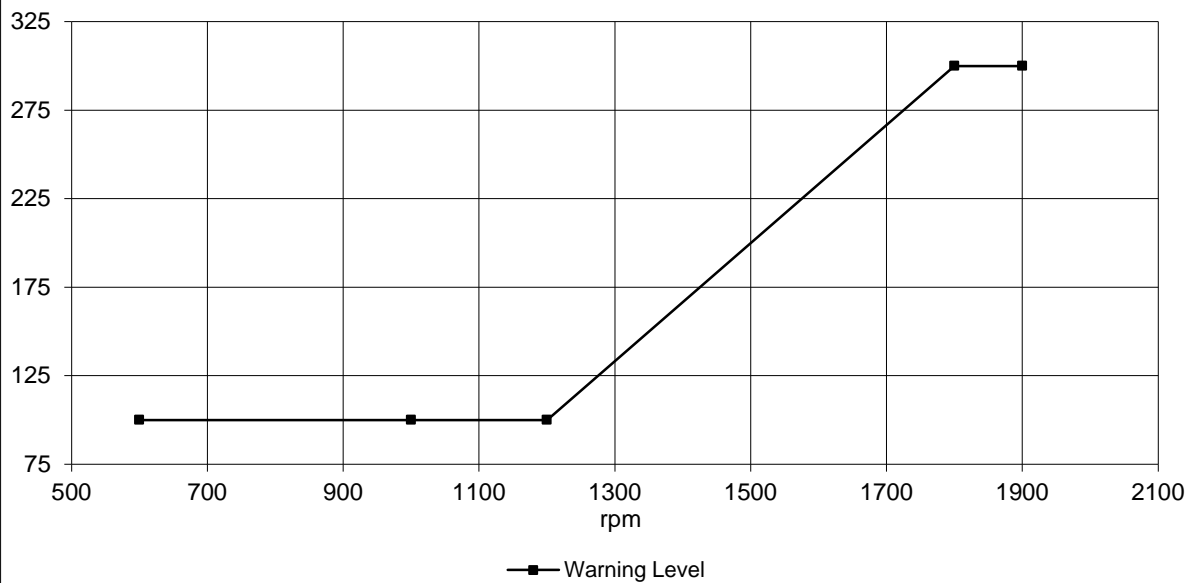
CAC P abs (kPa)

Charge Air Pressure Limits



Fuel P (kPa)

Fuel Pressure Limits

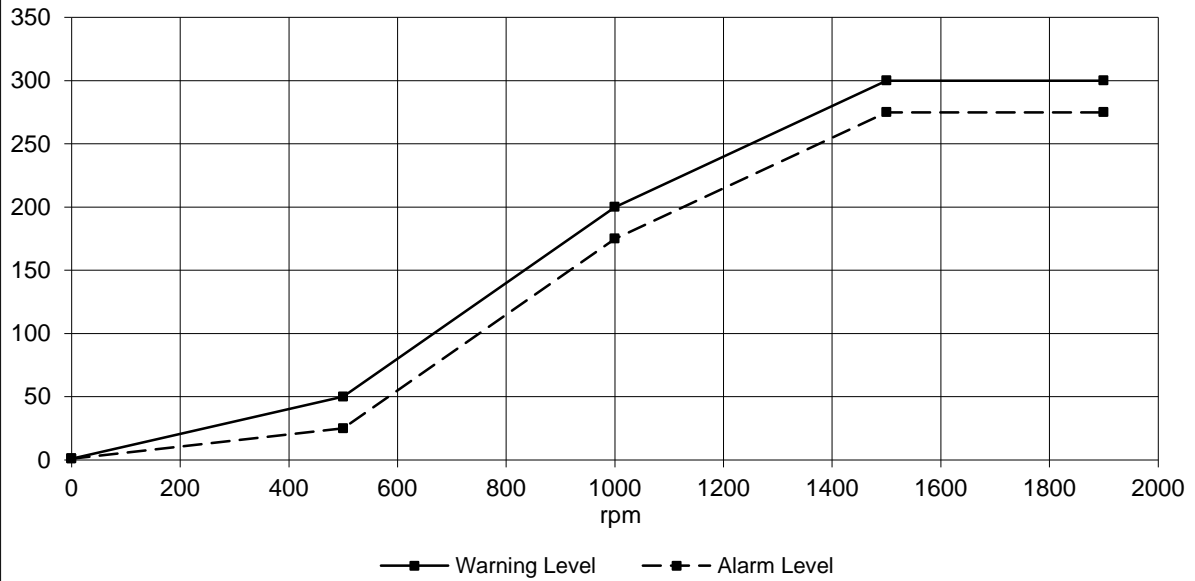


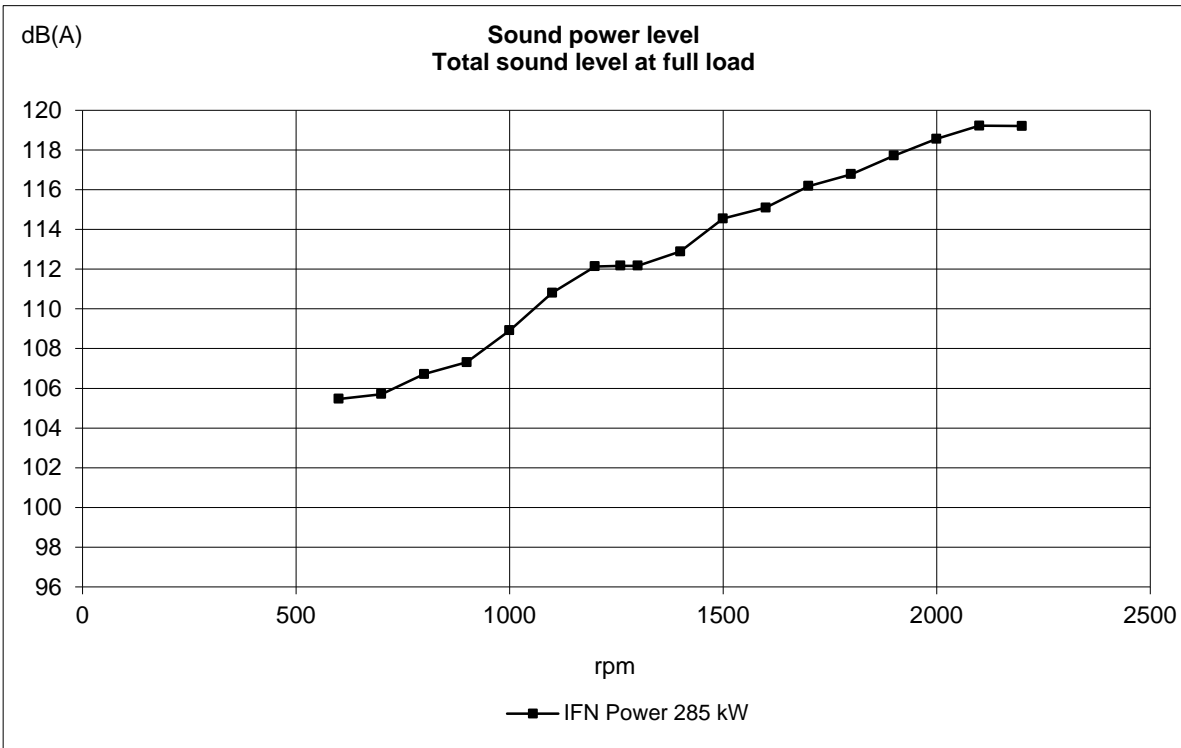
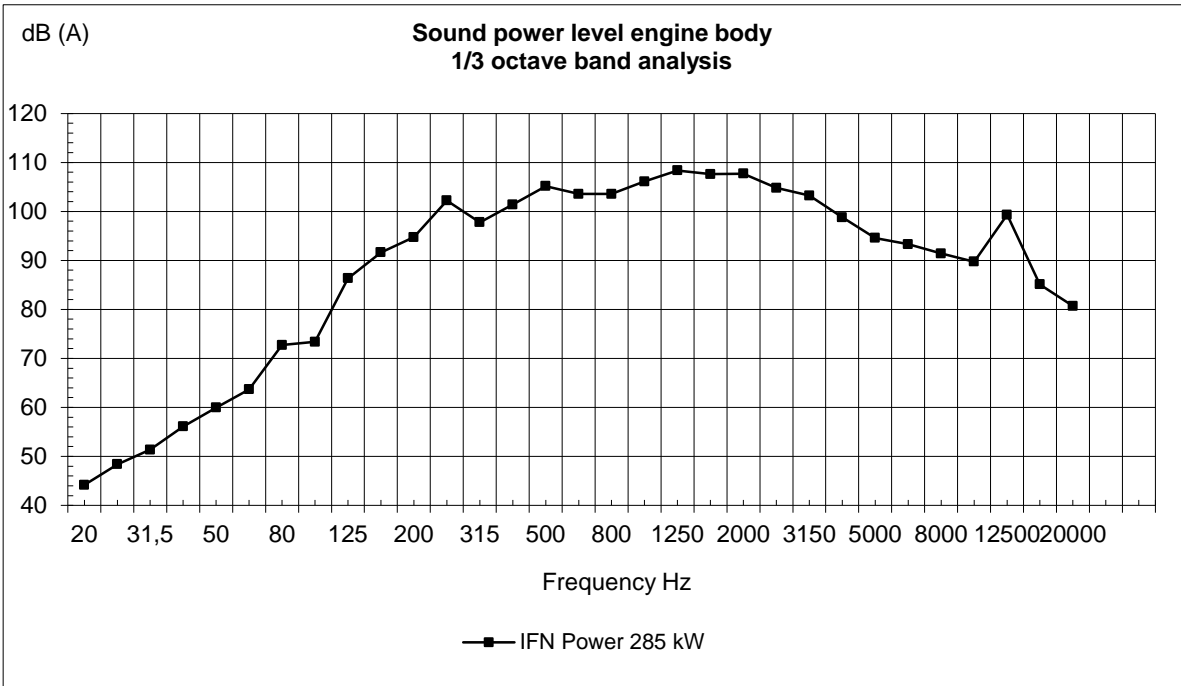
g/kWh

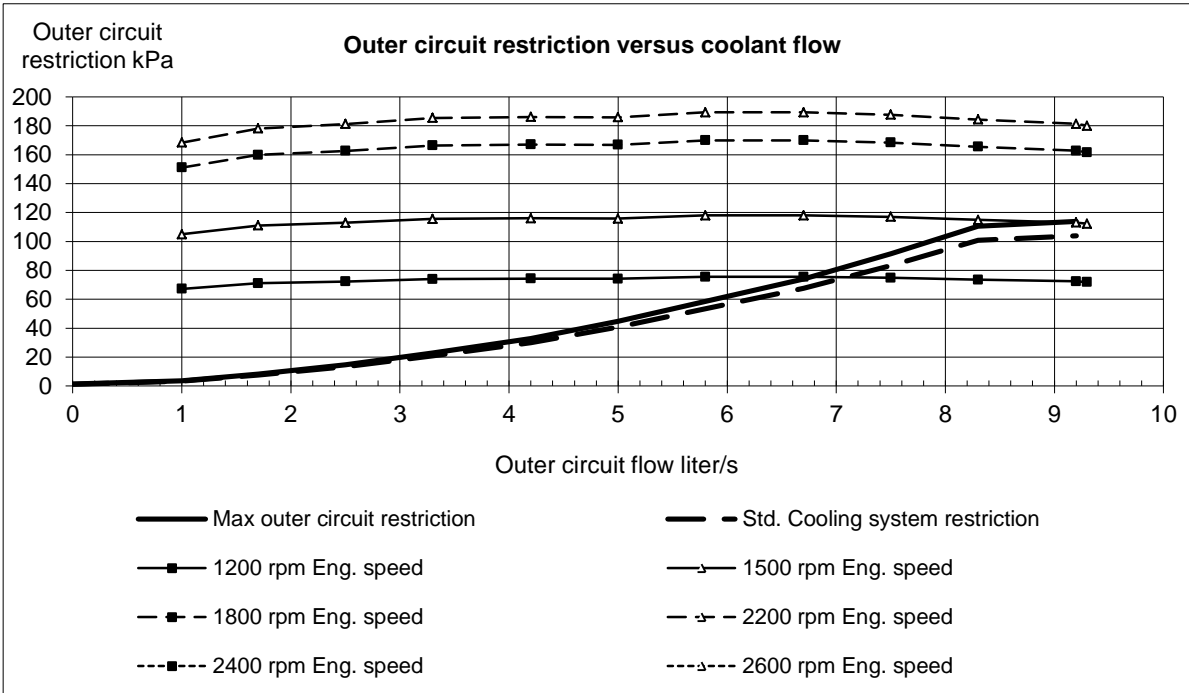
Smoke emission

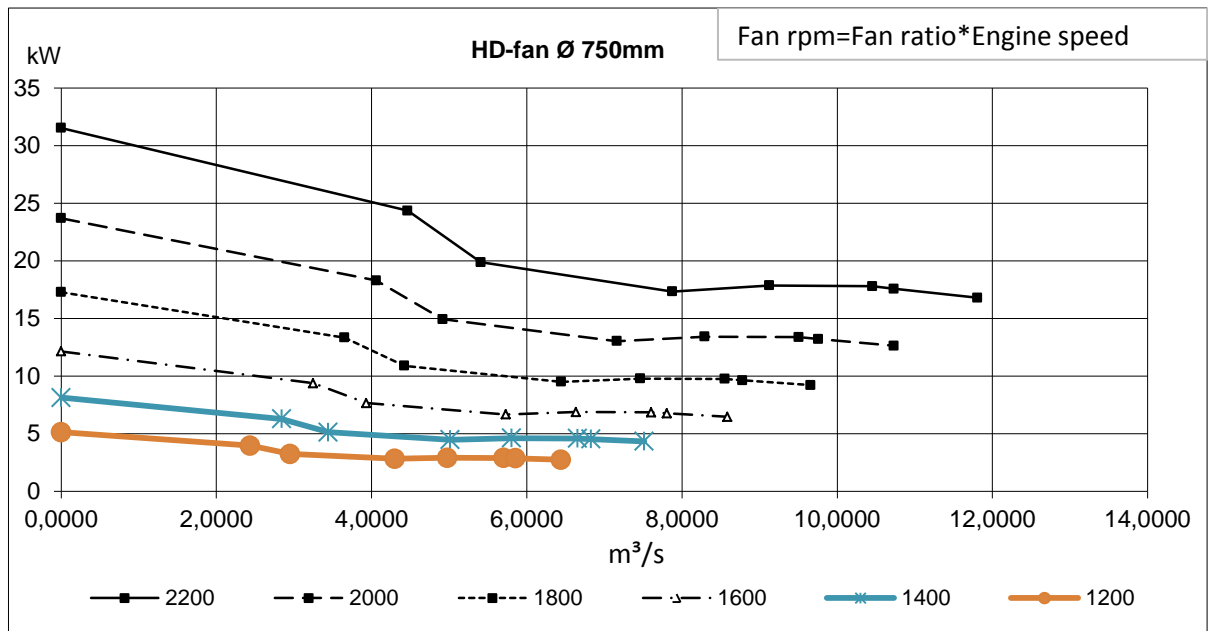
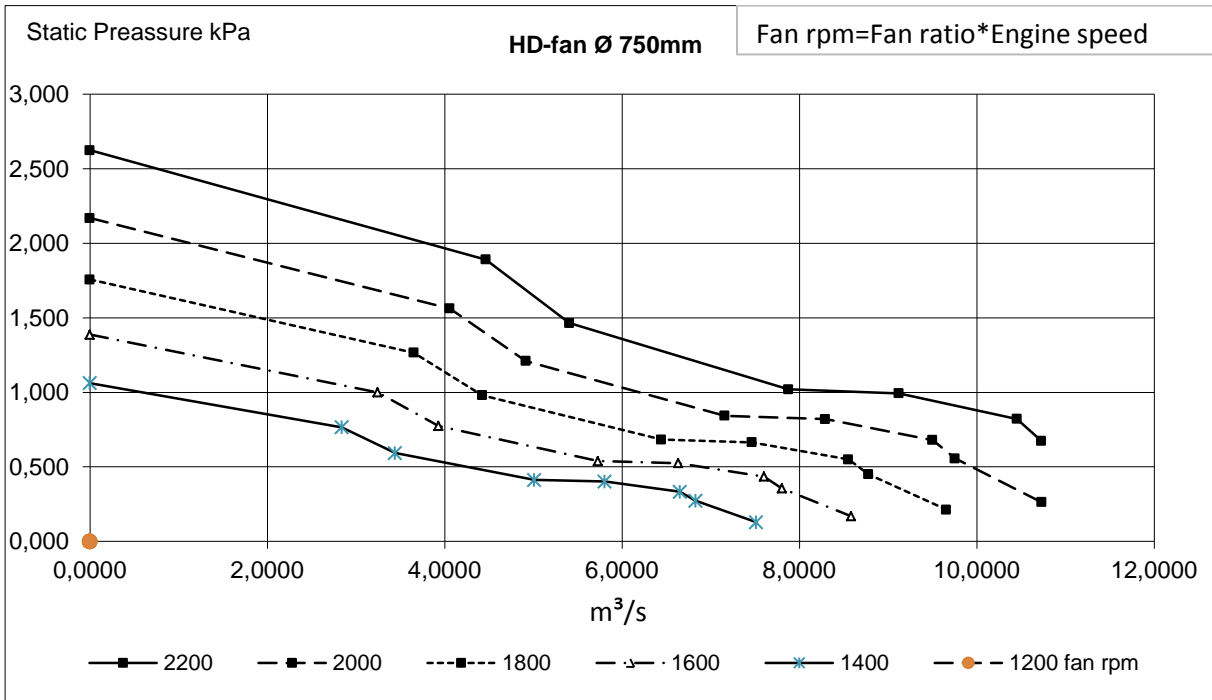
Oil P abs (kPa)

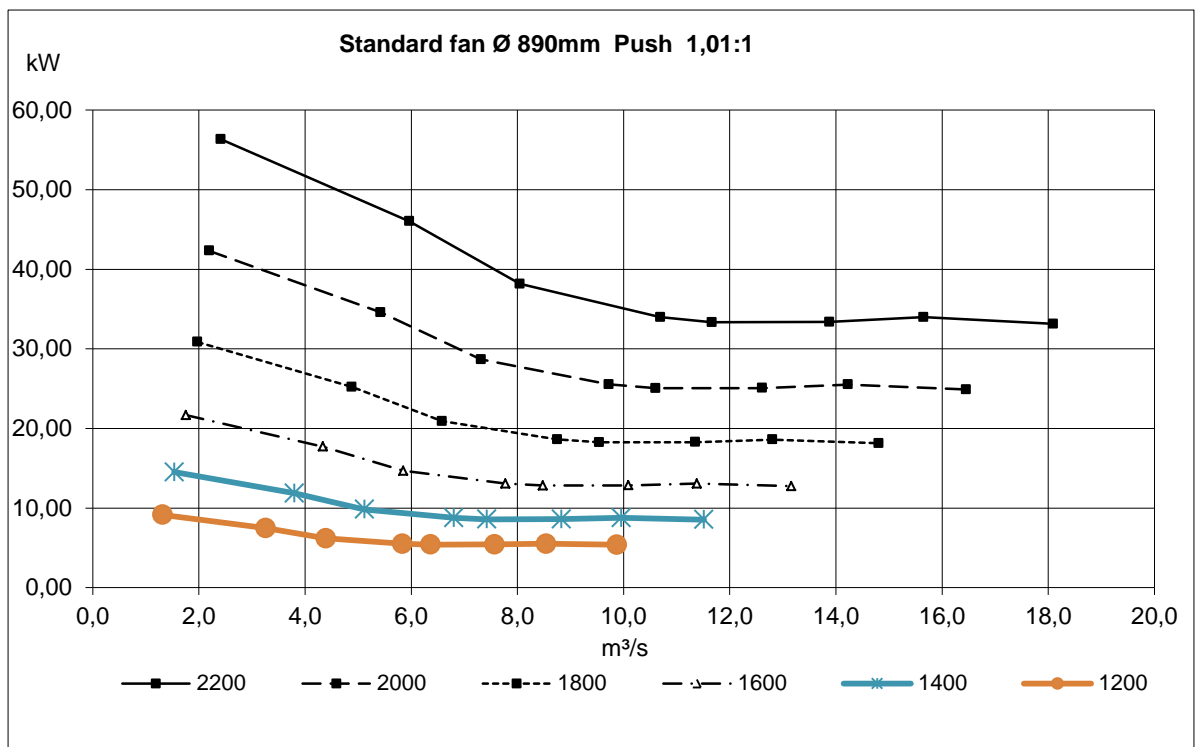
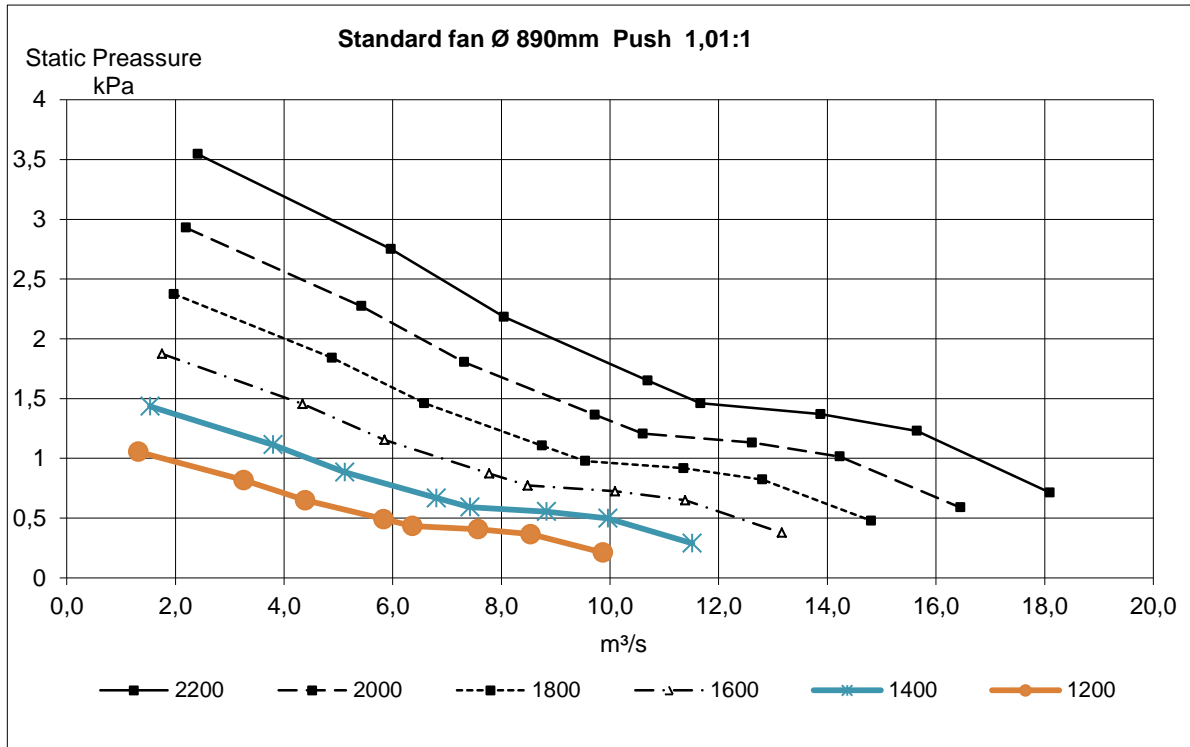
Oil Pressure Limits



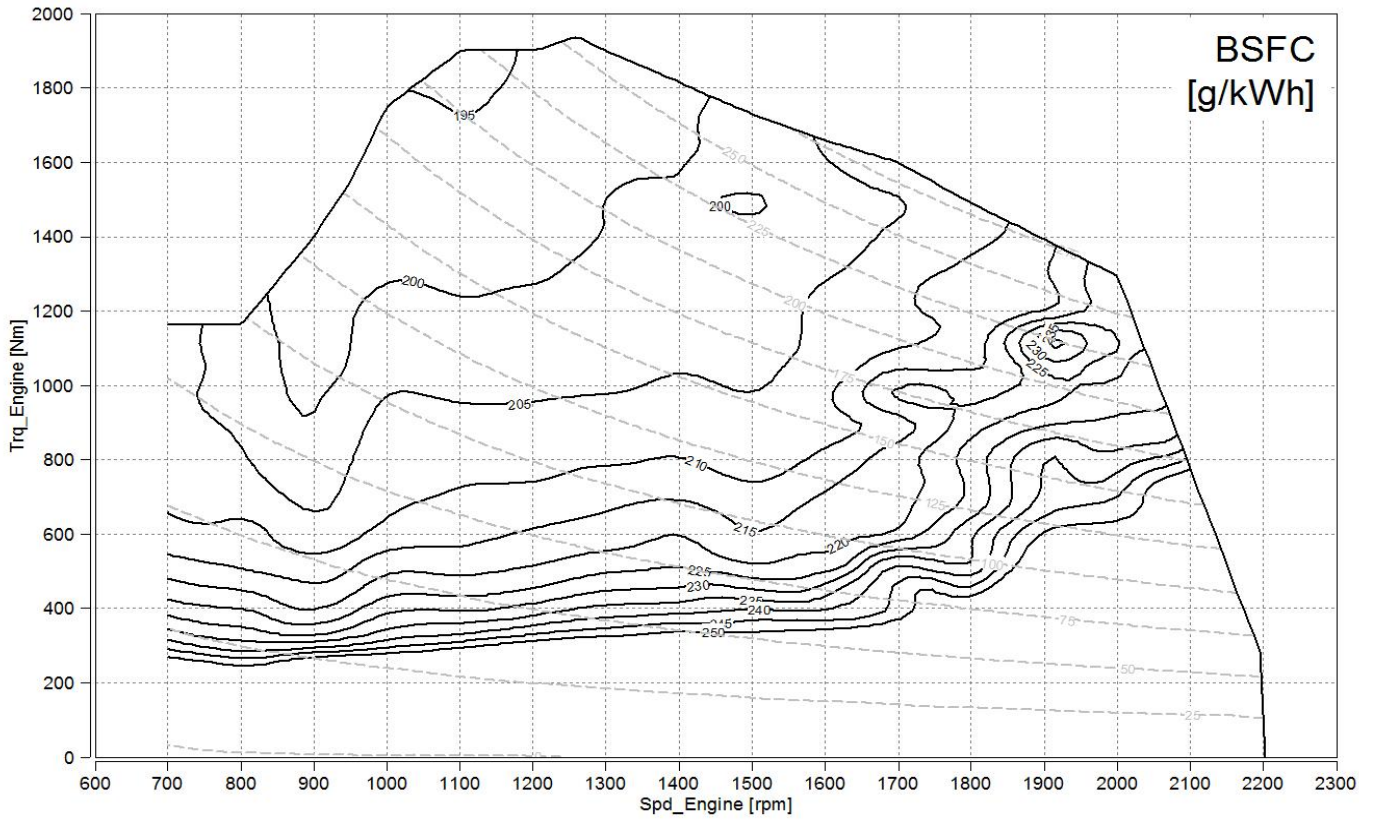








BSFC [g/kWh]



Fuel consumption [l/h]

