


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
ICFN Power	185 kW	without fan	kW	181	185	185	185	
			hp	246	252	252	252	
		with fan 650 mm pull	kW	174	174	174	174	
			hp	236	237	237	237	
Torque at:	ICFN Power 185 kW	Nm	1150	982	884	803		
		lbf ft	848	724	652	592		
Max torque at engine speed	ICFN Power	1200 rpm	Nm	1160				
			lbf ft	856				
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:	ICFN Power 185 kW		MPa	1,88	1,60	1,44	1,31	
			psi	273	232	209	190	
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		rpm	1500	1800	2000	2200
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)	ICFN Power 185 kW	25°C	m³/min	11,6	12,6	14,4	15,2
		77°F	cfm	410	445	509	537
 See front page for important information							
Max allowable air intake restriction including piping			kPa psi	6 0,9			
Heat rejection to exhaust at:	ICFN Power 185 kW		kW BTU/min	90 5135	99 5653	108,6 6176	118,7 6750
Exhaust gas temperature after turbine at:			°C °F	371 700	376 709	362 684	374 705
 See front page for important information							
Max allowable back pressure in exhaust line (after turbine) Pipe dimension Ø: 102 mm			kPa psi	15 2,2	17 2,5	20 2,9	22 3,2
 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	11 1,6	13 1,9	14 2,0
Exhaust gas flow at: (temp and pressure after turbine at the corresponding power setting)	ICFN Power 185 kW		m³/min	23,4	25,1	27,3	28,9
			cfm	826	886	964	1021

VOLVO PENTA

TAD871VE 185kW/2200rpm



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Cooling system		rpm	1500	1800	2000	2200
Heat rejection radiation from engine at:	ICFN Power 185 kW	kW	5	5	4,8	5,2
		BTU/min	307	290	273	296
Heat rejection to coolant at:	ICFN Power 185 kW	kW	116	123	124	133
		BTU/min	6585	6995	7040	7581
Radiator cooling system type			Closed circuit			
Standard radiator core area	ICFN Power 185 kW	m ²	0,6			
		foot ²	6,46			
Fan diameter	650 mm	ICFN Power 185 kW	mm	650		
			in	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 (Only available option)			
	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	ICFN Power 185 kW	kW	29,8	29,3	33,8	35,5
		BTU/min	1695	1666	1922	2019
Charge air mass flow	ICFN Power 185 kW	kg/s	0,229	0,249	0,285	0,3
Charge air inlet temp. (Charge air temp after turbo compressor)	ICFN Power 185 kW	°C	178	166	168	167
		°F	352	331	334	333
	See front page for important information Max allowable Charge air outlet temp. (Charge air temp after charge air cooler)	°C	49	49	50	50
		°F	120	120	122	122
	See front page for important information Maximum pressure drop over charge air cooler incl. piping	kPa	7	9	11	12
		psi	1,02	1,31	1,60	1,74
Charge air pressure (relative) (After charge air cooler)		kPa	203	182	180	174
		psi	29,44	26,40	26,11	25,24
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.

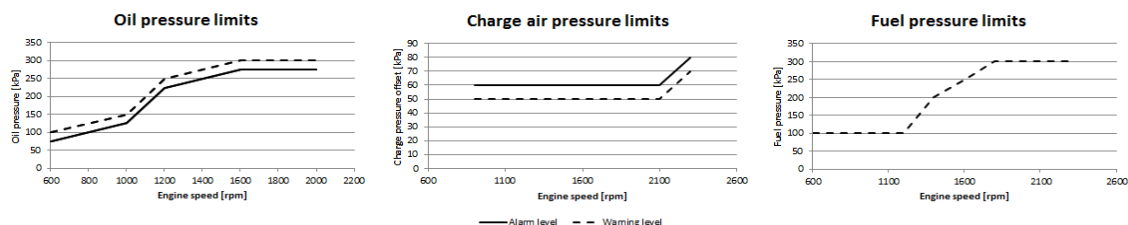
Engine speed	Engine power	ICFN Power 185 kW					
		Air on temp		Air flow		External restriction	
		°C	°F	m ³ /s	ft ³ /s	Pa	psi
1500	181	62	143	7,4	261,3	0	
		246	61	141	7,2	254,3	100
	252	58	137	6,7	236,6	200	0,029
		54	130	6,1	215,4	300	0,044
2200	185	63	146	9,4	332,0	0	
		252	63	145	9,3	328,4	100
	252	62	144	9	317,8	200	0,029
		61	141	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

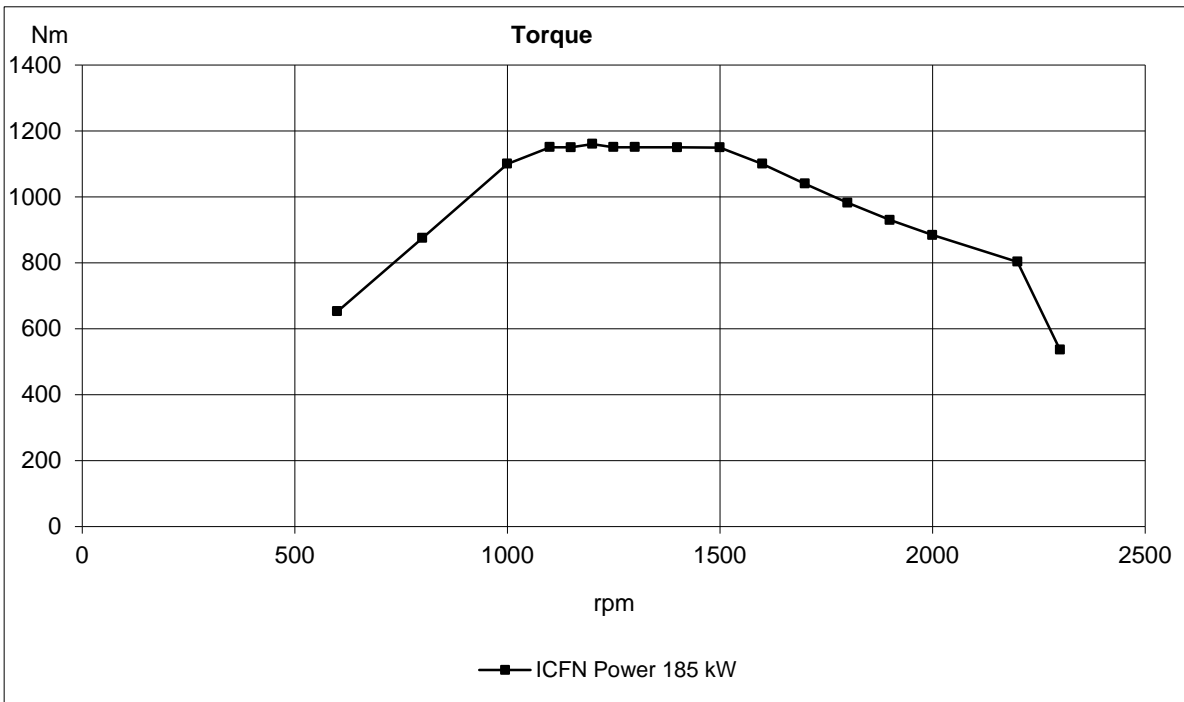
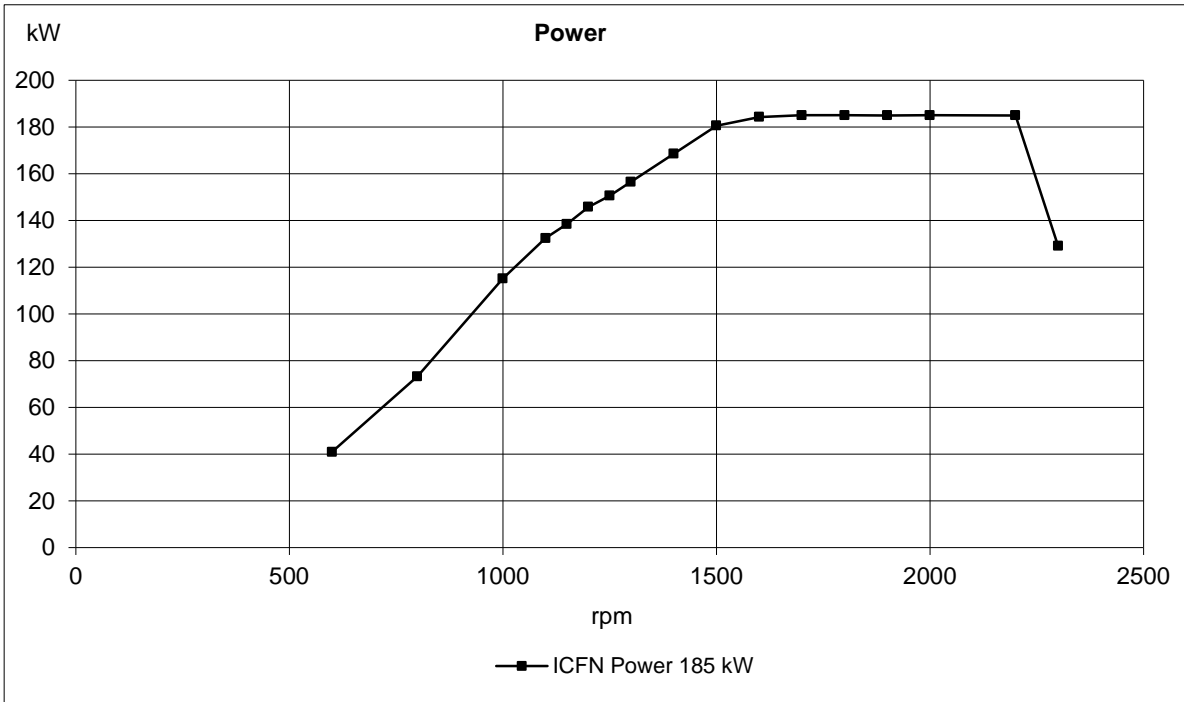
Voltage and type			24V
Alternator:	make		MELCO
	output	A	110/130
	tacho output	Hz/alternator rev.	
	drive ratio		
Starter motor:	make		MELCO
	type		85P50/90P55
	output	kW hp	5 / 5.5 6.8 / 7.5
Number of teeth on:	flywheel		137
	starter motor		10 / 12 teeth
Inlet manifold heater (at 20 V)		kW	4
Power relay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

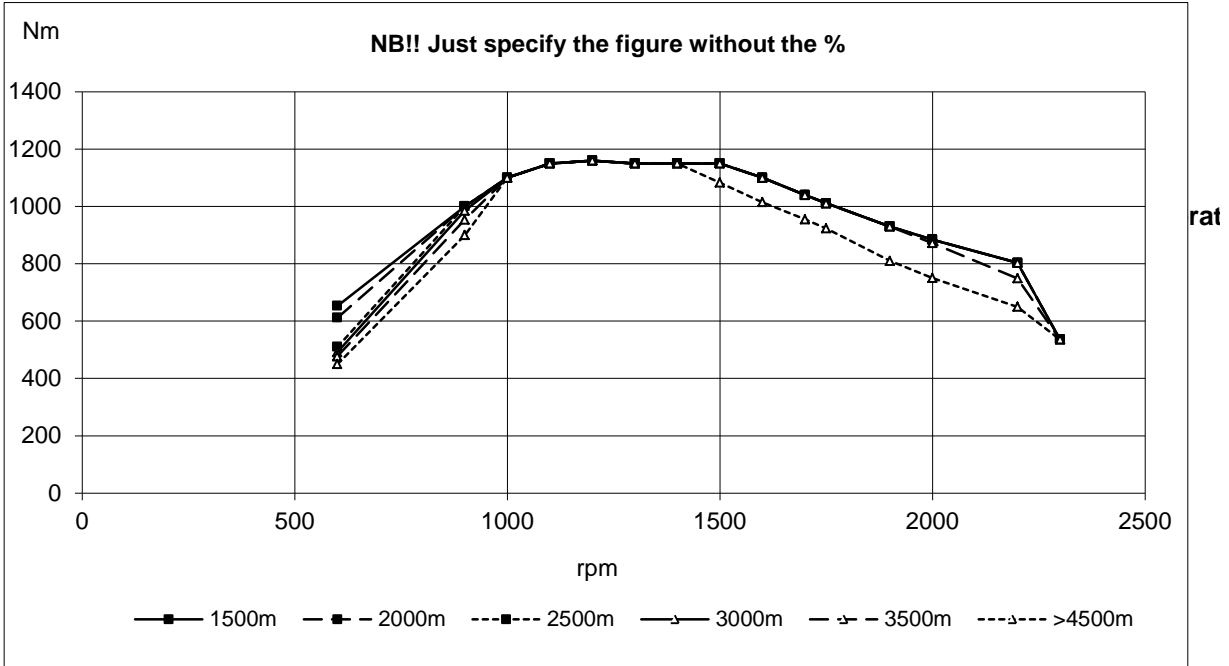
Conditions: (5 mΩ main circuit resistance@ 20°C)	Temperature	°C	25	0	-15
	Battery	Ah / CCA	140/800	140/800	140/800
Crank speed		rpm	185	160	120
Crank current		A	220	300	470
Starter input power during crank		kW	4,91	5,90	6,94
Battery power during crank		kW	5,15	6,31	7,50
Min battery @ 0°C		Ah / CCA	100/700		

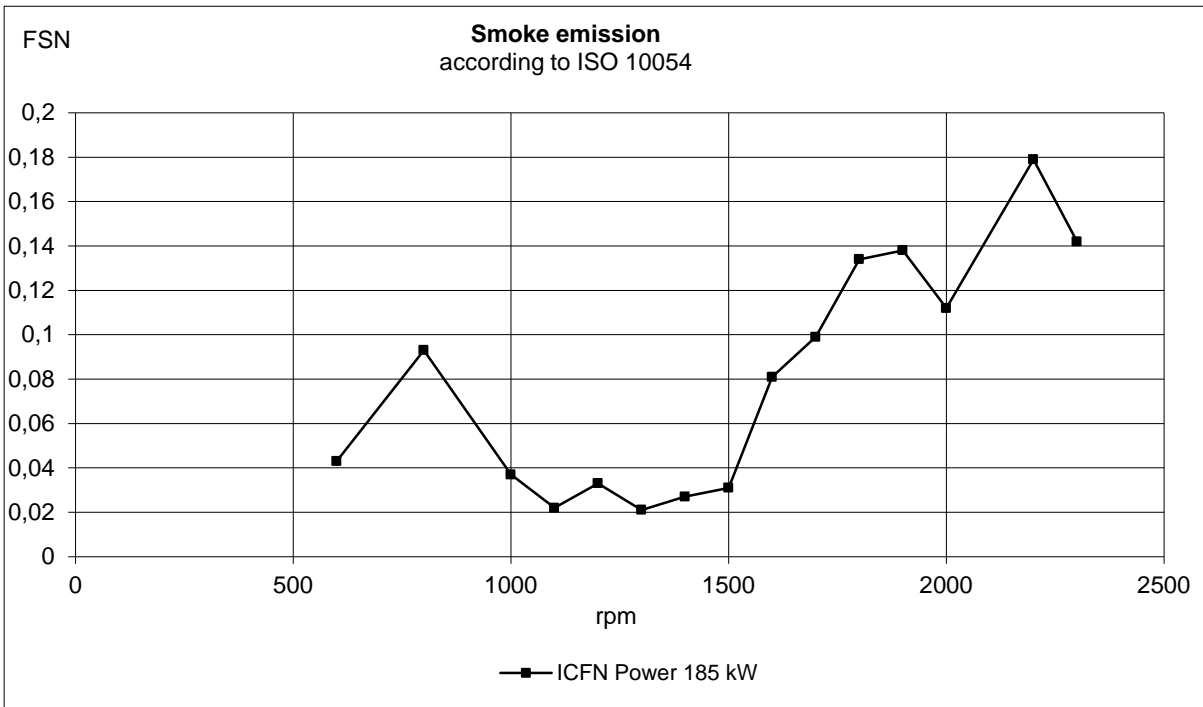
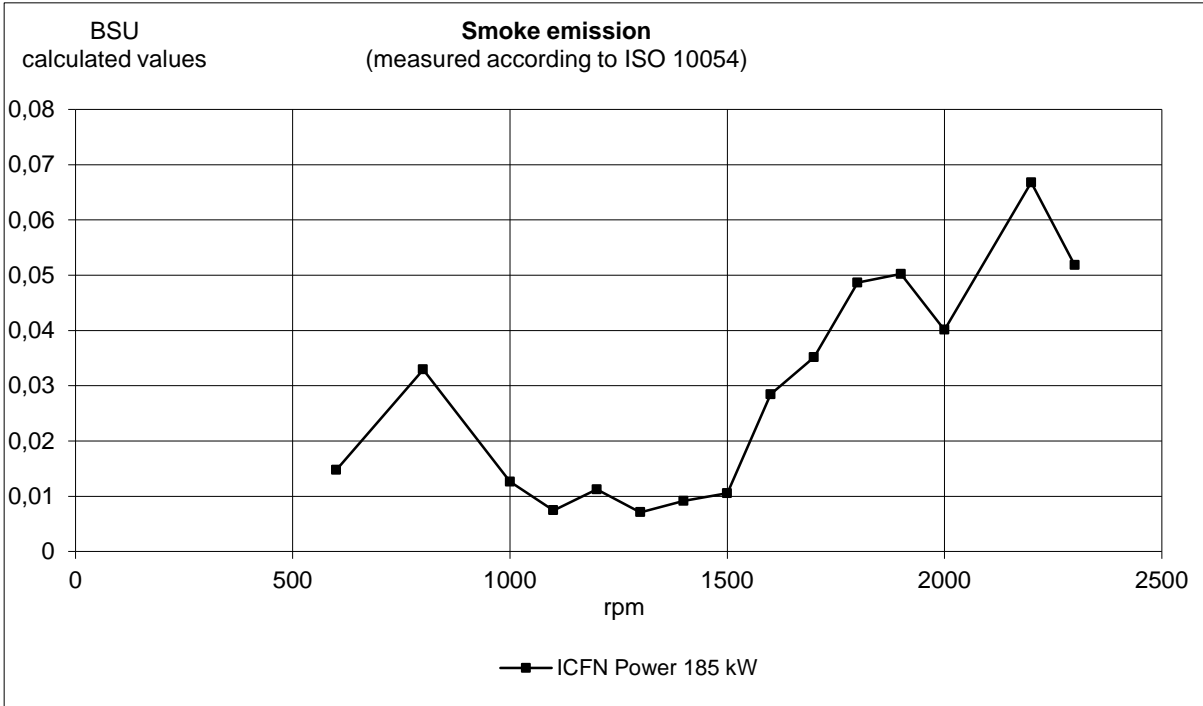
Power take off		rpm	1400	1800	2000	2200
Front end in line with crank shaft max:*	0.02 kgm ²	Nm	1064,0	743,0	740	833
		lbf ft	785	548	546	614
		SAE 2, STD 10" & 11,5", 1.303 kgm ²	0.03 kgm ²	Nm	1030,0	706,0
lbf ft	760			521	514	580
0.04 kgm ²	Nm			996,0	663,0	654
	lbf ft	735	489	482	538	
Front end belt 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	75			
		hp	102			
Speed ratio direction of rotation viewed from flywheel side			1:1 Counter clockwise			
Maximum torque on PTO at compressor position:*		Nm	200			
		lbf ft	148			
Speed ratio direction of rotation viewed from flywheel side			1.026:1 Counter clockwise			
Timing gear at hydraulic pump PTO max:*		Nm	80			
		lbf ft	59			
Speed ratio direction of rotation viewed from flywheel side			1.3:1 Clockwise			
Max allowed bending moment in flywheel housing SAE2		Nm	4600			
		lbf ft	3393			
Max. rear main bearing load		N	4250			
		lbf	955,4			

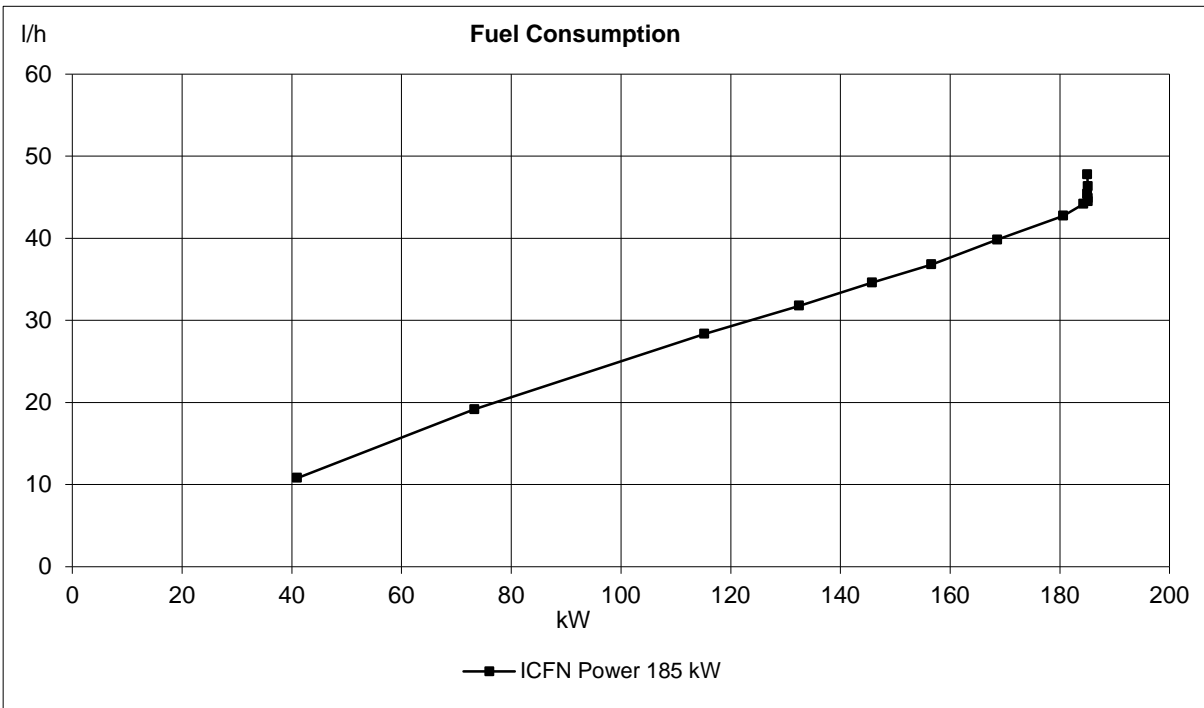
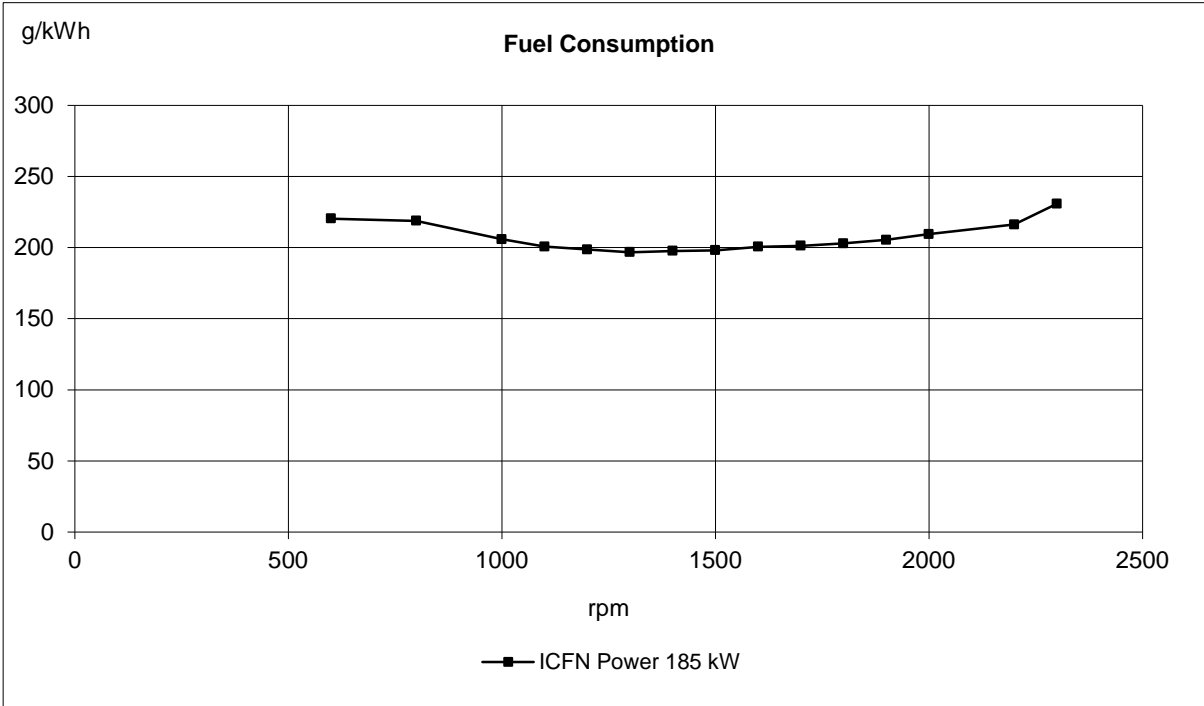
* Maximum allowed torque at individual PTO's.

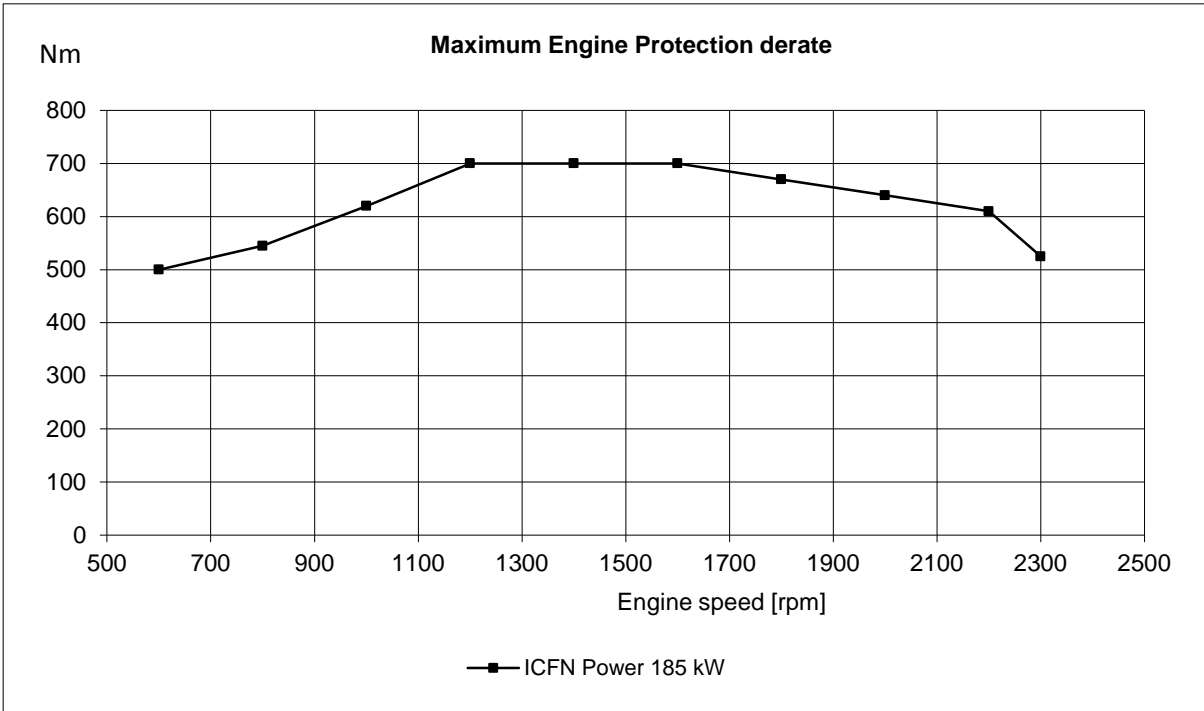
If more then one PTO output is used simultaniously, calculations needs to be performed to determine available maximum. Available torque depends on application inertia.

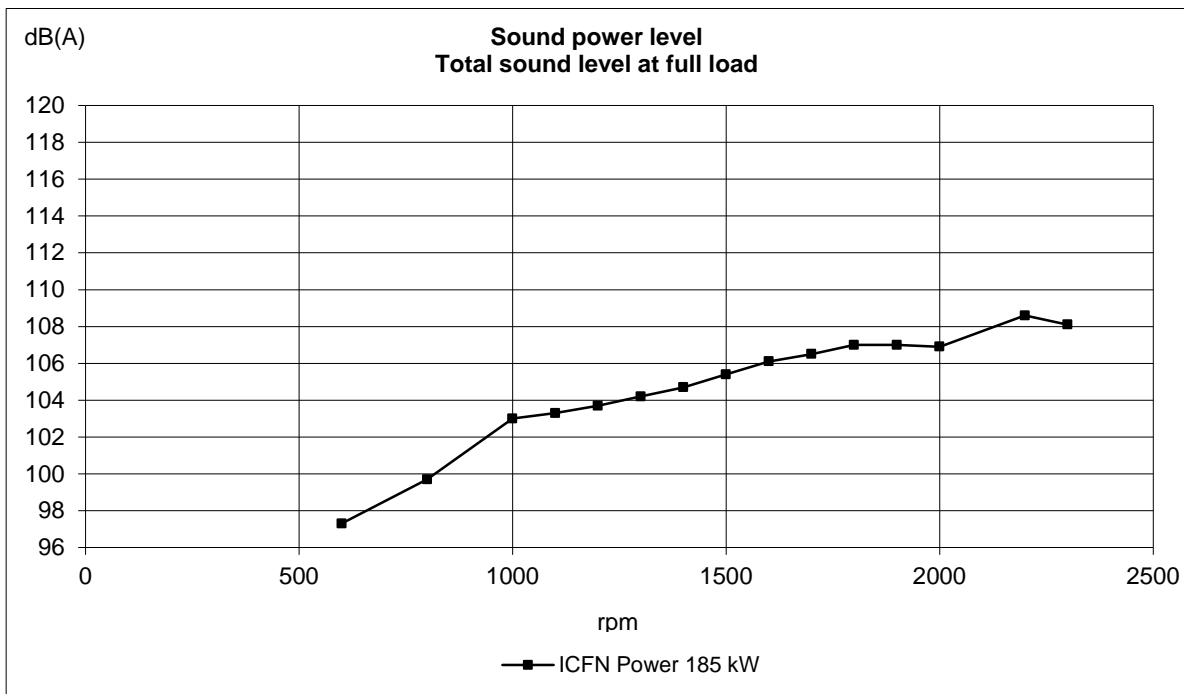
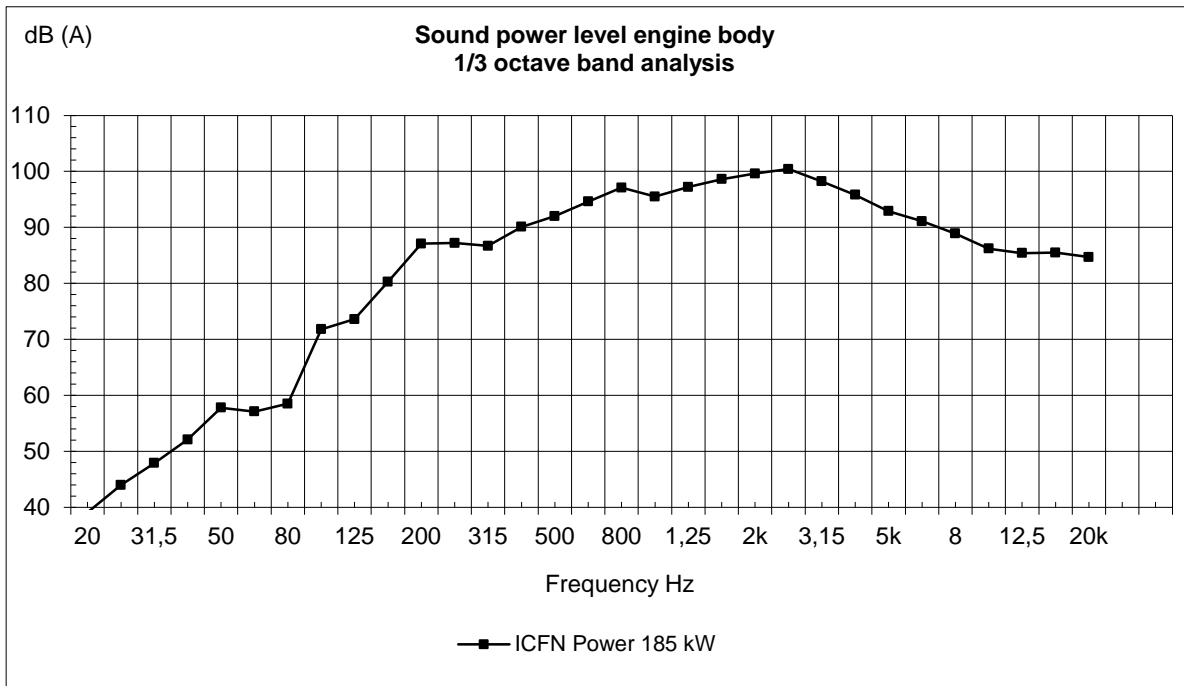


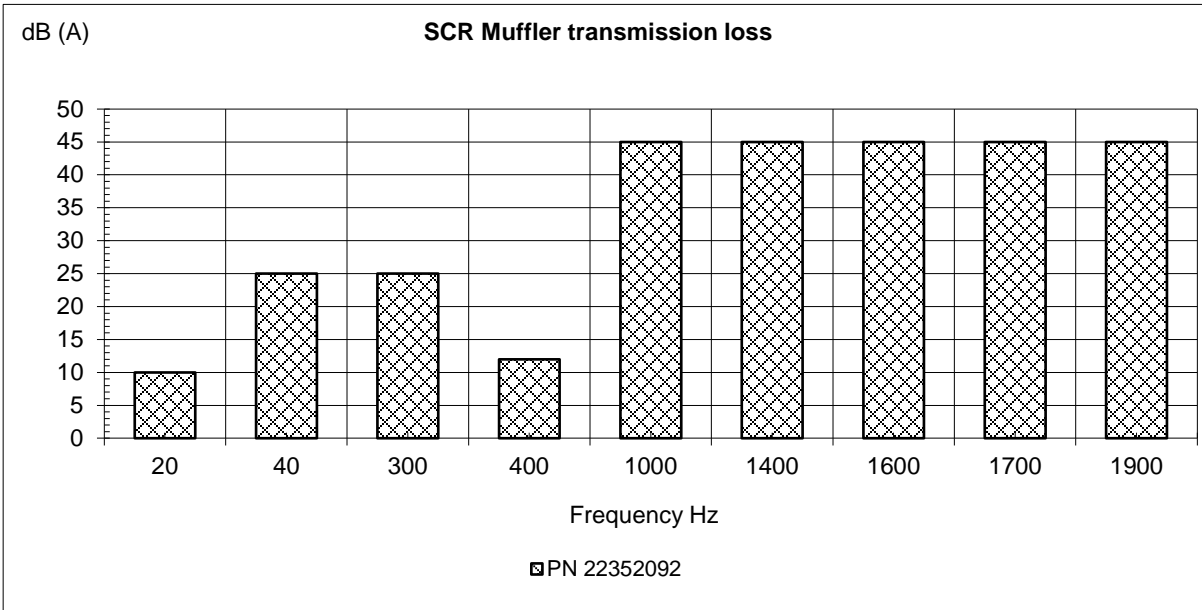


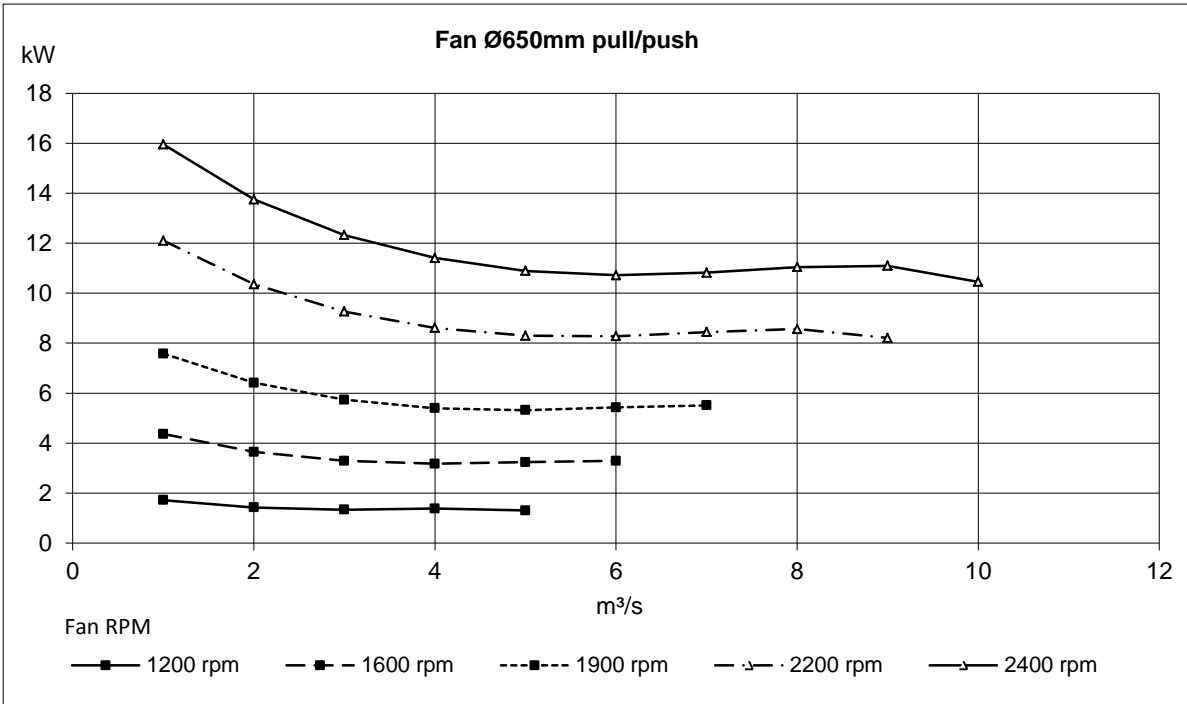




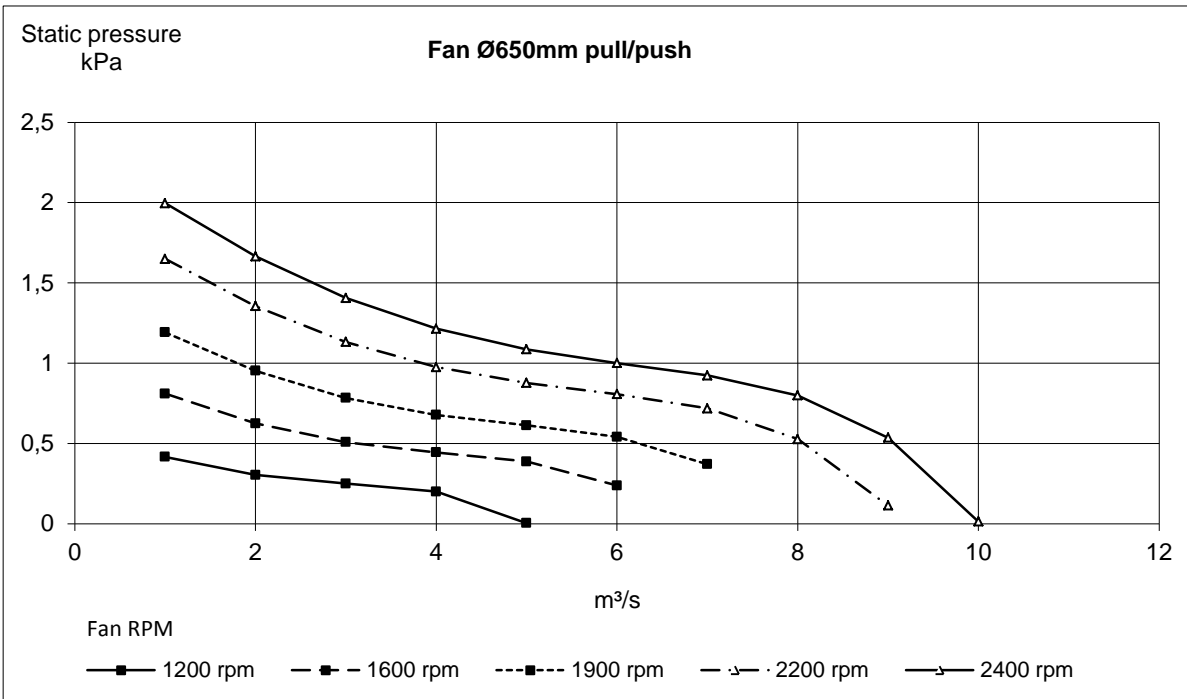








Maximum fan speed with visco clutch: 2400rpm



Maximum fan speed with visco clutch: 2400rpm

