


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, counterclockwise viewed towards flywheel

Number of cylinders			6
Displacement, total		liters	16,12
		in ³	984
Firing order			1-5-3-6-2-4
Bore		mm	144
		in	5,67
Stroke		mm	165
		in	6,50
Compression ratio			17,0:1
Wet weight	Engine only (Estimated) (excl after treatment comp.)	kg	1565
		lb	3450
	Power pac	kg	
		lb	

Performance				rpm	1200	1500	1800	1900
IFN Power	450 kW	without fan		kW	357	446	450	450
				hp	485	607	612	612
		with fan		kW	See diagram for fan power consumption			
		890 mm		hp				
Torque at:		IFN Power		Nm	2840	2840	2387	2262
				lbf ft	2095	2094	1761	1668
Max torque at engine speed		rpm	1260 rpm	Nm	2900			
				lbf ft	2139			
Power tolerance				%	±2			
Mean piston speed				m/s	6,6	8,3	9,9	10,5
				ft/sec	21,7	27,1	32,5	34,3
Effective mean pressure at:		IFN Power		MPa	2,21	2,21	1,86	1,76
				psi	321	321	270	256
Max combustion pressure at:		IFN Power		MPa	17	17	17	18
				psi	2465	2465	2465	2610
Total mass moment of inertia, J (mR ²) (not including flywheel)				kgm ²	4,1			
				lbf ²	97,3			
Friction Power				kW	26	39	58	65
				hp	35	53	79	88

Derating see Technical Diagrams

Engine brake performance (only engines with VCB)

		rpm	1200	1500	1900	2200
Brake power:	without fan	kW	85	152	284	345
		hp	116	207	386	469
Brake torque:	without fan	Nm	676	968	1427	1498
		lbf ft	499	714	1053	1104
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	-10		
		°F	14		
	#REF!	°C	-25		
		°F	-13		
*Specify oil and fuel quality	T>-15°C Oil VDS4/VDS3 15W/40				
	T<-15°C Oil VDS4/VDS3 5W/40				
Heater type	Make	Power kW	Engaged hours	Cooling water temp engine block	
Self circulating	Volvo 21578298	2	12	1°C 34°F	

* See also general section in the sales guide

Lubrication system

Lubricating oil consumption at max rpm at:	IFN Power	liter/h	0,03	
		US gal/h	0,008	
		liter/h		
		US gal/h		
Oil system capacity including filters		liter	48	
		US gal	12,68	
Oil sump capacity: (both variants)	Max	liter	42	
		US gal	11,10	
	Min	liter	32	
		US gal	8,45	
Oil change intervals/specifications	VDS3	h	1000 / See manual	
	VDS4	h	1000 / See manual	
Engine angularity limits:	front up	°	30	
	front down	°	30	
	side tilt	°	30	
Oil pressure at rated speed		kPa	300 - 650	
		psi	44 - 94	
Oil pressure shut down switch setting		kPa	N/A	
		psi		




Lubrication system

Lubrication oil temperature in sump:	max	°C	130	
		°F	266	
Oil filter micron size		μ	40	



Fuel system

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	16,5 2,4
System return flow at max. Speed	liter/h US gal/h	30,0 7,9
Fuel return line max. restriction (measured at fuel return connection)	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
Fuel filter micron size	μ	5
Engine Control System, standard	Volvo/EMS2.3	
Specific UREA consumption, NRTC	Vol%	5,7
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	1800	1900
Change air consumption at: (+25°C and 100kPa)	IFN Power	m³/min cfm	24,5 865	29,7 1049	31,7 1119	32,5 1148
 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	kW BTU/min	252 14331	327 18596	347 19734	349 19847
Exhaust gas temperature after turbine at:	IFN Power	°C °F	455 851	515 959	515 959	510 950
 See front page for important information						
Max allowable back pressure in exhaust line (after turbine) Pipe dimension Ø: 125 mm		kPa psi	20 2,9	26 3,8	30 4,4	31 4,5
 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	18 2,6	24 3,5	26 3,8	27 3,9
Exhaust gas flow at: (temp and pressure after turbine at the	IFN Power	m³/min cfm	63,8 2253	81,8 2889	87,7 3097	88,7 3132

Cooling system		rpm	1200	1500	1800	1900
Heat rejection radiation from engine at:	IFN Power	kW	8	8	8	8
		BTU/min	455	455	455	455
Heat rejection to coolant at:	IFN Power	kW	141	169	187	193
		BTU/min	8019	9611	10635	10976
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	IFN Power	m ²	1,42			
		foot ²	15,28			
HD radiator core area		m ²	0,87			
		foot ²	9,36			
Fan diameter	890 mm IFN Power	mm	890			
		in	35,04			
Fan power consumption	890 mm	kW hp	See diagram for actual fan drive ratio power.			
Fan drive ratio	fan Ø890		See diagram for cooling performance			
Coolant capacity:	Engine	liter	24			
		US gal	6,3			
	STD. 1,42m ² radiator with hoses Pusher syst. Core thickness 63mm	liter	60			
		US gal	15,9			
	STD.0,87m ² radiator with hoses Puller syst. Core thickness 41mm	liter	30			
	US gal	7,9				
	HD 890m ² radiator with hoses	liter	32			
		US gal	8,5			
Coolant pump		drive/ratio	belt/1,77:1			
Coolant flow with standard system		l/s	4,7	5,8	7	7,3
		US gal/s	1,2	1,5	1,8	1,9
Minimum coolant flow		l/s	4,3	5,4	6,6	6,9
		US gal/s	1,1	1,4	1,7	1,8
Maximum outer circuit restriction incl. piping		kPa	70,0			
		psi	10,2			
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	1800	1900
Heat rejection to charge air cooler	IFN Power	kW	63	87	88	91
		BTU/min	3583	4948	5004	5175
Charge air mass flow	IFN Power	kg/s	0,5	0,59	0,63	0,64
Charge air inlet temp. (Charge air temp after turbo compressor)	IFN Power	°C	163	170	165	165
		°F	325	338	329	329
 See front page for important information Max allowable Charge air outlet temp. (Charge air temp after charge air cooler)		°C	40	50	50	50
		°F	104	122	122	122
 See front page for important information Maximum pressure drop over charge air cooler incl. piping		kPa	13			
		psi	1,89			
Charge air pressure (After charge air cooler)		kPa	190	185	163	163
		psi	27,56	26,83	23,64	23,64
Standard charge air cooler core area		m ²	1,3			
		foot ²	13,99			

Cooling performance: STD cooling package 1,42m² radiator and suction 890mm 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.

Fix fan drive ratio 1:0,88

Engine speed rpm	Engine power kW hp	Air on temp		Air flow		External restriction	
		°C	°F	m ³ /s	ft ³ /s	Pa	psi
1800	450 612	58	136	7,6	268,4	320	0,046
		59	138	7,8	275,5	270	0,039
		61	142	8,2	289,6	170	0,025
		62	144	8,4	296,6	115	0,017
		64	147	8,9	314,3	0	

Cooling performance: STD cooling package 1,42 m² radiator and pusher 890mm 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.

Fix fan drive ratio 1:1,13

Engine speed rpm	Engine power kW hp	Air on temp		Air flow		External restriction	
		°C	°F	m ³ /s	ft ³ /s	Pa	psi
1900	450 612	70	159	10,0	353,1	450	0,065
		71	160	10,5	371,9	300	0,044
		72	161	11,1	392,3	150	0,022
		73	163	11,7	413,5	0	

Fix fan drive ratio 1:1,04

Engine speed rpm	Engine power kW hp	Air on temp		Air flow		External restriction	
		°C	°F	m ³ /s	ft ³ /s	Pa	psi
1900	450 612	69	156	9,1	321,7	450	0,065
		70	157	9,6	338,3	300	0,044
		70	159	10,2	358,4	150	0,022
		71	160	10,7	377,2	0	

Fix fan drive ratio 1:0,97

Engine speed rpm	Engine power kW hp	Air on temp		Air flow		External restriction	
		°C	°F	m ³ /s	ft ³ /s	Pa	psi
1900	450 612	67	153	8,4	297,7	450	0,065
		68	155	8,8	312,2	300	0,044
		69	157	9,4	331,3	150	0,022
		70	158	9,8	346,8	0	

Fix fan drive ratio 1:0,88

Engine speed rpm	Engine power kW hp	Air on temp		Air flow		External restriction	
		°C	°F	m ³ /s	ft ³ /s	Pa	psi
1900	450 612	65	149	7,6	269,5	450	0,065
		66	150	8,0	281,5	300	0,044
		67	153	8,5	298,8	150	0,022
		68	154	8,8	310,4	0	

Cooling performance: STD cooling package 1,42m² radiator and pusher 890mm electronically controlled visco 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.

Visco fan drive, pulley ratio 1:0,88

Engine speed rpm	Engine power kW hp	Air on temp		Air flow		External restriction	
		°C	°F	m ³ /s	ft ³ /s	Pa	psi
1900	450 612	64	148	7,5	263,1	450	0,065
		65	149	7,8	274,4	300	0,044
		67	152	8,2	290,6	150	0,022
		67	153	8,5	300,9	0	

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 conversion)	
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 available 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 high peaks	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	

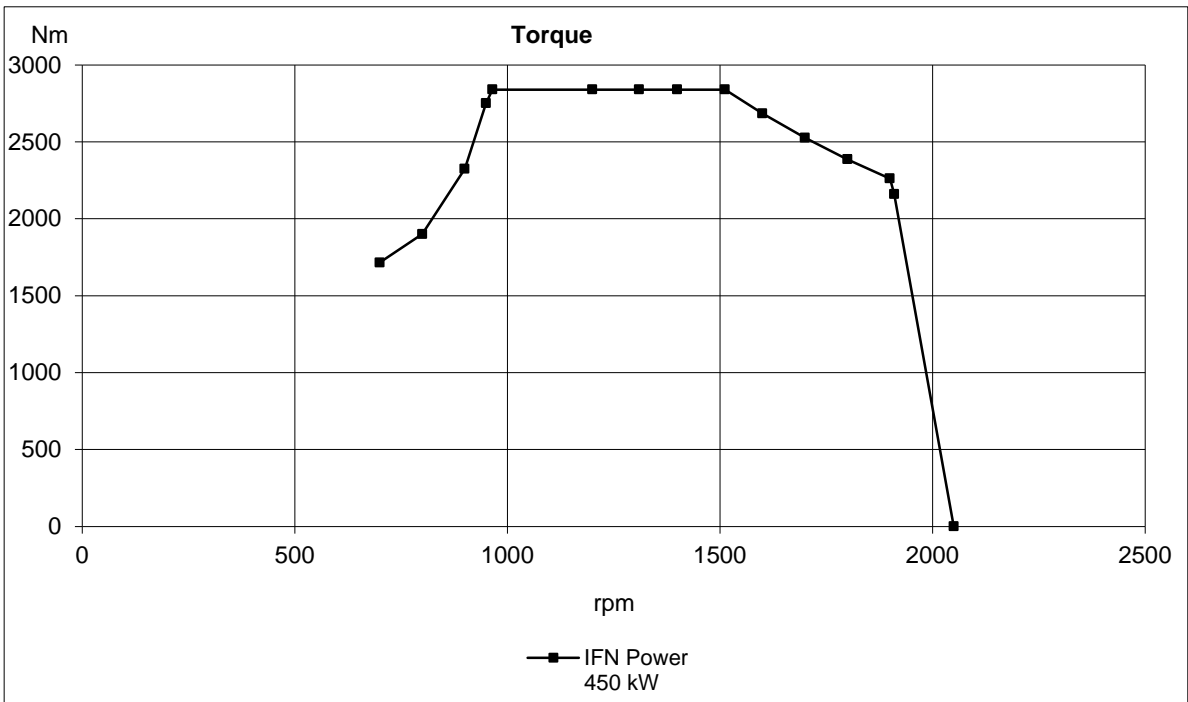
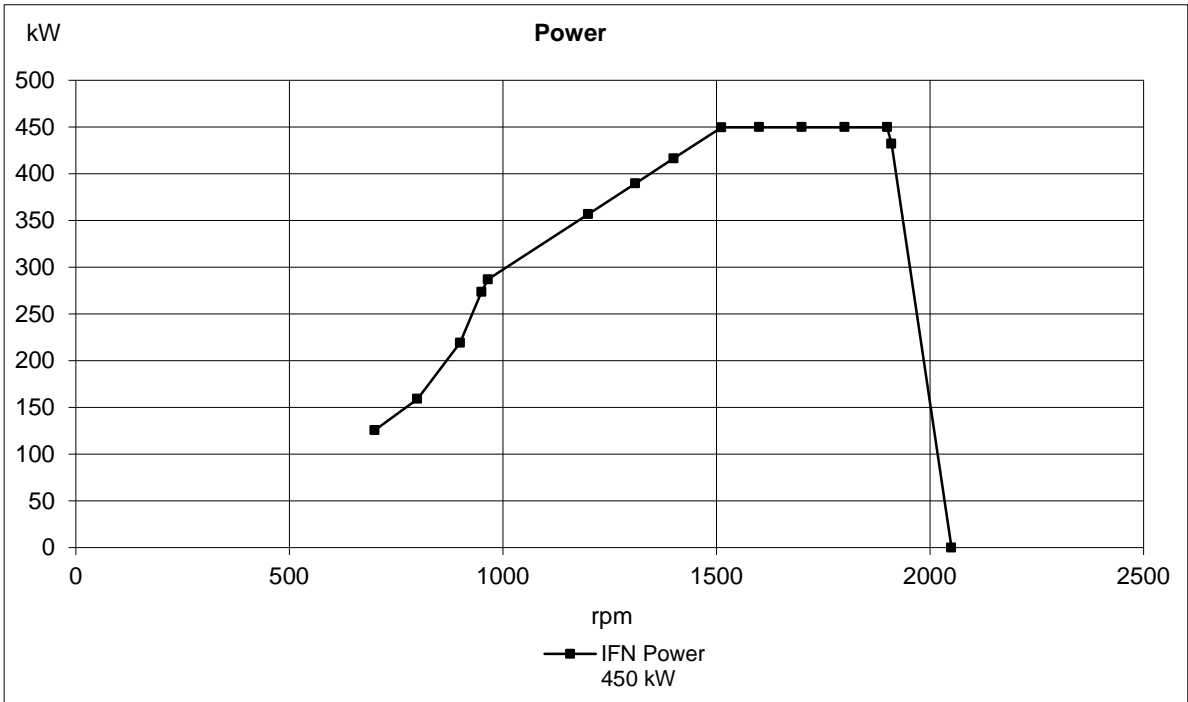
VOLVO PENTA TAD1671VE	Document No	Issue Index
	22293863	11

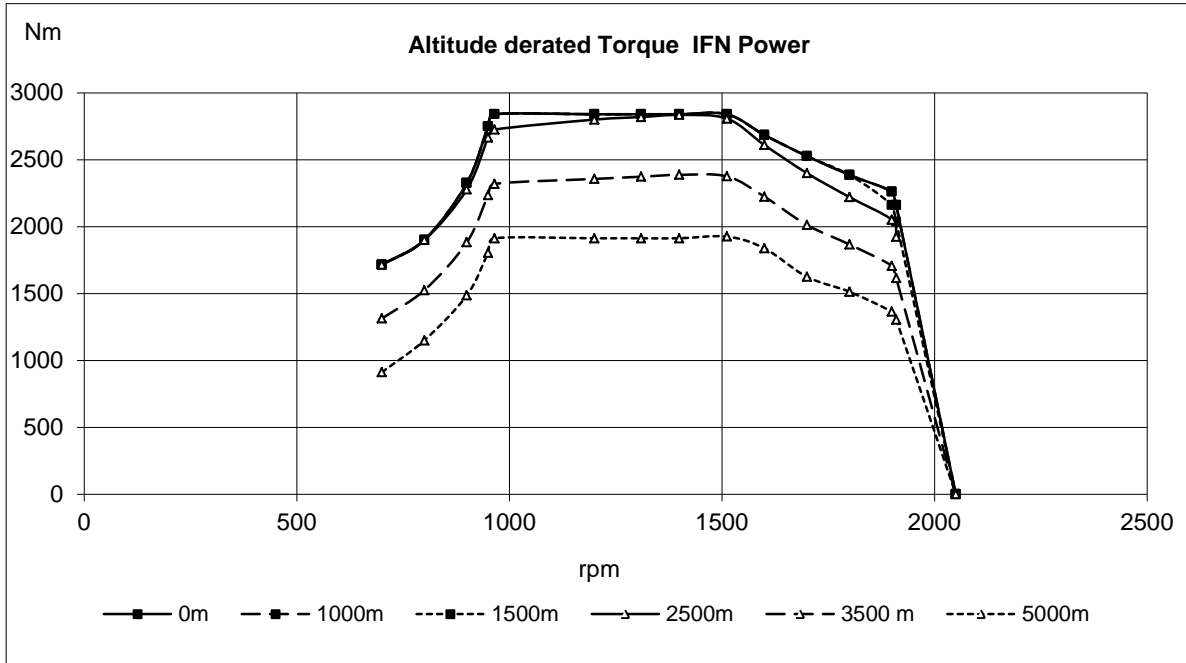
Electrical system

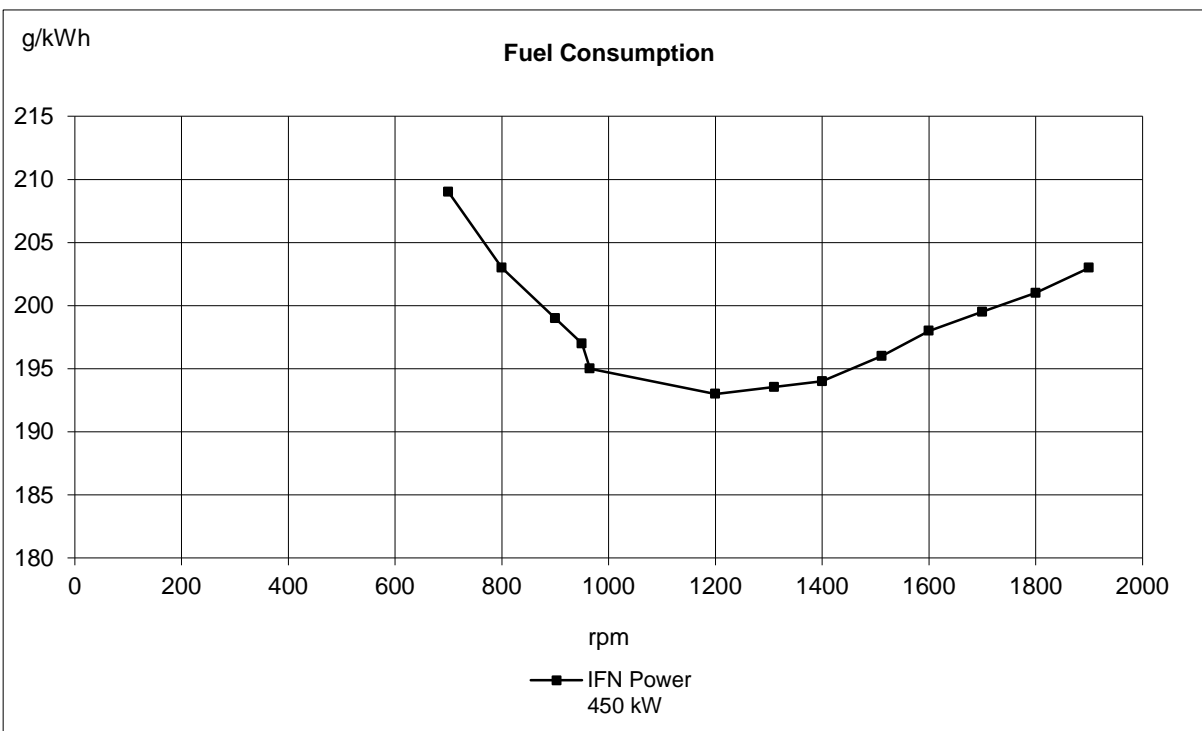
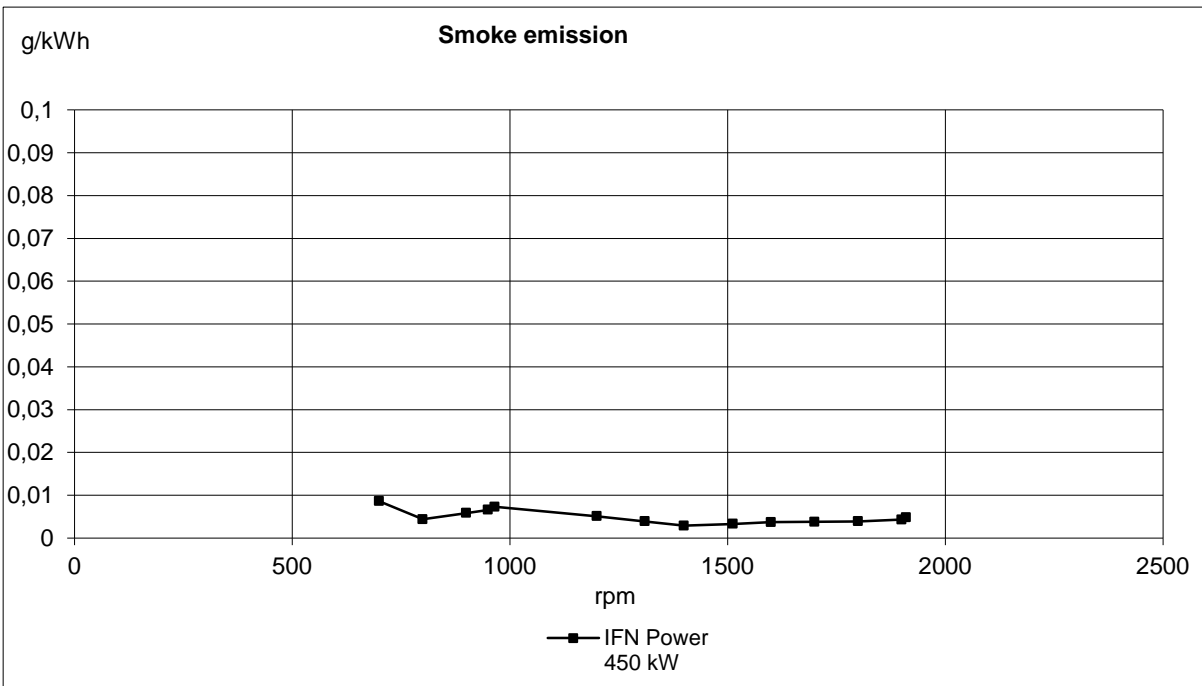
Voltage and type				24V		
Alternator:	make			Bosch		
	output	A		110/150		
	tacho output	Hz/alternator rev.		6		
	drive ratio			3,9:1		
Starter motor:	make			Melco		
	type			105P70		
	output	kW		7		
		hp		9,5		
Number of teeth on:	flywheel			153		
	starter motor			12		
Inlet manifold heater (at 20 V)		kW		2		
Power relay for the manifold heater		A		1		
Conditions:		Temperature	°C	0	-15	-25
(4,2 mΩ main circuit resistance@ 20°C)		Battery	Ah / CCA	185/1150	185/1150	185/1150
Crank speed		rpm		124	101	81
Crank current		A		435	562	686
Starter input power during crank		kW				
Battery power during crank		kW				
Min battery @ 0°C		Ah / CCA		140/800	140/900	185/1150

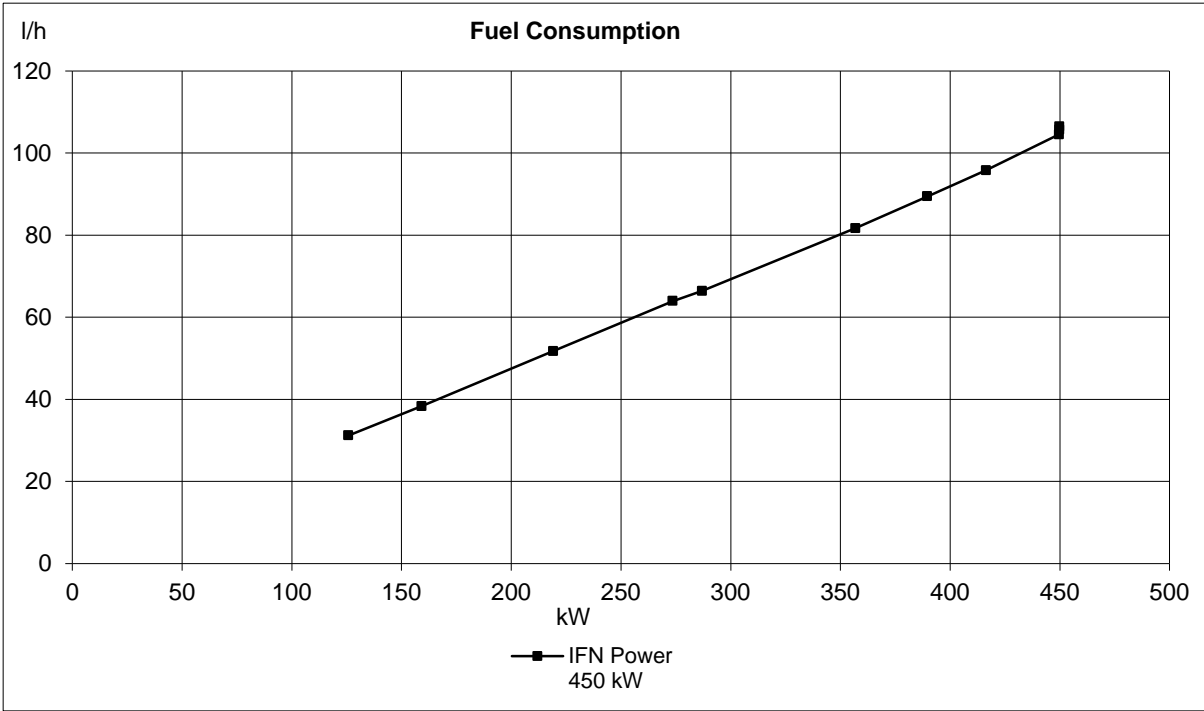
Power take off

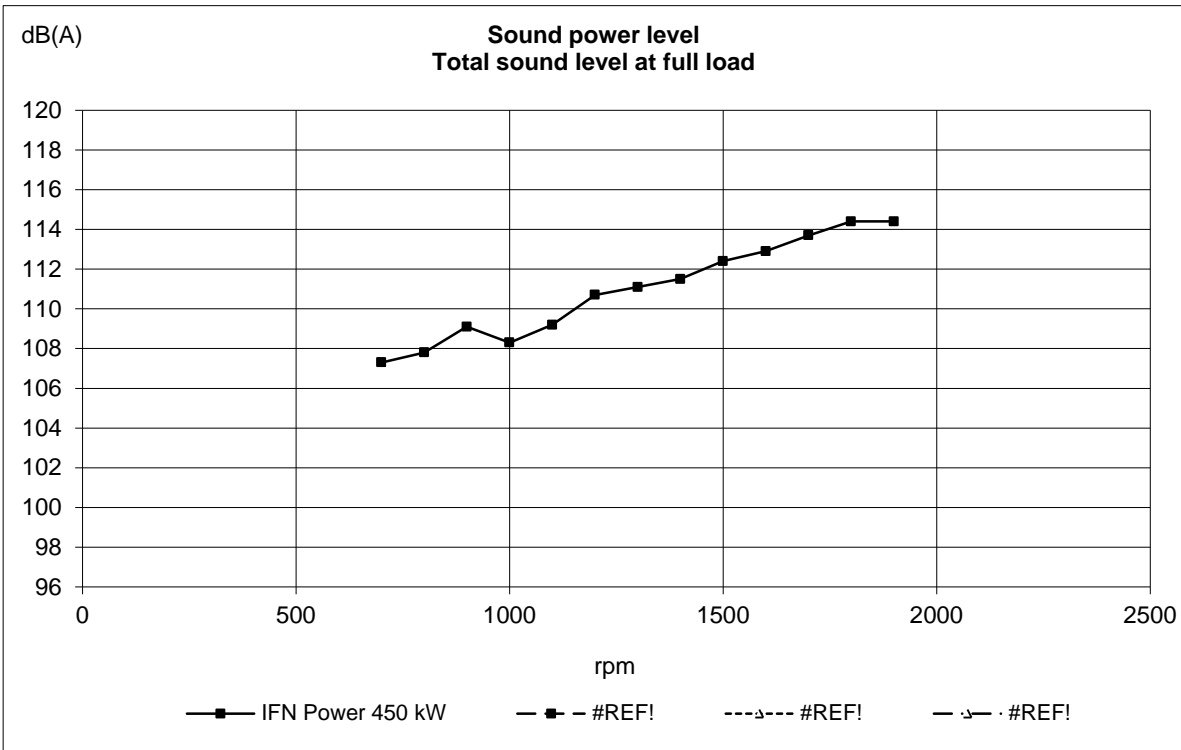
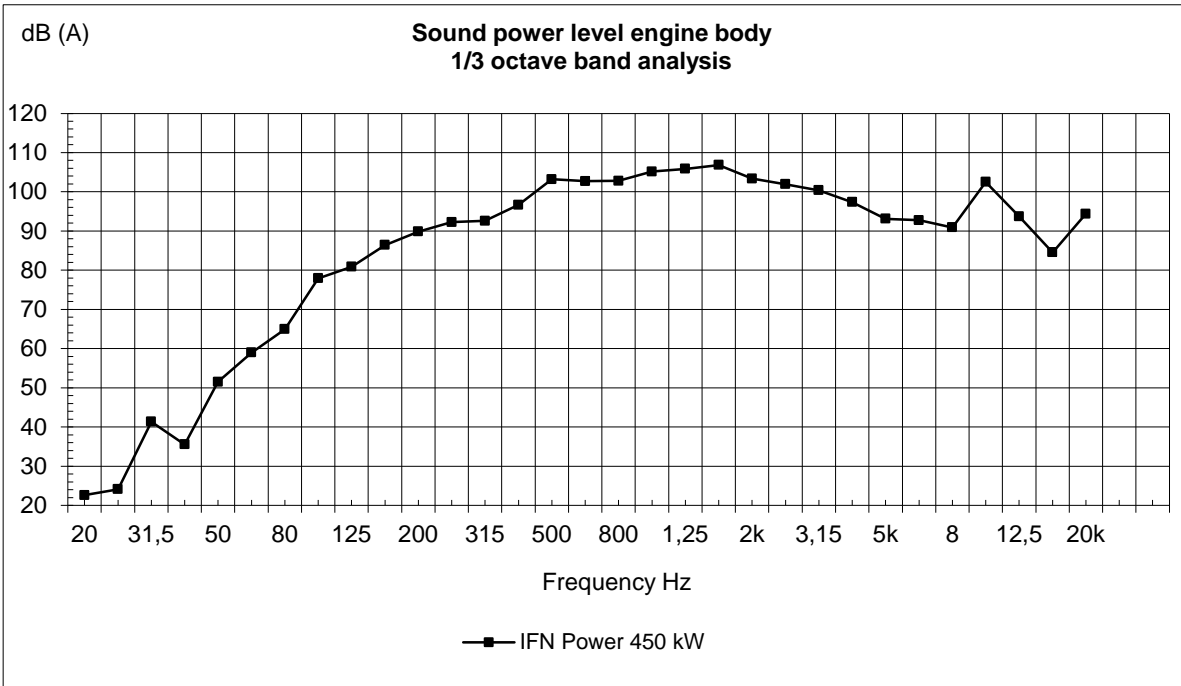
		rpm	1200	1500	1800	1900
Front end belt pulley load. Direction of load viewed from flywheel side:	max left	kW	26	33	40	
		hp	35	45	54	
	max down	kW	60	75	90	
		hp	82	102	122	
	max right	kW	26	33	40	
		hp	35	45	54	
Timing gear at compressor PTO max:		Nm	300			
		lbf ft	221			
Speed ratio direction of rotation viewed from flywheel side		1,31:1/ ccw				
Timing gear at servo pump max:		Nm	100			
		lbf ft	74			
Speed ratio direction of rotation viewed from flywheel side		1,58:1 / ccw				
Max allowed bending moment in flywheel housing		Nm	15000			
		lbf ft	11063			
Max. rear main bearing load		N	5000			
		lbf	1124,0			

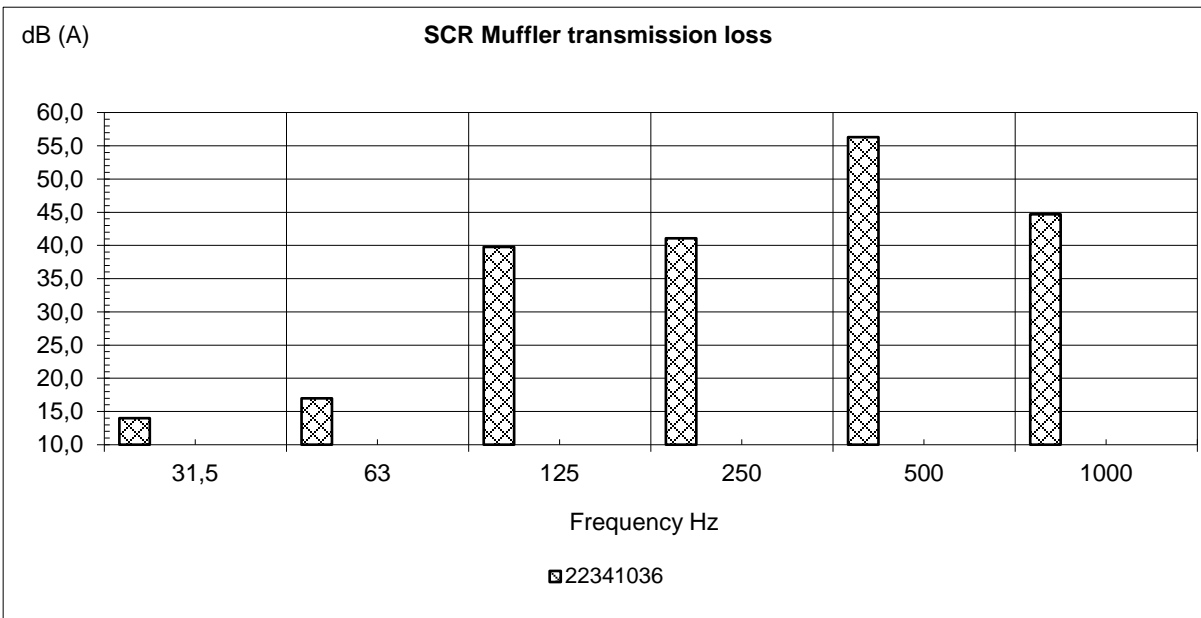
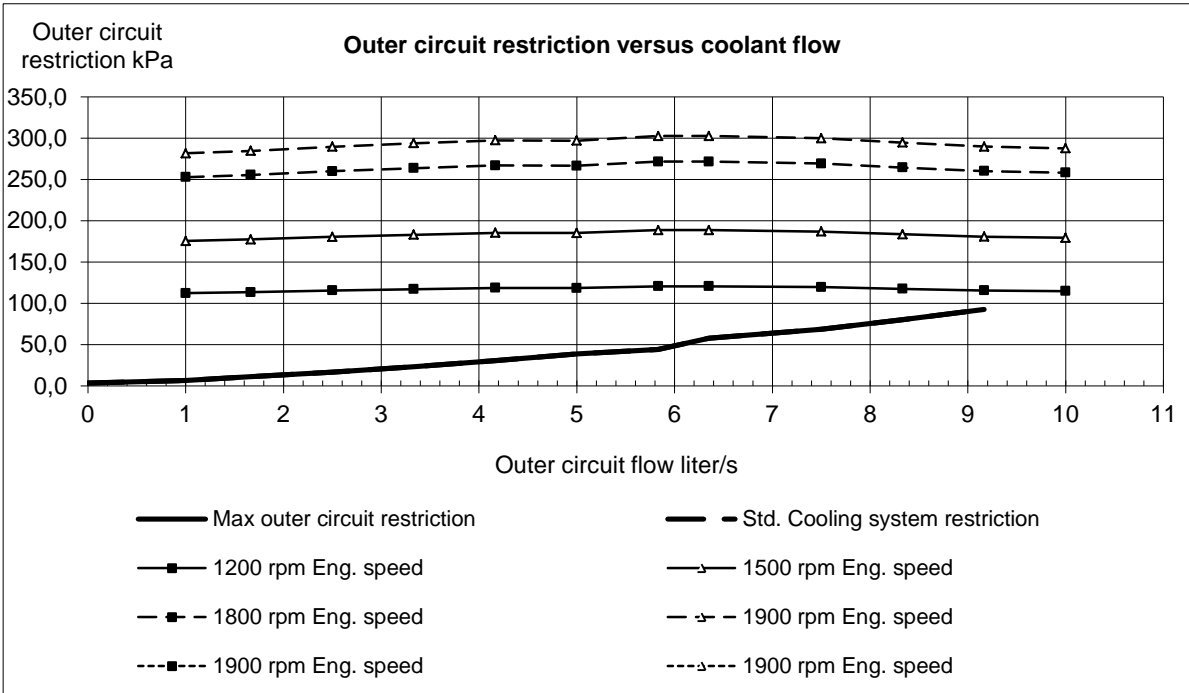




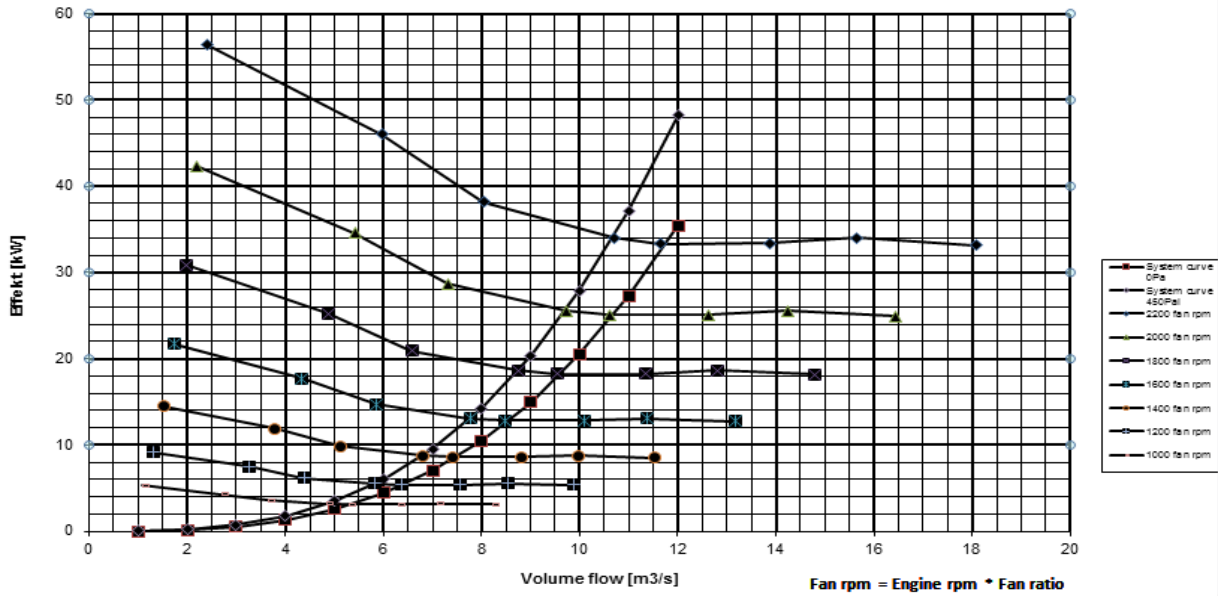




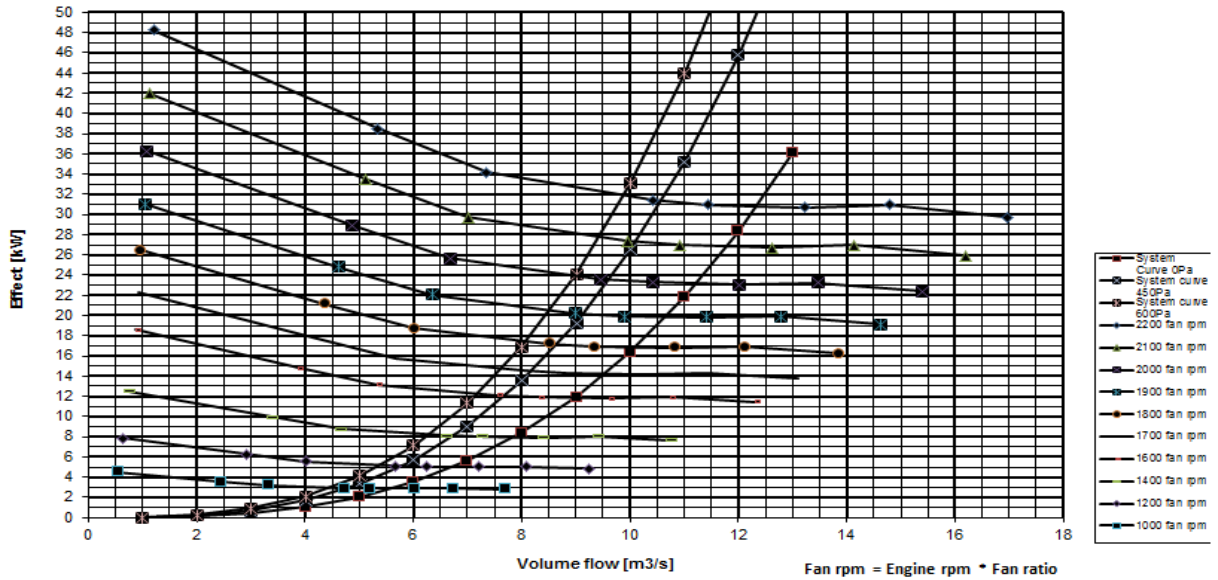




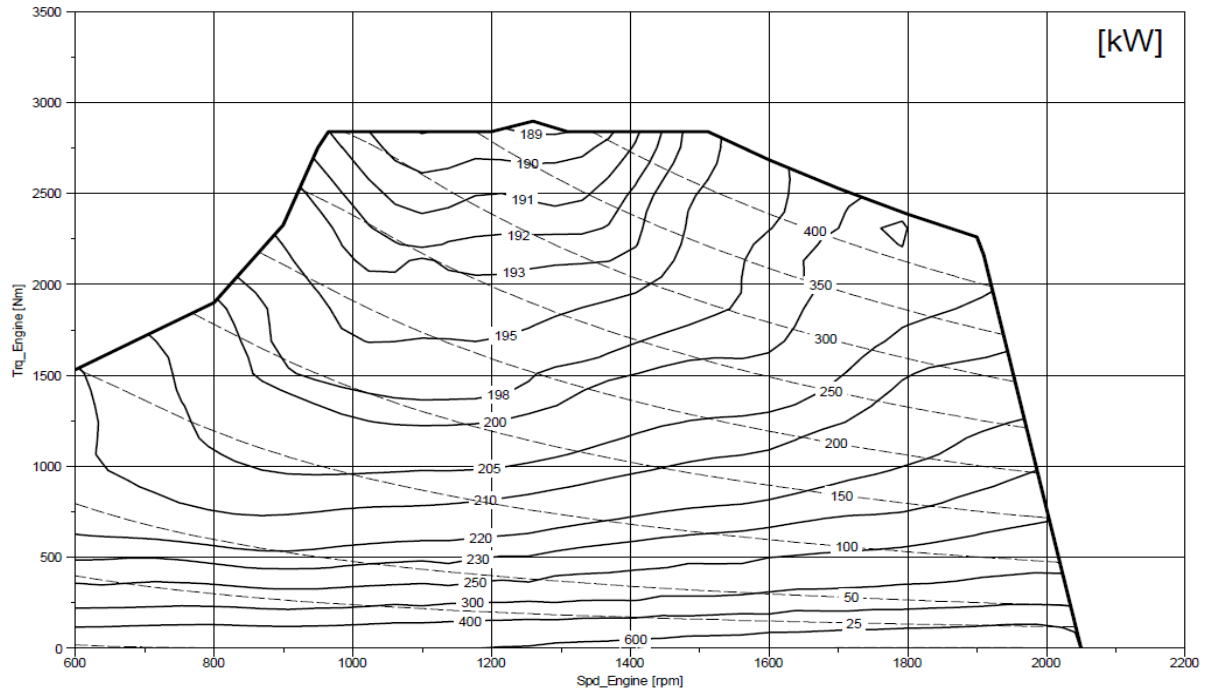
Fan power 890mm Pusher fan



Fan power 890mm Puller fan



BSFC [g/kWh]



Fuel consumption [l/h]

