


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 ³	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	737
		lb	1625
	Power pac	kg	947
		lb	2088

Performance				rpm	1500	1800	2000	2200
IFN Power	235 kW	without fan	kW	204	235	235	235	
			hp	277	320	320	320	
		with fan 650 mm pull	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			%	±3				
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	
Total mass moment of inertia, J (mR ²) (not including flywheel)			kgm ²	0,398				
			lbft ²	9,4				
Friction Power			kW	17	23	29	35	
			hp	23	31	39	48	

Derating see Technical Diagrams

Engine brake performance (only engines with engine brake)		rpm	1500	2200	2500	2800
Brake power:	without fan	kW	70	121	145	170
		hp	95	165	197	231
Brake torque:	without fan	Nm	448	524	555	580
		lbf ft	330	386	409	428
Engine speed range for engine brake activation:		rpm	900-2800			
Min engine speed with engine brake still active:		rpm	900			
Min oil temperature for engine brake activation:		°C	55			

Cold start performance

*Cold start limit temperature	without starting aid	°C	-15		
		°F	5		
	with manifold heater 4 kW	°C	-30		
		°F	-22		
	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 pan capacity:	Max	liter	24	
		US gal	6,34	
	Min	liter	19	
		US gal	5,02	
Oil change intervals/specifications	VDS4, VDS4.5	h	500	
		h		
Engine angularity limits:	front up	°	40	
	front down	°	45	
	side tilt	°	40	
Oil pressure at rated power		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

Urea consumption (vol% of diesel consumption)	vol%	7%
Fuel to conform to		EU EN590 US D975, 1-D and 2-D (Max 15ppm sulphur and 7% FAME)
System supply flow at max. speed	liter/h US gal/h	122 32,2
Fuel supply line max. restriction (Measured at fuel inlet connection)	kPa psi	25 3,6
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	60,0 15,9
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	m³/min	13,1	15,0	16,2	16,9
		77°F	cfm	463	530	572	597
 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 235 kW		kW BTU/min	113 6426	143 8132	152,1 8650	169,1 9617
Exhaust gas temperature after turbine at:	IFN Power 235 kW		°C °F	413 775	450 842	444 831	470 878
 See front page for important information							
Max allowable back pressure in exhaust line (after turbine) Pipe dimension Ø: 102 mm			kPa psi	18 2,6	22 3,2	23 3,3	25 3,6
 See front page for important information							
Max allowable temperature drop between turbine and SCR muffler inlet.			Δ°C Δ°F	15 27			
SCR muffler pressure drop (at exhaust gas flow and exhaust temp given)			kPa psi	10 1,5	14 2,0	15 2,2	17 2,5
Exhaust gas flow at: (temp and pressure after turbine at the corresponding power setting)	IFN Power 235 kW		m³/min	27,5	32,0	33,6	36,3
			cfm	971	1130	1187	1282

VOLVO PENTA

TAD873VE 235kW/2200rpm

Document No



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Cooling system		rpm	1500	1800	2000	2200
Heat rejection radiation from engine at:	IFN Power 235 kW	kW	7	8	8	9
		BTU/min	381	444	444	495
Heat rejection to coolant at:	IFN Power 235 kW	kW	124	141	144,9	153,7
		BTU/min	7040	8030	8240	8741
Radiator cooling system type			Closed circuit			
Standard radiator core area	IFN Power 235 kW	m ²	0,6			
		foot ²	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/1,40:1			
Coolant flow with standard system		l/s	5,4	6,5	7,2	8,0
		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	35,4	38,8	42,3	44,2
		BTU/min	2013	2207	2406	2514
Charge air mass flow	IFN Power 235 kW	kg/s	0,253	0,289	0,313	0,327
Charge air inlet temp. (Charge air temp after turbo compressor)	IFN Power 235 kW	°C	187	182	184	184
		°F	369	360	363	363
 See front page for important information Max allowable Charge air outlet temp. (Charge air temp after charge air cooler)		°C	48	49	50	50
		°F	118	120	122	122
 See front page for important information Maximum pressure drop over charge air cooler incl. piping		kPa	6	9	11	12
		psi	0,87	1,31	1,60	1,74
Charge air pressure (relative) (After charge air cooler)		kPa	225	212	204	190
		psi	32,63	30,75	29,59	27,56
Standard charge air cooler core area		m ²	0,5			
		foot ²	5,38			

Cooling performance: 0,6 m² 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.

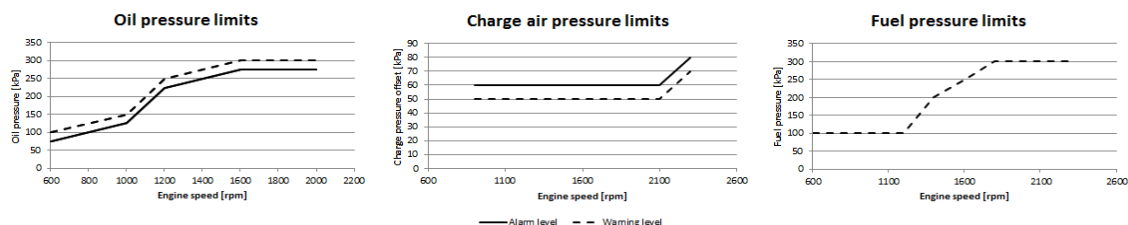
Engine speed	Engine power	IFN Power 235 kW					
		Air on temp		Air flow		External restriction	
		°C	°F	m ³ /s	ft ³ /s	Pa	psi
1500	204 277	57	135	7,5	264,9	0	
		56	133	7,3	257,8	100	0,015
		54	129	6,8	240,1	200	0,029
		50	121	6,2	219,0	300	0,044
2200	235 320	58	136	9,4	332,0	0	
		58	136	9,3	328,4	100	0,015
		57	134	9,0	317,8	200	0,029
		55	131	8,6	303,7	300	0,044

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	Default setting	Engine protection	
Parameter	Unit	Setting range	Default setting	Level	Action. Default/Alternative
Oil temp	°C		125	125	Derate/Shut down
Oil pressure	Low idle	kPa	75,0	75	Shut down.
	Rated speed	kPa	275	275	Shut down.
Oil level			Low level		
Coolant temp	°C		107	107	Derate/Shut down
Coolant level		See cooling system	On	Low level	Derate/Shut down
Fuel feed pressure	Low idle	kPa	100		
	Rated speed		300		
Water in fuel			Alarm when closed		
EGR temp	°C		210	210	Derate/Shut down
Air filter pressure drop			5kPa		
Altitude, above sea	m			700	Automatic derating, see section derating
Charge air temp	°C		120	120	Derate/Shut down
Charge air pressure	kPa		Alarm map value	Alarm map value	Derate/Shut down
SCR temp	°C		515	515	Derate

Parameter	Warning	Alarm	Derated 0% to engine protection map	Derated 100% to engine protection map	Forced idle after 5 sec	Forced shut down after 0 sec
Coolant temp	102°C	107°C	107°C	112°C		
Oil temp	120°C	125°C	125°C	130°C		
Low oil pressure	Warning map value	Alarm map value				Alarm map value
High charge air temp	115°C	120°C	120°C	140°C		
High charge air pressure	Warning map value	Alarm map value		Alarm map value		
EGR temp	200°C	210°C	210°C	220°C		



Electrical system

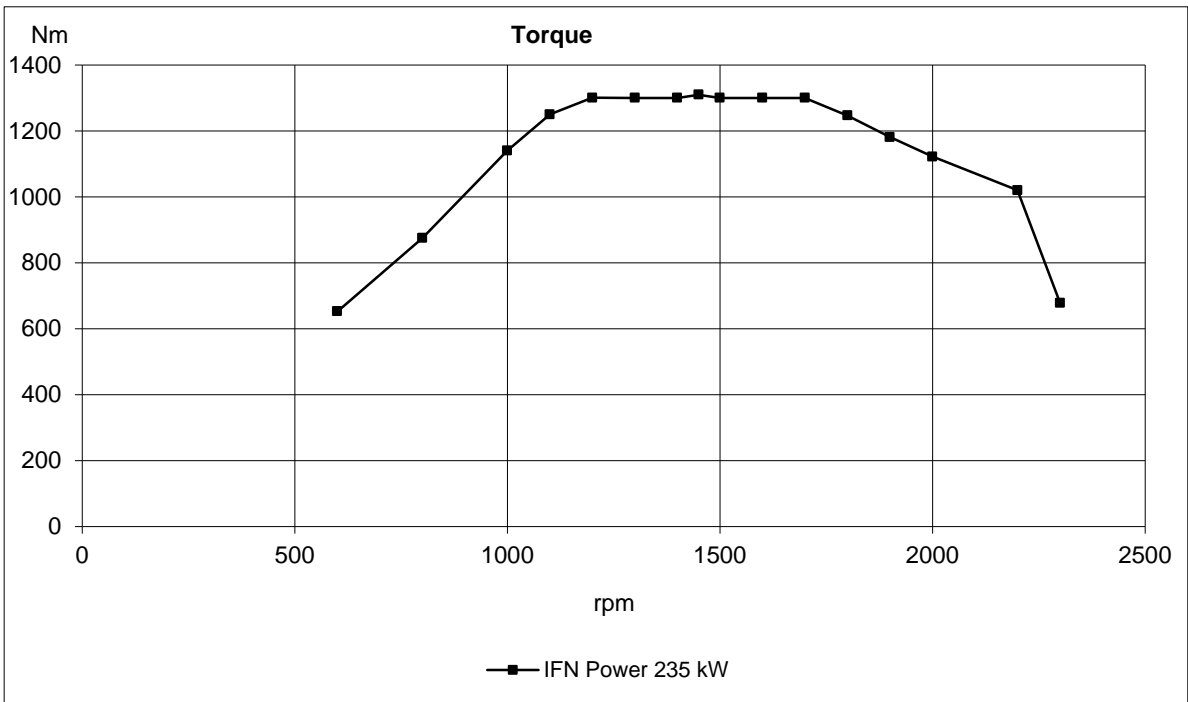
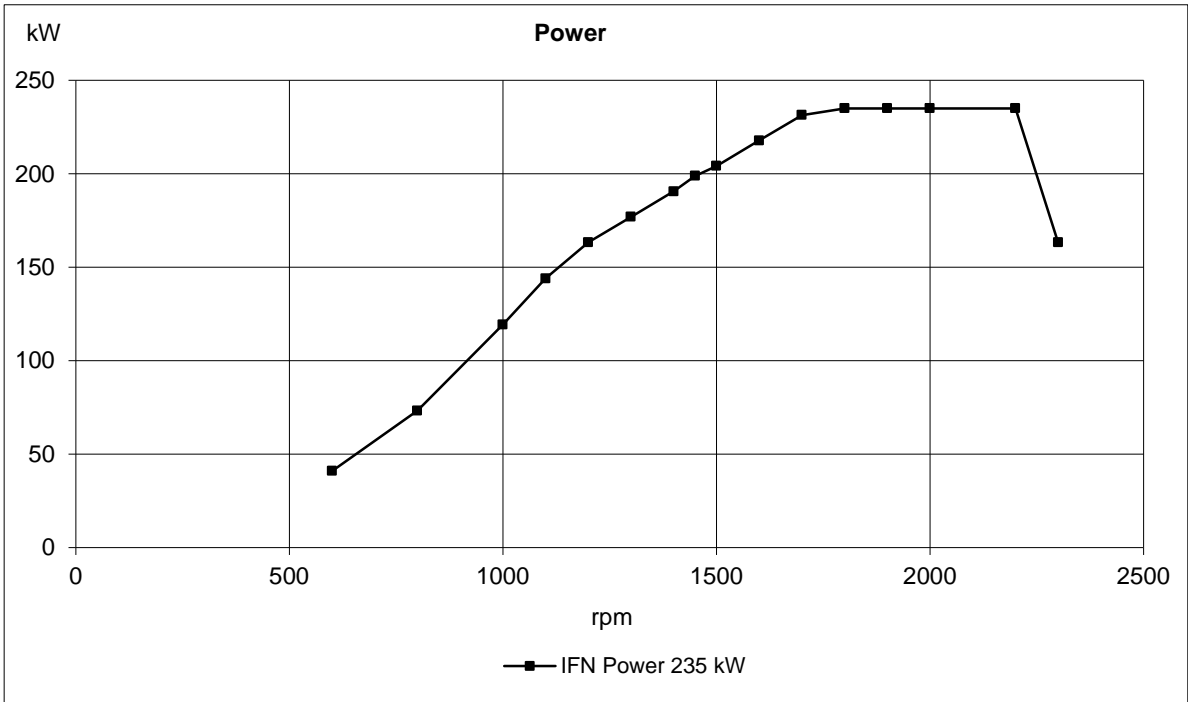
Voltage and type			24V
Alternator:	make		MELCO
	output	A	110/130
	tacho output	Hz/alternator rev.	
	drive ratio		
Starter motor:	make		MELCO
	type		85P50/90P55
	output	kW hp	5 / 5.5 6.8 / 7.5
Number of teeth on:	flywheel		137
	starter motor		10 / 12 teeth
Inlet manifold heater (at 20 V)		kW	4
Power relay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

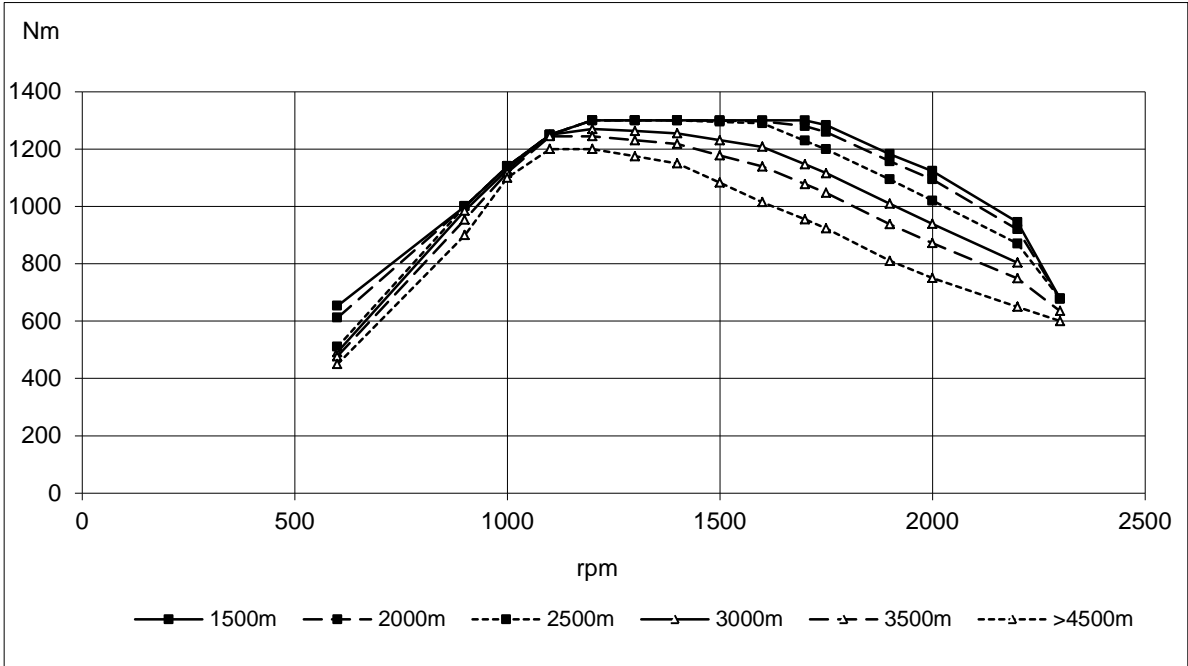
Conditions: (5 mΩ main circuit resistance@ 20°C)	Temperature	°C	25	0	-15
	Battery	Ah / CCA	140/800	140/800	140/800
Crank speed	rpm		185	160	120
Crank current	A		220	300	470
Starter input power during crank	kW		4,91	5,90	6,94
Battery power during crank	kW		5,15	6,31	7,50
Min battery @ 0°C	Ah / CCA		100/700		

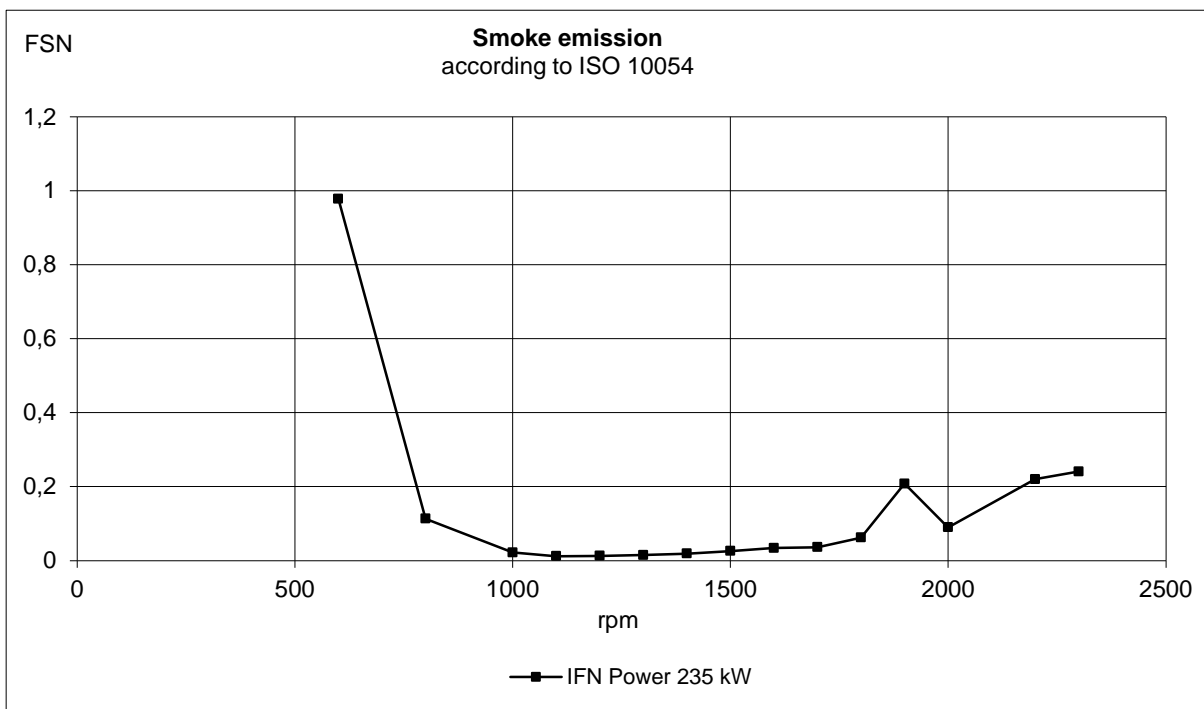
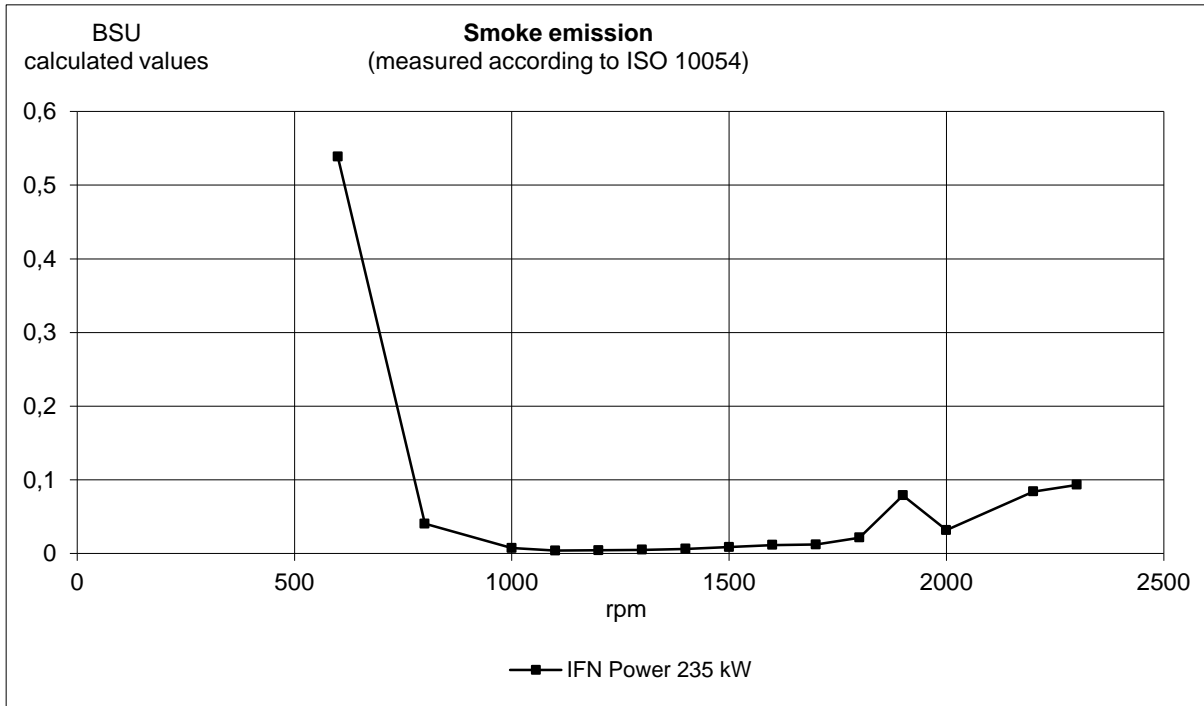
Power take off		rpm	1400	1800	2000	2200	
Front end in line with crank shaft max:*	0.02 kgm ²	Nm lbf ft	1064,0 785	743,0 548	740 546	833 614	
	SAE 2, STD 10" & 11,5 ", 1.303 kgm ²	0.03 kgm ²	Nm lbf ft	1030,0 760	706,0 521	697 514	786 580
		0.04 kgm ²	Nm lbf ft	996,0 735	663,0 489	654 482	729 538
Front end belt pulley load.	Max up (above or equal to horizontal line)	kW hp	12,5 17,0	16 21,8	18,8 25,6	19,6 26,7	
	Max down (below horizontal line)	kW hp	26,6 36,2	34,2 46,5	38 51,7	41,8 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	4250 955,4				

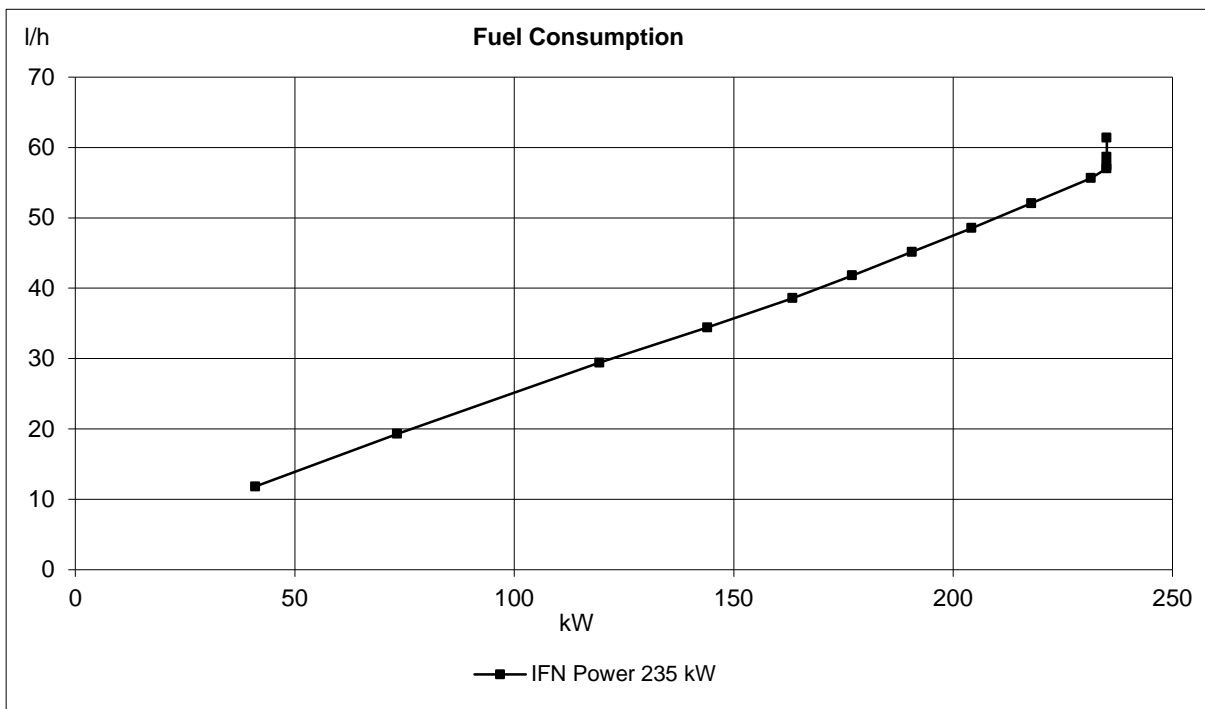
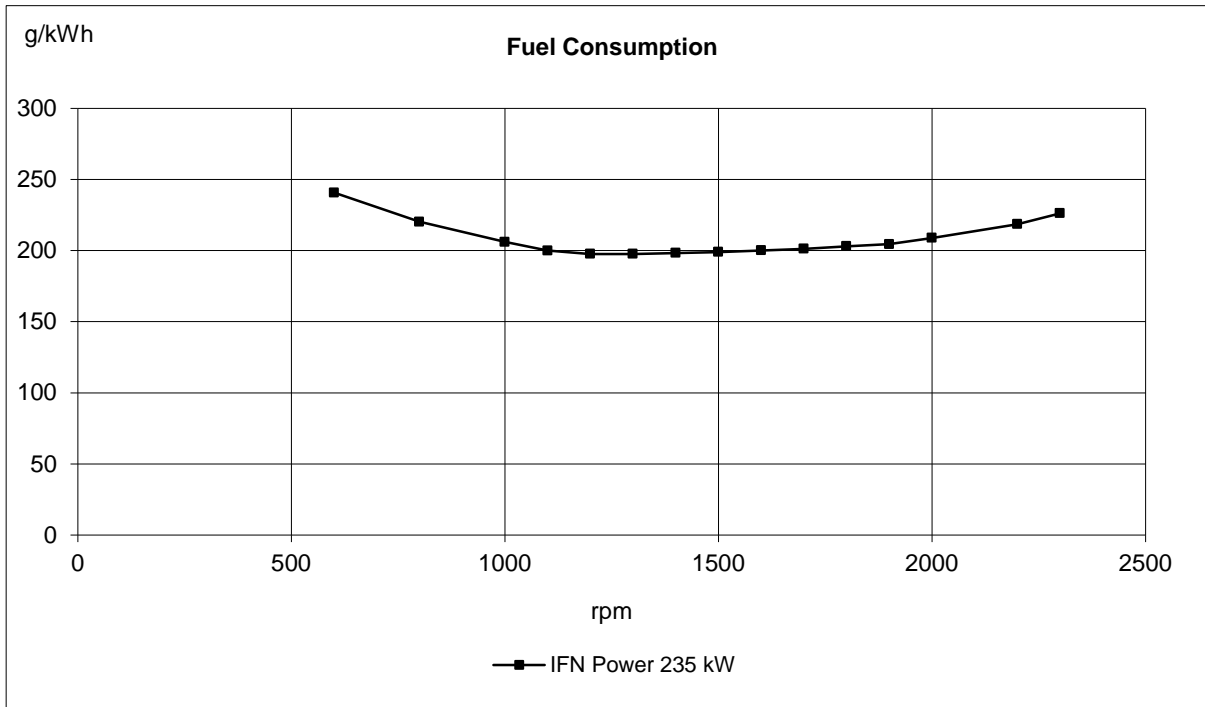
* Maximum allowed torque at individual PTO's.

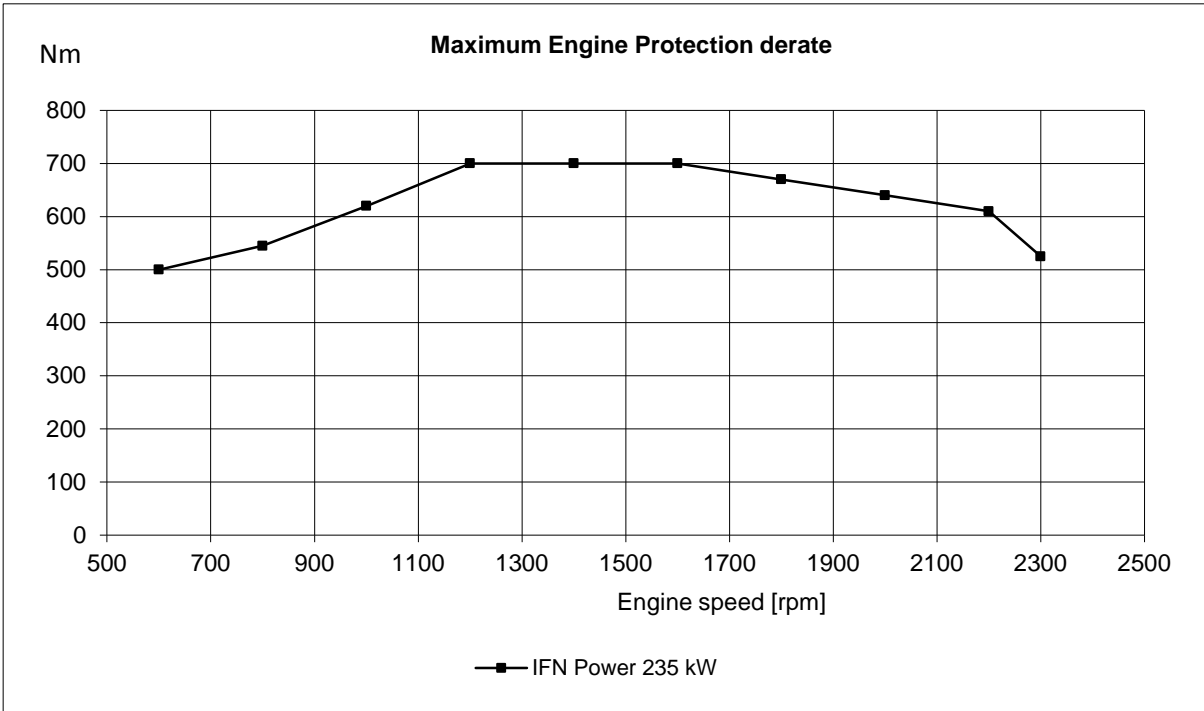
If more then one PTO output is used simultaneously, calculations needs to be performed to determine available maximum. Available torque depends on application inertia.

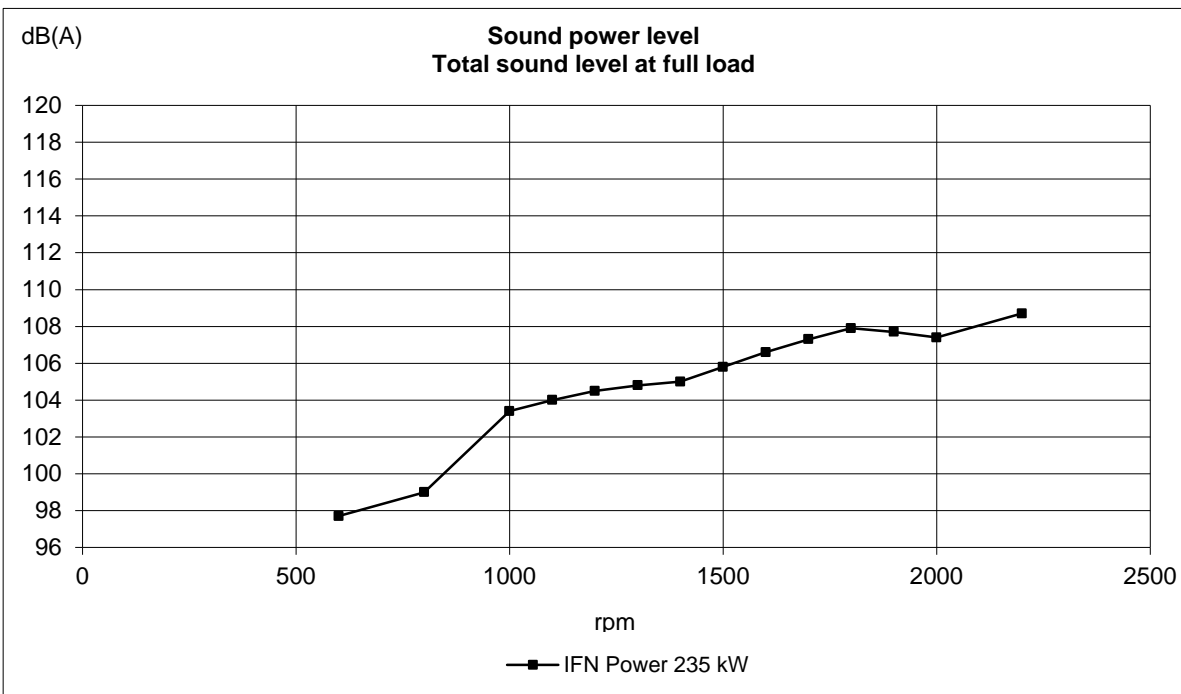
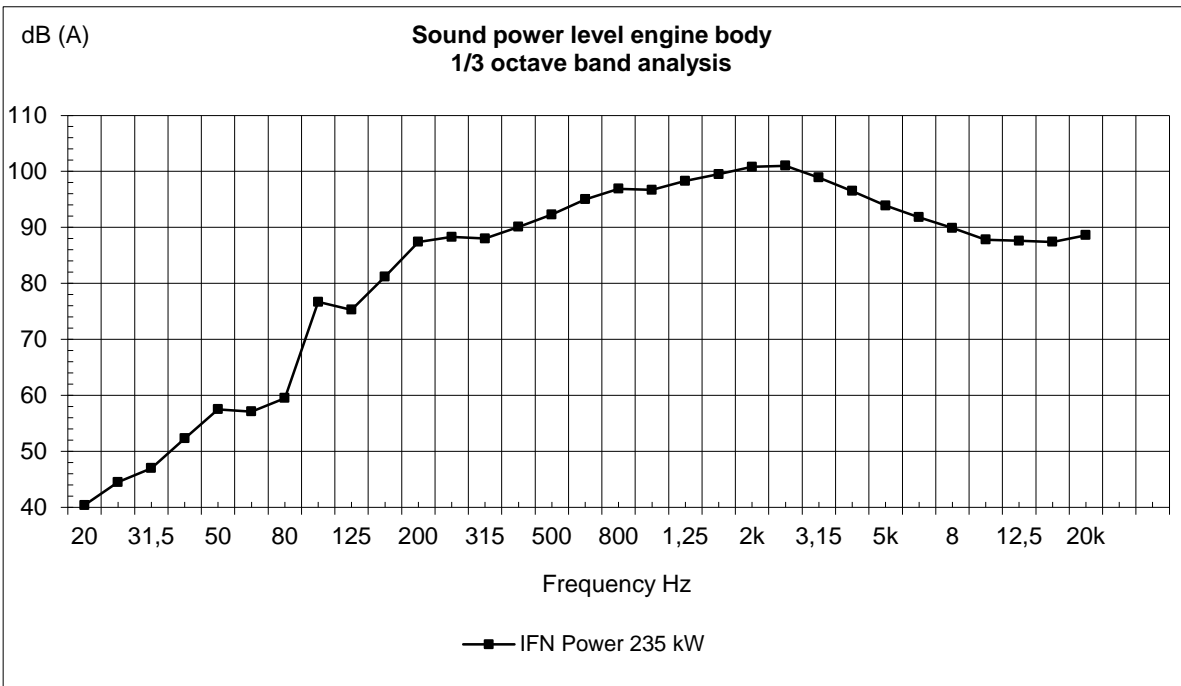


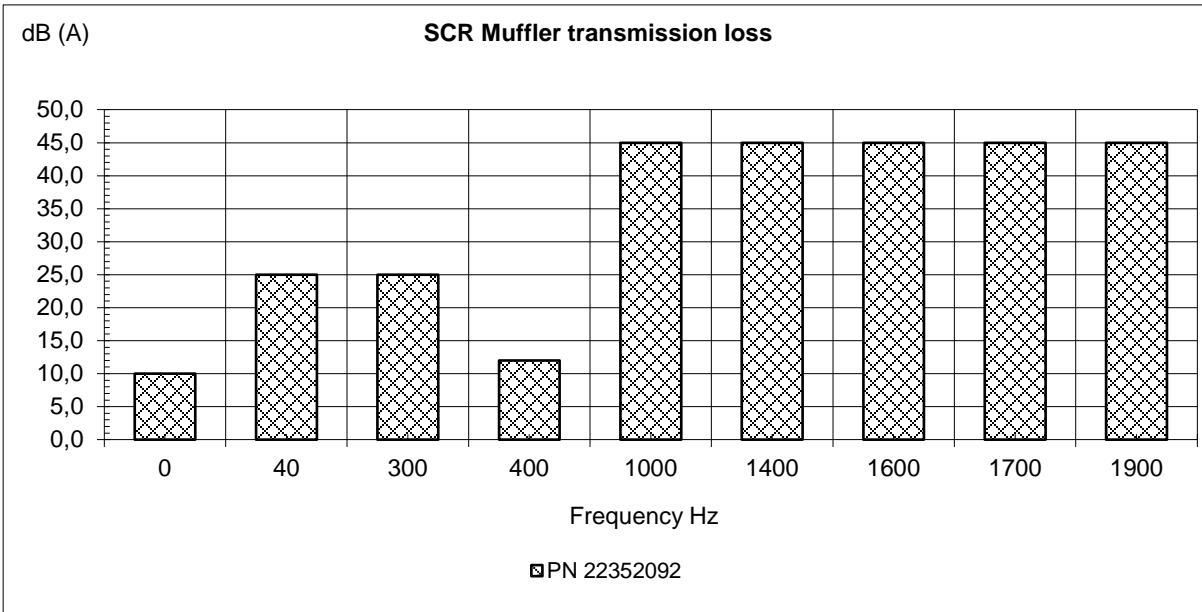


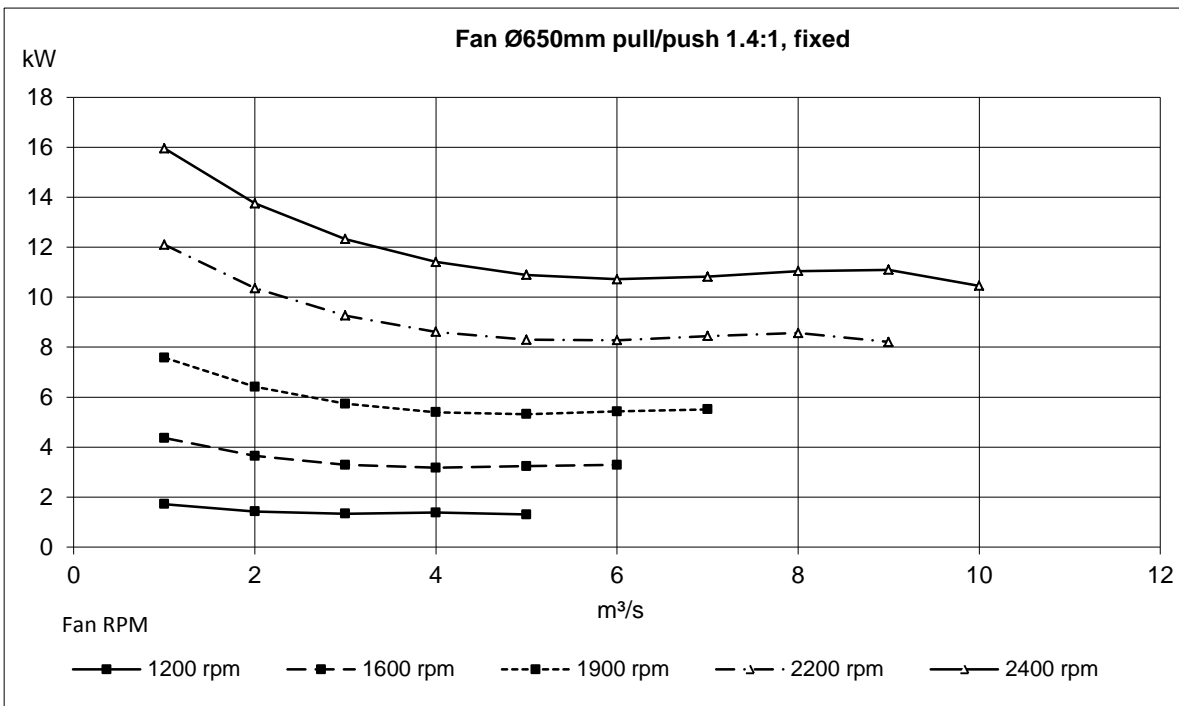




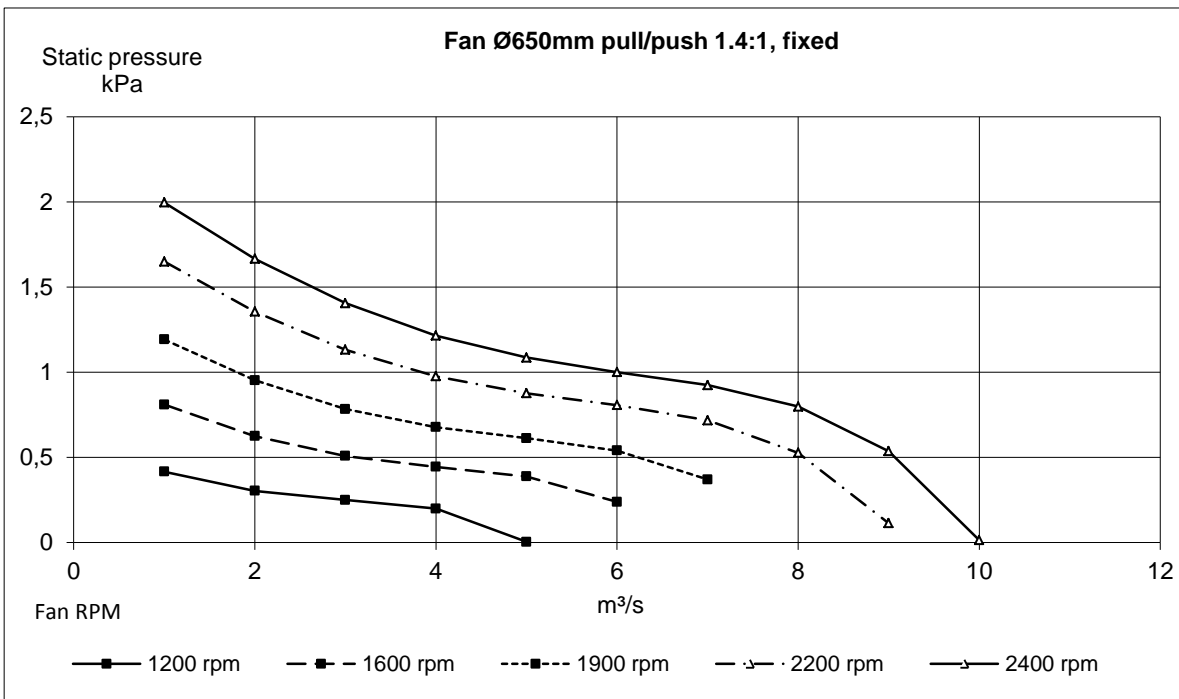








Maximum fan speed with visco clutch: 2400rpm



Maximum fan speed with visco clutch: 2400rpm

