


**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 diesel engine with direct injection. Rotation direction, anti-clockwise viewed towards flywheel

Number of cylinders			6
Displacement, total		liters	7,70
		in <sup>3</sup>	470
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 (Not including after treatment system)	Engine only	kg	707
		lb	1559
	Power pac	kg	917
		lb	2022

**Performance**

			rpm	1500	1800	2000	2200
IFN Power	235 kW	without fan	kW	204	235	235	235
			hp	277	320	320	320
	650 mm	with fan	kW	197	224	224	224
			hp	268	305	305	305
Torque at:	IFN Power 235 kW	Nm	1300	1245	1123	1021	
		lbf ft	959	918	828	753	
Max torque at engine speed	IFN Power	1450 rpm	Nm	1310			
			lbf ft	966			
Power tolerance			%	±5			
Mean piston speed			m/s	6,8	8,1	9,0	9,9
			ft/sec	22,1	26,6	29,5	32,5
Effective mean pressure at:	IFN Power 235 kW	MPa	2,12	2,04	1,83	1,67	
		psi	307	295	266	241	
Max combustion pressure at:	IFN Power 235 kW	MPa	14,2	15	15	14,3	
		psi	2059	2175	2175	2074	
Total mass moment of inertia, J (mR <sup>2</sup> ) (not including flywheel)		kgm <sup>2</sup>	0,421				
		lbf <sup>2</sup>	10,0				
Friction Power		kW	18	25	31	38	
		hp	24	34	42	52	

**Derating see Technical Diagrams**

**Engine brake performance (only engines with engine brake)**

			rpm	1500	1800	2200	2500
Brake power:	without fan	kW	36	53	83	107	
		hp	49	72	113	146	
Brake torque:	without fan	Nm	230	280	360	410	
		lbf ft	170	207	266	302	
Engine speed range for engine brake activation:		rpm	900-2500				
Min engine speed with engine brake still active:		rpm	750				
Min oil temperature for engine brake activation:		°C	N/A				

**Cold start performance**

*Cold start limit temperature	without starting aid	°C	-15	
		°F	5	
	with manifold heater 4 kW	°C	-25	
		°F	-13	
	with manifold heater 4 kW and block heater	°C	-35	
		°F	-31	
*Specify oil quality	Above -15°C; 15W40 Above -25°C; 10W30 Below -25°C; 5W30			
Block heater type	Make	Power kW	Engaged hours	Cooling water temp engine block
	Volvo	1,5		

\* See also general section in the sales guide



**Lubrication system**

Lubricating oil consumption (average)		Vol%	0,05
Oil system capacity including filters		liter	27
		US gal	7,13
Oil sump capacity:	Max	liter	24
		US gal	6,34
	Min	liter	19
		US gal	5,02
Oil change intervals/specifications	VDS3, VDS4.5	h	500
	VDS3 with oil analysis	h	1000
Engine angularity limits:	front up	°	35
	front down	°	35
	side tilt	°	35
Oil pressure at rated speed	kPa	425	
	psi	62	

**Lubrication system**

Lubrication oil temperature in sump:	max	°C	125
		°F	257
Oil filtration efficiency (in accordance with ISO 4548-12)	97%	μ	36
	50%	μ	14

Fuel system		rpm	1500	1800	2000	2200
Fuel to conform to			EU EN590 US D975, 1-D and 2-D (Max 3000ppm sulphur and 7% FAME) For further information, see service bulletin 18-8-8			
System supply flow at max. speed		liter/h US gal/h	165 43,6			
Fuel supply line max. restriction (Measured at fuel inlet connection)		kPa psi	10 1,5			
Fuel supply line max. pressure, during engine stand still (measured at fuel inlet connection)		kPa psi	20 2,9			
System return flow at max. speed		liter/h US gal/h	111,0 29,3			
Fuel return line max. restriction (Measured at fuel return connection)		kPa psi	15 2,2			
Max. allowable inlet fuel temp (Measured at fuel inlet connection)		°C °F	80 176			
Prefilter / Water separator filtration efficiency	99%	μ	30			
Main fuel filter filtration efficiency (in accordance with ISO 19438)	98%	μ	5			
	96%	μ	4			
Governor type/make, standard		Volvo / EMS 2.3				
Injection pump type/make		Denso HP4				

Intake and exhaust system		Inlet air temp	rpm	1500	1800	2000	2200
Charge air consumption at: (+25°C and 100kPa)	IFN Power 235 kW	25°C	m <sup>3</sup> /min	14,1	17,0	18,4	19,8
		77°F	cfm	498	600	650	699
 <b>See front page for important information</b>							
Max allowable air intake restriction including piping			kPa psi	6 0,9			
Heat rejection to exhaust at:	IFN Power 235 kW		kW	150	183	189	202
			BTU/min	8530	10407	10748	11510
Exhaust gas temperature after turbine at:	IFN Power 235 kW		°C	485	493	475	474
			°F	905	919	887	885
 <b>See front page for important information</b>							
Max allowable back pressure in exhaust line (after turbine) Pipe dimension Ø: 127 mm			kPa psi	8 1,2	12 1,7	14 2,0	15 2,2
Exhaust gas flow at: (temp and pressure after turbine at the corresponding power setting)	IFN Power 235 kW		m <sup>3</sup> /min	36,3	42,6	44,2	46,9
			cfm	1282	1504	1561	1656

**VOLVO PENTA**

TAD843VE 235kW/2200rpm

Document No



**22430531**

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**09**

Cooling system		rpm	1500	1800	2000	2200
Heat rejection radiation from engine at:	IFN Power 235 kW	kW	8	9	8,5	8,8
		BTU/min	478	506	483	500
Heat rejection to coolant at:	IFN Power 235 kW	kW	89	105	109	120
		BTU/min	5061	5971	6199	6824
Radiator cooling system type			Closed circuit			
Standard radiator core area	IFN Power 235 kW	m <sup>2</sup>	0,6			
		foot <sup>2</sup>	6,46			
Fan diameter	650 mm	IFN Power 235 kW	650			
			25,59			
Maximum fan power consumption	650 mm pull	kW	7,2	10,8	10,8	10,8
		hp	10	15	15	15
Fan drive ratio	fan Ø650		1:1.4			
	fan position high		1:1.1			
Coolant capacity:	engine	liter	17			
		US gal	4,5			
	engine + standard radiator, hoses and expansion tank	liter	51			
		US gal	13,5			
Coolant pump		drive/ratio	belt/1,4:1			
Coolant flow with standard system		l/s	5,4	6,5	7,2	8
		US gal/s	1,4	1,7	1,9	2,1
Minimum coolant flow		l/s				6,0
		US gal/s				1,6
Maximum outer circuit restriction incl. piping		kPa	40,0			
		psi	5,8			
Thermostat:	start to open	°C	85			
		°F	185			
	fully open	°C	95			
		°F	203			
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	85			
		psi	12,3			
Standard pressure cap setting		kPa	100			
		psi	14,5			
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	1500	1800	2000	2200
Heat rejection to charge air cooler	IFN Power 235 kW	kW	35,6	43,3	47,2	51,3
		BTU/min	2025	2462	2684	2917
Charge air mass flow	IFN Power 235 kW	kg/s	0,281	0,339	0,367	0,393
Charge air inlet temp. (Charge air temp after turbo compressor)	IFN Power 235 kW	°C	166	172	175	180
		°F	331	342	347	356
 <b>See front page for important information</b> Max allowable Charge air outlet temp. (Charge air temp after charge air cooler)		°C	40	45	47	50
		°F	104	113	117	122
 <b>See front page for important information</b> Maximum pressure drop over charge air cooler incl. piping		kPa	7	9	11	12
		psi	1,0	1,3	1,6	1,7
Charge air pressure (After charge air cooler)		kPa	183	189	186	184
		psi	26,54	27,41	26,98	26,69
Standard charge air cooler core area		m <sup>2</sup>	0,5			
		foot <sup>2</sup>	5,38			

**Cooling performance: 0,6 m<sup>2</sup> radiator and 650mm fan, pull**

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		IFN Power 235 kW			
				Air flow		External restriction	
				°C	°F	m <sup>3</sup> /s	ft <sup>3</sup> /s
2200	235	69,6	157	9,1	321,4	0	
	320	69,1	156	8,9	314,3	100	0,015
		68,3	155	8,6	303,7	200	0,029
		66,9	152	8,2	289,6	300	0,044

**Cooling performance: 0,6 m<sup>2</sup> radiator and 650mm fan, push**

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		IFN Power 235 kW			
				Air flow		External restriction	
				°C	°F	m <sup>3</sup> /s	ft <sup>3</sup> /s
2200	235	67,1	153	5,9	208,4	0	
	320	65,4	150	5,8	204,8	100	0,015
		63,2	146	5,7	201,3	200	0,029
		61,6	143	5,6	197,8	300	0,044

\* AOT-temperatures are based upon simulations.

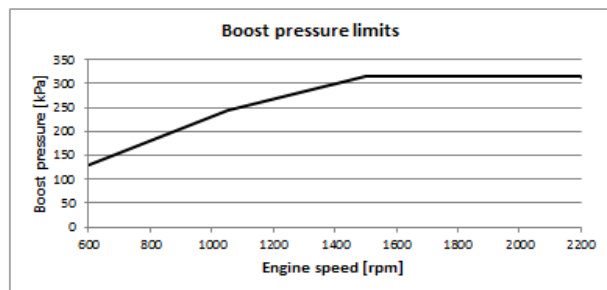
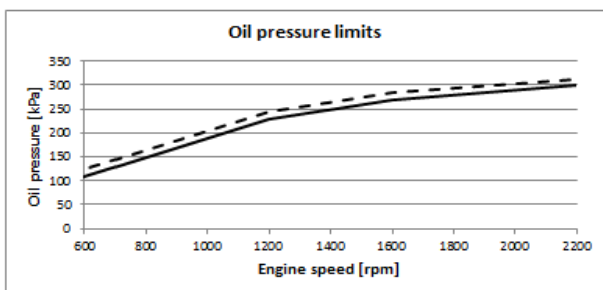
### Engine management system

Functionality	Alternatives			Default setting
Governor mode	Droop	Isochronous		Isochronous
Governor droop	10	125	Nm/rpm	
Governor response	Adjustable PI constants			
Idle speed	600	800	rpm	600
Stop function				Replaced by "Ignition of stop engine"
Preheating function	Ignition	Request	Request + temp	If preheat is available, preheat will be active at ignition on if temp low or demanded by driver.
Lamp test				No lamp test, not used any longer
Ignition of stop engine	Yes	No		No

Engine sensors and switch settings		Alarm level		Engine protection	
Parameter	Unit	Setting range	Default setting	Level	Action. Default/Alternative
Oil temp	°C		125	125	Derate
Oil pressure	Low idle		100,0	100	Shut down
	Rated speed		300	300	Shut down
Coolant temp	°C		107	107	Derate
Coolant level			On	Low level	Derate
Water in fuel		On if closed circuit			
Air filter pressure drop			5kPa		
Altitude, above sea	m				Automatic derating, see section derating
Charge air temp	°C		80	80	Derate
Charge air pressure	kPa		See map		Derate
Engine speed	rpm				Shut down. ON/OFF*

\* Off means no shut down, alarm only

Parameter	Warning	Alarm	Derated 0% to engine protection map	Derated 100% to engine protection map	Forced idle after 0 sec	Forced shut down after 0 sec
Coolant temp	103°C	107°C	107°C	110°C		
Oil temp	122°C	125°C	125°C	130°C		
Low oil pressure	Warning map value	Alarm map value		Alarm map value		
High charge air temp	77°C	80°C	80°C	100°C		
High charge air pressure		Alarm map value	Alarm map value			



### Electrical system

Voltage and type			24V
Alternator:	make		MELCO
	output	A	110/130
	tacho output	Hz/alternator rev.	
	drive ratio		
Starter motor:	make		MELCO
	type		85P50 / 90P55
	output	kW hp	5 / 5.5 6.8 / 7.5
	flywheel		137
Number of teeth on:	starter motor		10 / 12 teeth
Inlet manifold heater (at 20 V)		kW	4
Power relay for the manifold heater		A	200

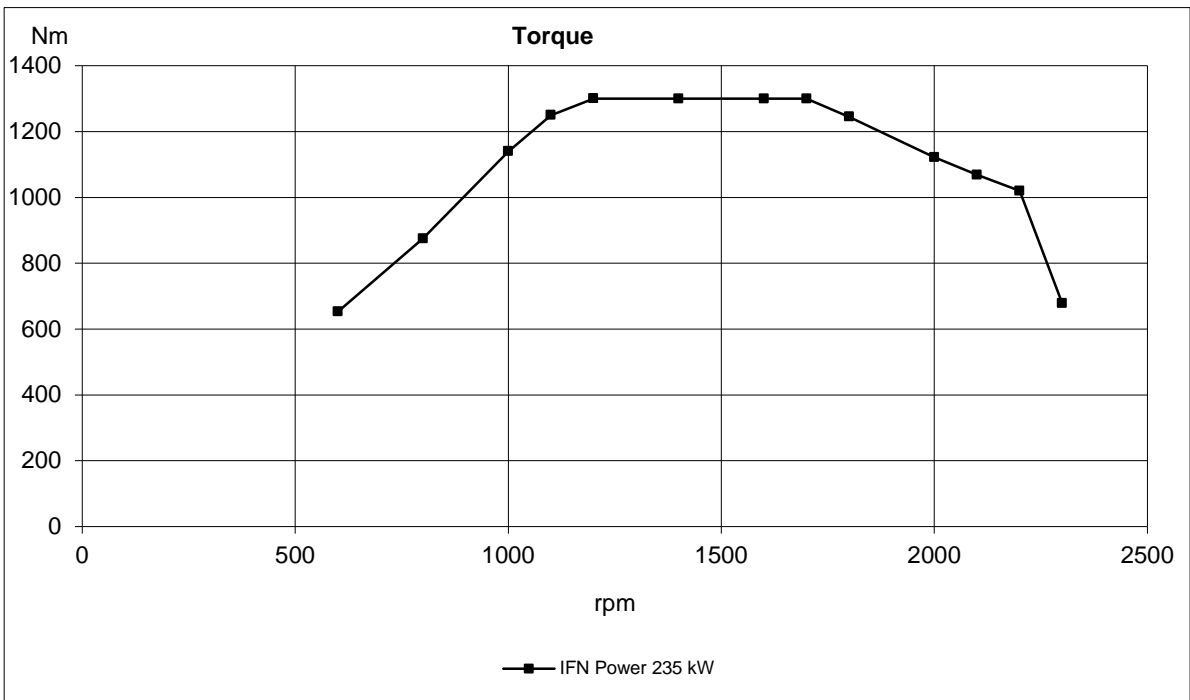
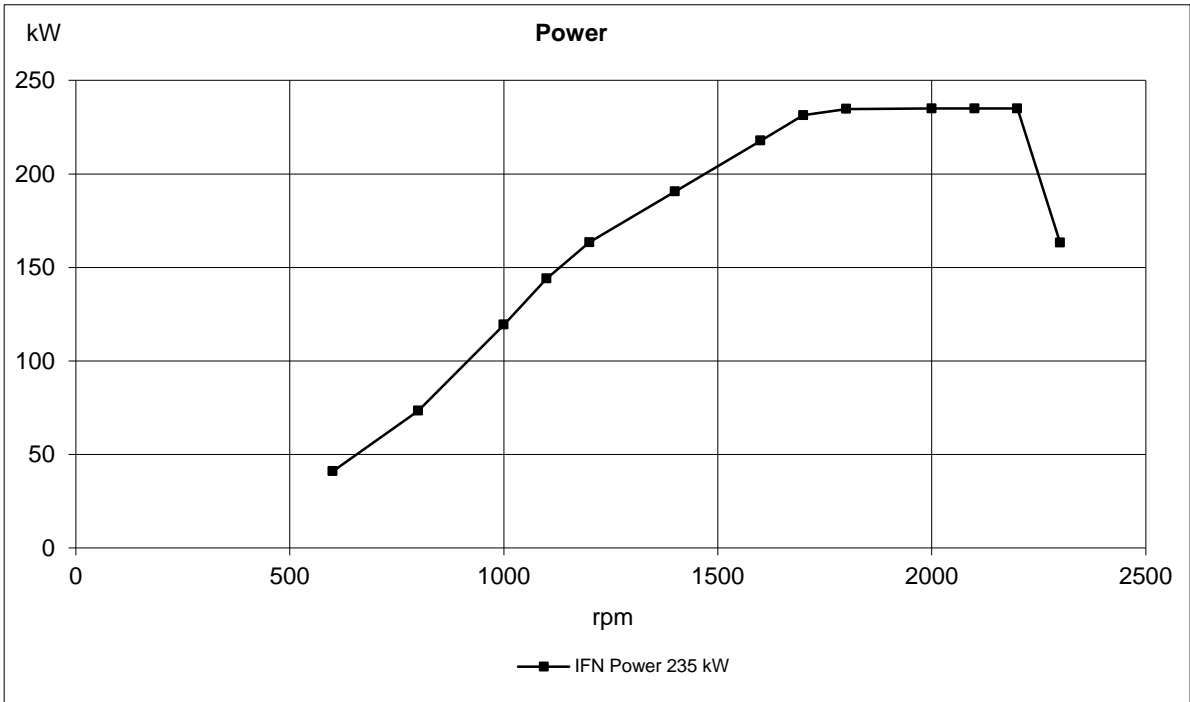
Conditions: (5 mΩ main circuit resistance@)	Temperature	°C	25	0	-15
	Battery	Ah / CCA	140/800	140/800	170/1000
Crank speed		rpm	185	160	120
Crank current		A	220	300	470
Starter input power during crank		kW	4,91	5,90	6,94
Battery power during crank		kW	5,15	6,31	7,50
Min battery @ 0°C		Ah / CCA	100/700		

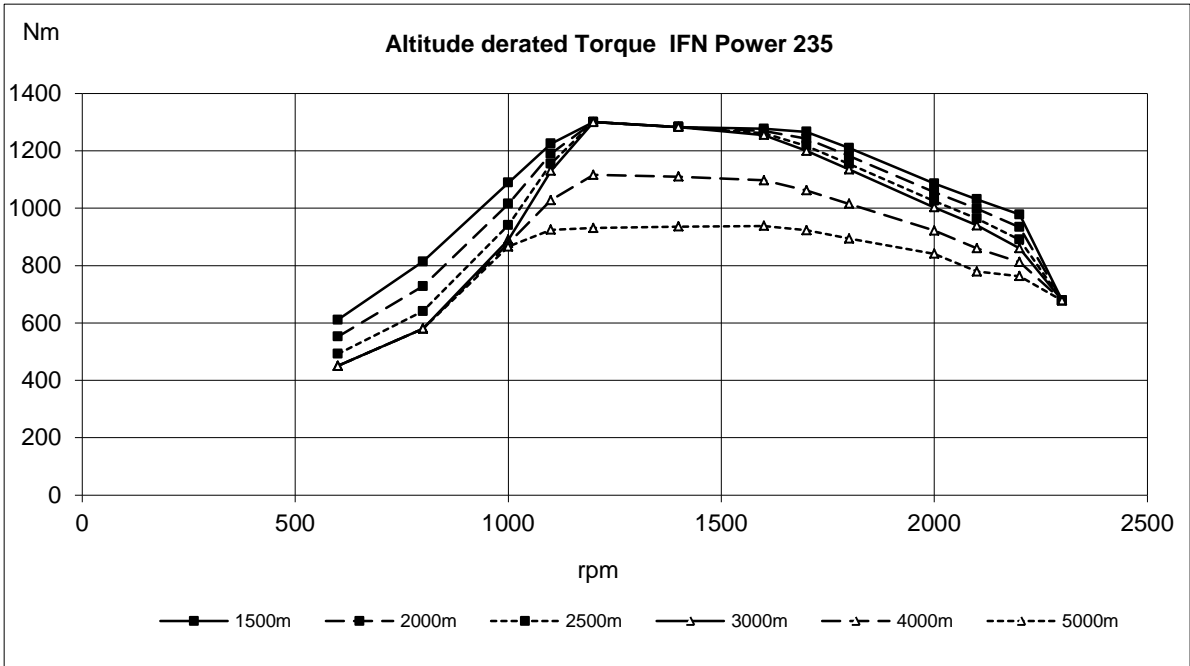
### Power take off

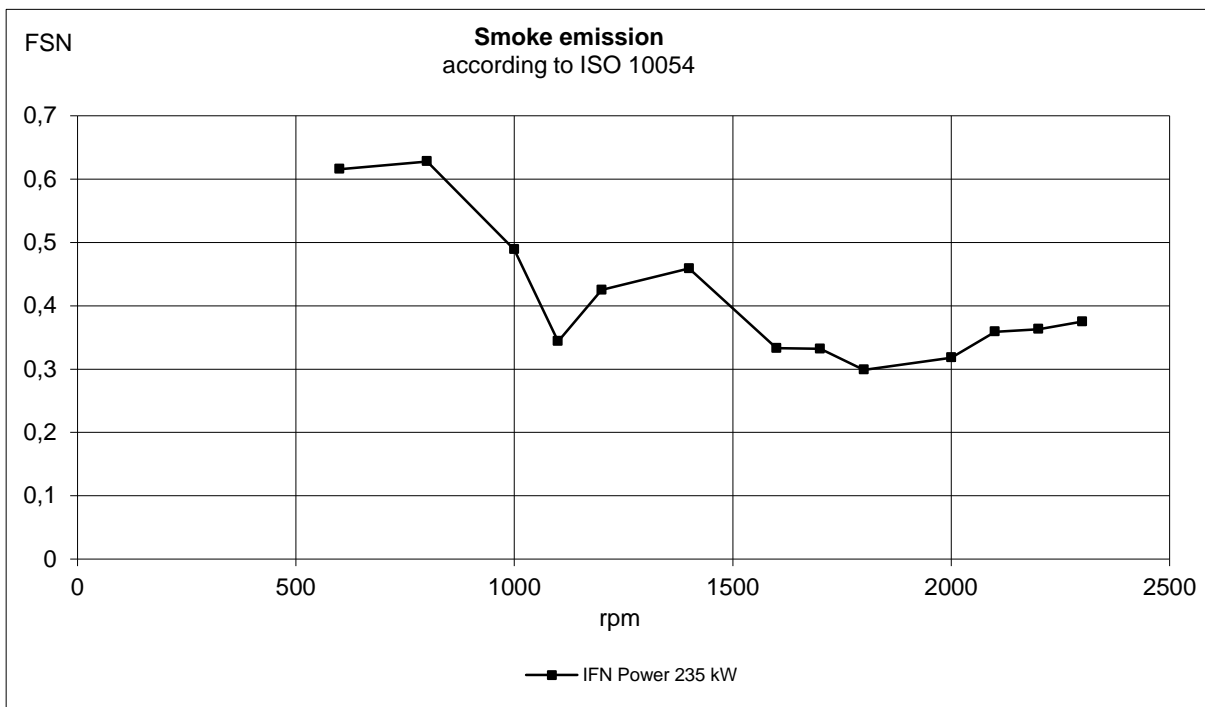
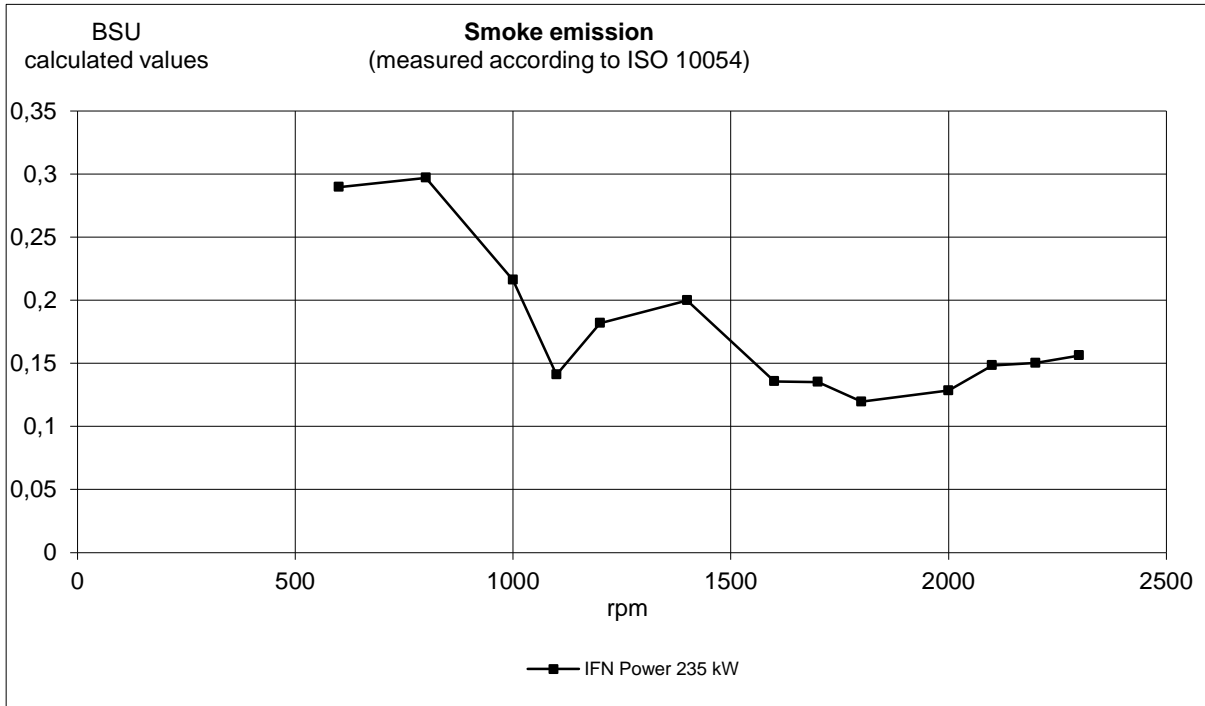
		rpm	1500	1800	2000	2200	
Front end in line with crank shaft max:*	0.02 kgm <sup>2</sup>	Nm lbf ft	1064,0 785	743,0 548	740 546	833 614	
	SAE 2, STD 10" & 11,5", 1.303 kgm <sup>2</sup>	0.03 kgm <sup>2</sup>	Nm lbf ft	1030,0 760	706,0 521	697 514	786 580
		0.04 kgm <sup>2</sup>	Nm lbf ft	996,0 735	663,0 489	654 482	729 538
Front end belt pulley load.	Max up (above or equal to horizontal line)	kW	12,5	16	18,8	19,6	
		hp	17,0	21,8	25,6	26,7	
	Max down (below horizontal line)	kW	26,6	34,2	38	41,8	
		hp	36,2	46,5	51,7	56,8	
Maximum power on Rear PTO on top of flywheel housing (REPTO):*		kW hp	75 102				
Speed ratio direction of rotation viewed from flywheel side			1:1 Counter clockwise				
Maximum torque on PTO at compressor position:*		Nm lbf ft	200 148				
Speed ratio direction of rotation viewed from flywheel side			1.026:1 Counter clockwise				
Timing gear at hydraulic pump PTO max:*		Nm lbf ft	80 59				
Speed ratio direction of rotation viewed from flywheel side			1.3:1 Clockwise				
Max allowed bending moment in flywheel housing SAE2		Nm lbf ft	4600 3393				
Max. rear main bearing load		N lbf					

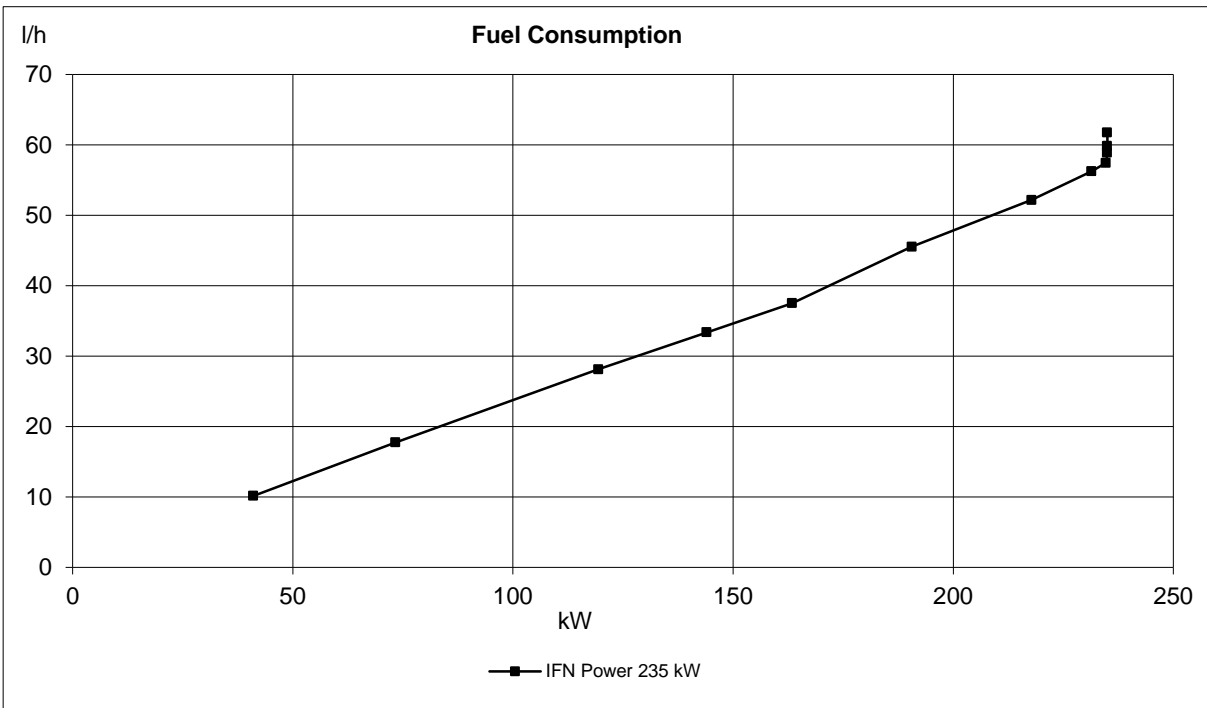
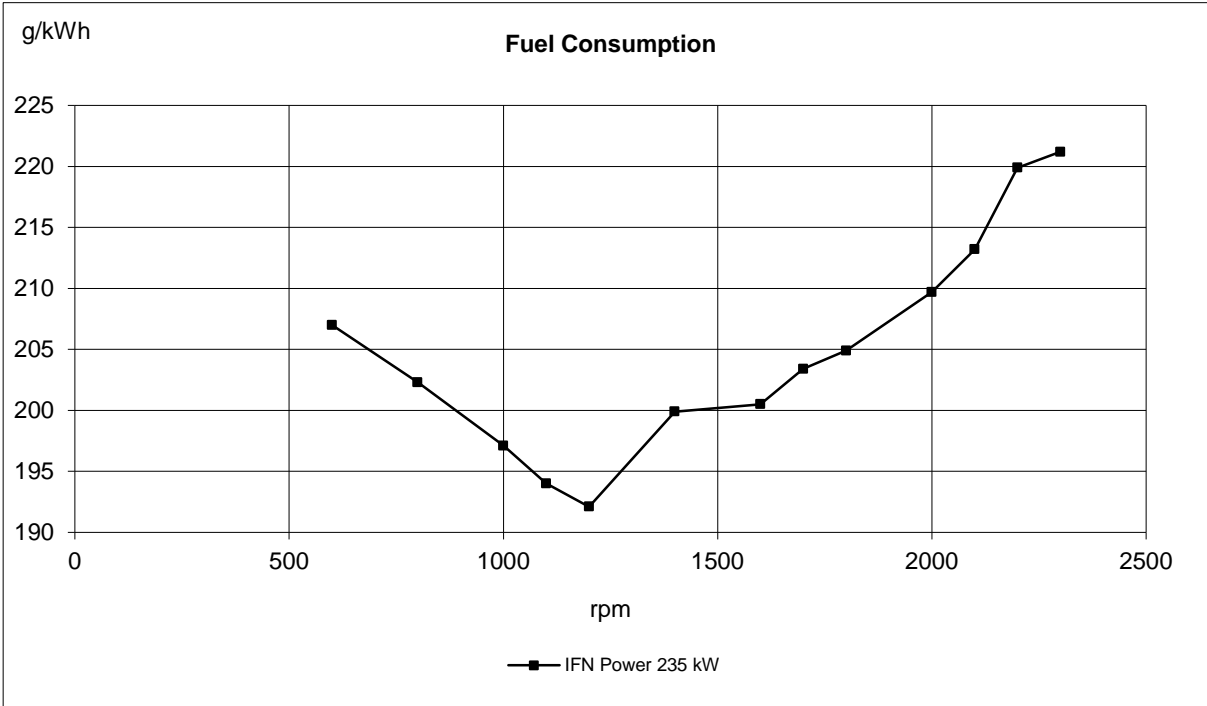
\* Maximum allowed torque at individual PTO's.

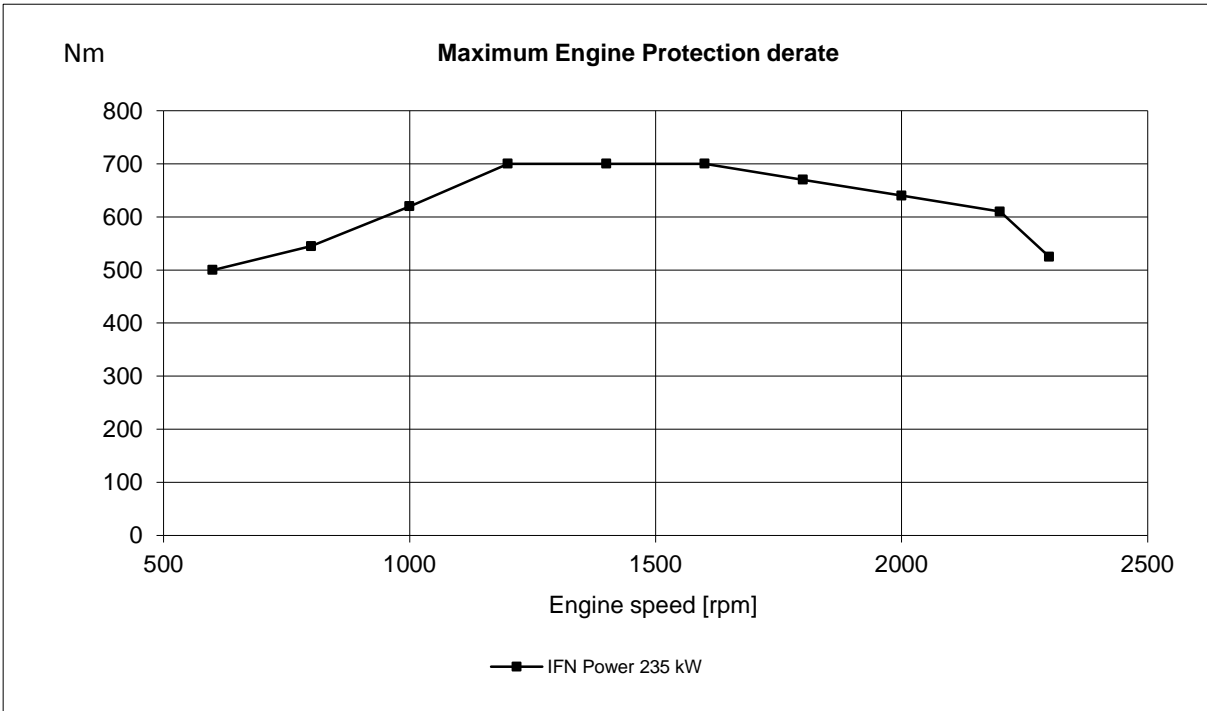
If more than one PTO output is used simultaneously, calculations needs to be performed to determine available maximum. Available torque depends on application inertia.

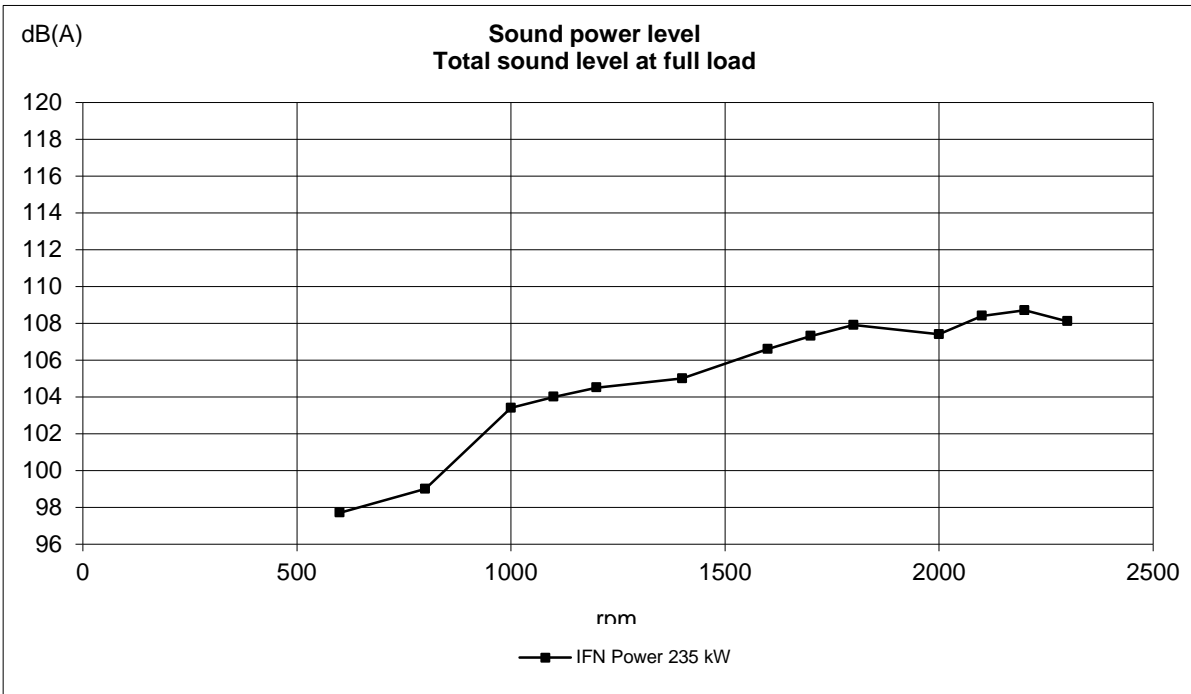
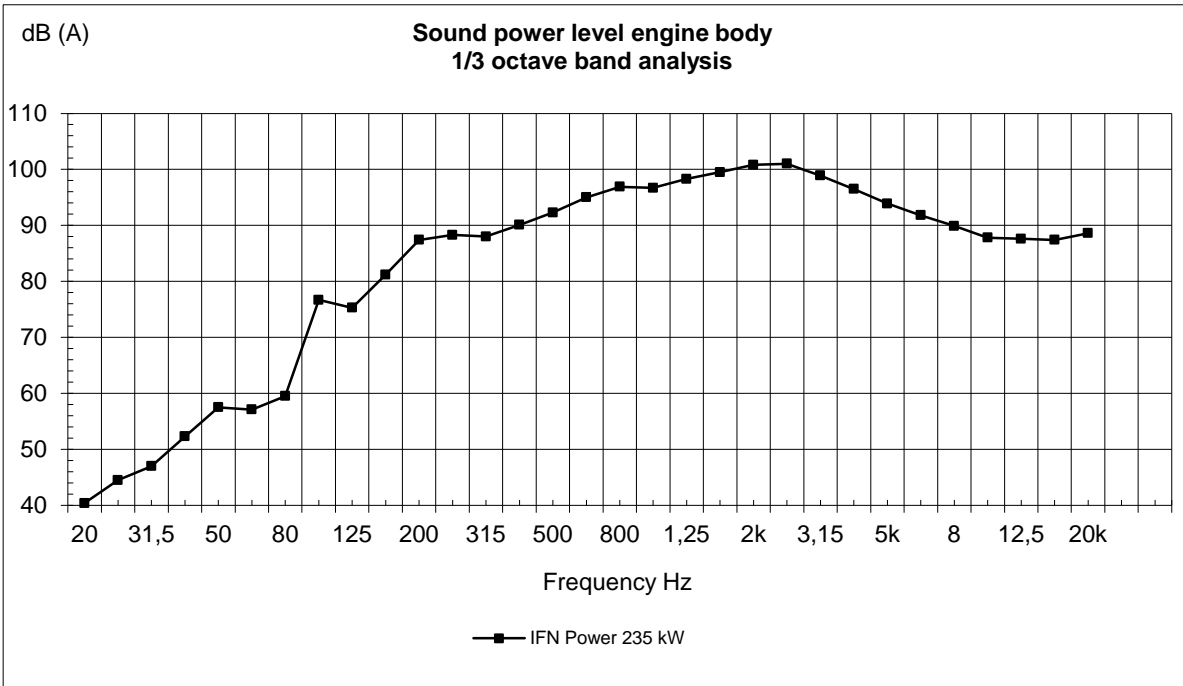


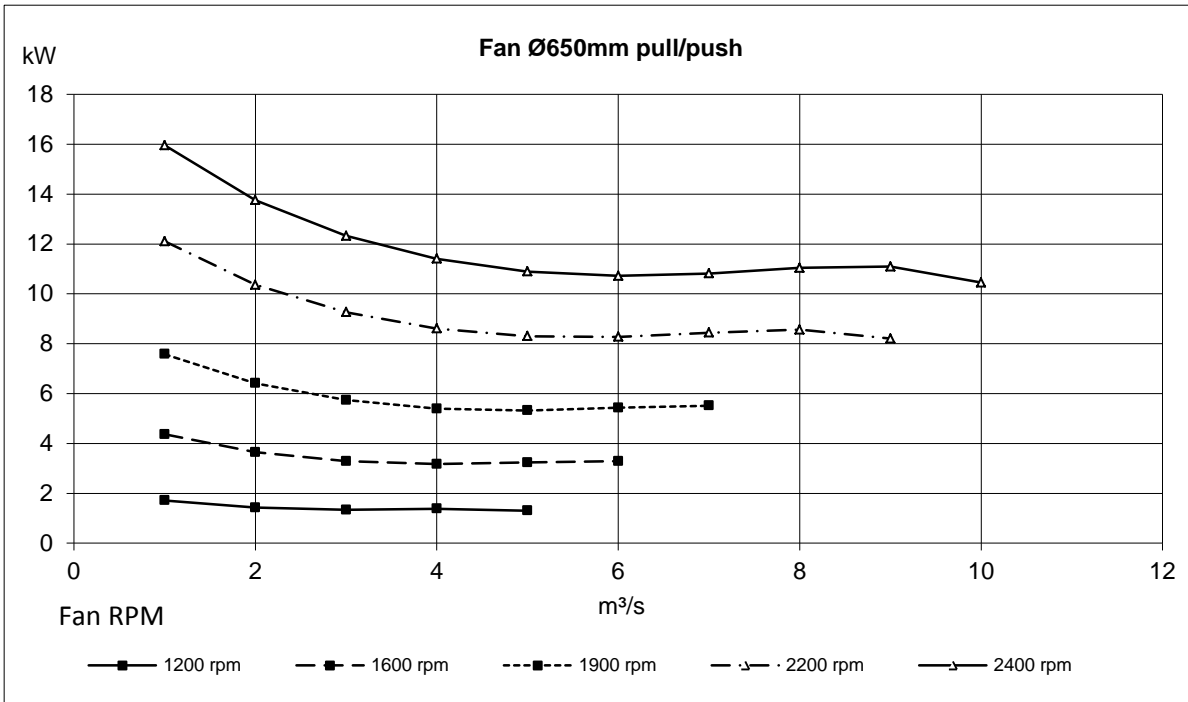




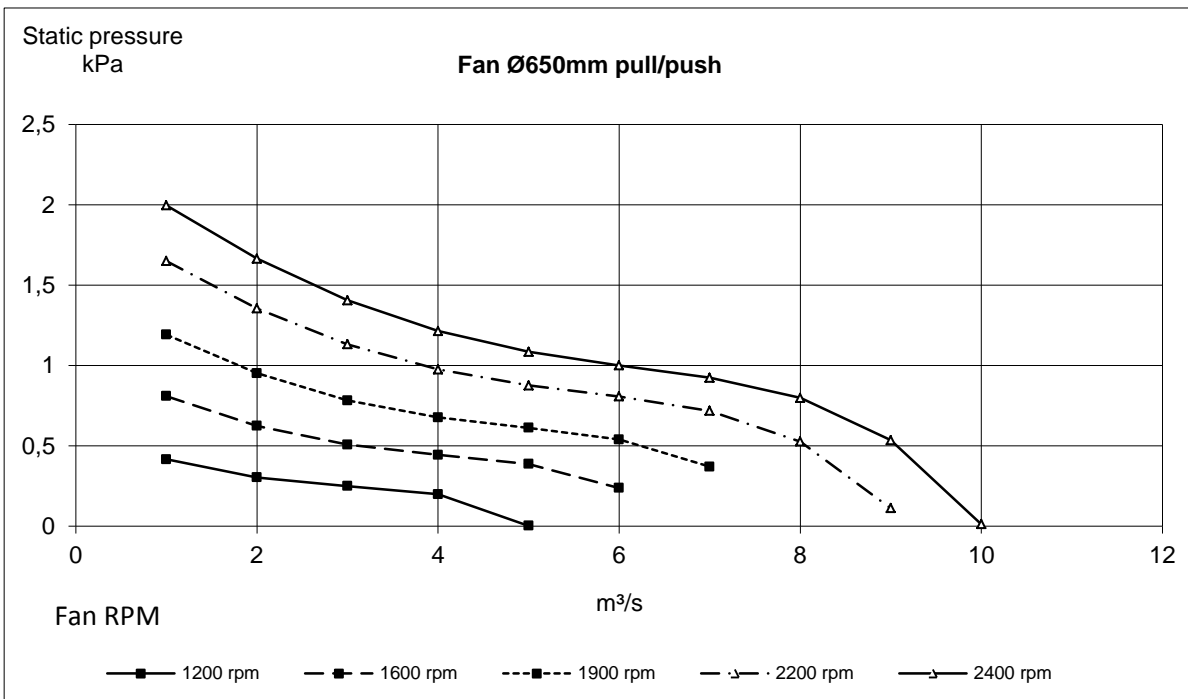








Maximum fan speed with visco clutch: 2400rpm



Maximum fan speed with visco clutch: 2400rpm

