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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 penalities 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 in^3	12,78 780
Firing order			1-5-3-6-2-4
Bore		mm in	131 5,16
Stroke		mm in	158 6,22
Compression ratio			17,1:1
Wet weight	Engine only (Estimated) (excl after treatment comp.)	kg lb	1325 2921
	Power pac	kg lb	1790 3946

Performance				**rpm**	**1200**	**1500**	**1800**	**1900**
IFN Power	345 kW	without fan		kW	299	345	345	345
				hp	407	469	469	469
		with fan		kW	290	330	326	325
		890 mm		hp	394	449	443	441
Torque at:		IFN Power		Nm	2380	2196	1830	1734
				lbf ft	1755	1620	1350	1279
Max torque at engine speed		rpm	1200 rpm	Nm	2380			
				lbf ft	1755			
Power tolerance				%	±2			
Mean piston speed				m/s	6,3	7,9	9,5	10,0
				ft/sec	20,7	25,9	31,1	32,8
Effective mean pressure at:		IFN Power		MPa	2,34	2,16	1,80	1,71
				psi	339	313	261	247
Max combustion pressure at:		IFN Power		MPa	15,2	15,7	15,7	15,1
				psi	2204	2277	2277	2190
Total mass moment of inertia, J (mR^2) (not including flywheel)				kgm² lbft²	1,143 27,1			
Friction Power				kW	23	33	47	52
				hp	31	45	64	71
Derating see Technical Diagrams								

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Engine brake performance (only engines with VCB)		rpm	1200	1500	1800	1900
Brake power:	without fan	kW	N/A	N/A	N/A	N/A
		hp				
Brake torque:	without fan	Nm				
		lbf ft				
Engine speed range for VCB activation:		rpm	N/A			
Min engine speed with VCB still active:		rpm	N/A			
Min oil temperature for VCB activation:		°C	N/A			

Cold start performance

*Cold start limit temperature	without starting aid	°C	-15	
		°F	5	
	with manifold heater 3 kW	°C	-25	
		°F	-13	
	with manifold heater 3 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 21578298	2	12	-1°C
				30°F

* See also general section in the sales guide

Lubrication system

Lubricating oil consumption (average)			liter/h	0,02
Oil system capacity including filters			liter	Std sump 36 / Aluminium sump 52
			US gal	Std sump 9,51 / Aluminium sump 13,74
Plastic Oil pan capacity:		Max	liter	30
			US gal	7,93
		Min	liter	19
			US gal	5,02
Aluminium Oil pan capacity:		Max	liter	46
			US gal	12,15
		Min	liter	36
			US gal	9,51
Oil change intervals/specifications	VDS3		h	500
	VDS4		h	500
Engine angularity limits:	front up		°	Std sump 11 / Aluminium sump 35
	front down		°	Std sump 11 / Aluminium sump 35
	side tilt		°	Std sump 11 / Aluminium sump 35
Oil pressure at rated speed			kPa	300 - 650
			psi	44 - 94

Lubrication system

Lubrication oil temperature in sump:	max	°C	130
		°F	266
Oil filter filtration efficiency (in accordance with ISO 4548-12)	99%	µ	38
	50%	µ	14

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Fuel system

System supply flow at max. Speed	liter/h	130
	US gal/h	34,3
Fuel supply line max. restriction (measured at fuel inlet connection)	kPa	30
	psi	4,4
Fuel supply line max. pressure, during engine stand still (meassured at fuel inlet connection)	kPa	16,5
	psi	2,4
Fuel supply line min. pressure, during engine stand still (meassured at fuel inlet connection)	kPa	-125
	psi	-18,1
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
Fuel filter filtration efficiency 75%	µ	4
Governor type/make, standard	Volvo/EMS2.3	
Fuel to conform to		Fuel corresponding to EN590:1999 or ASTM D 975-No or JIS KK2204:2004

Intake and exhaust system		**rpm**	**1200**	**1500**	**1800**	**1900**
Charge air consumption at: (+25°C and 100kPa)	IFN Power	m³/min	19,0	23,0	25	26
		cfm	671	812	883	918
⚠ **See front page for important information** Max allowable air intake restriction including piping		kPa	5			
		psi	0,7			
Heat rejection to exhaust at:	IFN Power	kW	229	268	269	280
		BTU/min	13023	15241	15298	15923
Exhaust gas temperature after turbine at:	IFN Power	°C	544	539	493	497
		°F	1011	1002	919	927
⚠ **See front page for important information** Max allowable back pressure in exhaust line (after turbine)		kPa	9	12	14	15
Pipe dimension Ø: 125 mm		psi	1,3	1,7	2,0	2,2
⚠ ıst gas flow at: (temp and pressure after turbine at the corresponding power setting)	IFN Power	m³/min	52,0	60,0	62	63
		cfm	1836	2119	2190	2225

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Cooling system			**rpm**	**1200**	**1500**	**1800**	**1900**
Heat rejection radiation from engine at:		IFN Power	kW	11,0	11,0	9,6	10,3
			BTU/min	626	626	546	586
Heat rejection to coolant at:		IFN Power	kW	157	177	182	214
			BTU/min	8928	10066	10350	12170
Coolant			Yellow Volvo Coolant Solution (VCS)				
Radiator cooling system type				Closed circuit			
Standard radiator core area			m²	0,8			
			foot²	8,61			
Fan diameter	890 mm		mm	890			
			in	35,04			
Fan power consumption	890 mm		kW	9,5	15,0	19,5	20,5
			hp	13	20	27	28
Fan drive ratio	fan Ø890			0,99:1 ccw			
Coolant capacity:	engine		liter	20			
			US gal	5,3			
	std. 0,8m² radiator with hoses		liter	24			
			US gal	6,3			
Coolant pump			drive/ratio	belt/1,41:1 cw			
Coolant flow with standard system			l/s	3,7	4,7	5,7	6
			US gal/s	1,0	1,2	1,5	1,6
Minimum coolant flow			l/s	3,2	4,2	5,5	5,5
			US gal/s	0,8	1,1	1,5	1,5
Maximum outer circuit restriction incl. piping			kPa	65,0			
			psi	9,4			
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			

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Charge air cooler system		rpm	1200	1500	1800	1900
Heat rejection to charge air cooler	IFN Power	kW	51	60	65	65
		BTU/min	2900	3412	3696	3696
Charge air mass flow	IFN Power	kg/s	0,37	0,44	0,50	0,51
Charge air inlet temp.	IFN Power	°C	176	180	178	177
(Charge air temp after turbo compressor)		°F	349	356	352	351
⚠ **See front page for important information** Max allowable Charge air outlet temp.		°C	42	46	49	50
(Charge air temp after charge air cooler)		°F	108	115	120	122
⚠ **See front page for important information** Maximum pressure drop over charge air cooler incl. piping		kPa	12			
		psi	1,74			
Charge air pressure		kPa	211	223	217	214
(Relative, after charge air cooler)		psi	30,60	32,34	31,47	31,04
Standard charge air cooler core area		m²	0,8			
		foot²	8,61			

Cooling performance: 0.8 m² radiator and pull 890 fixed fan standard drive ratio 0.99

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	
	kW						
rpm	hp	°C	°F	kg/s	lb/s	Pa	psi
1900	345	63	145	10,1	22,3	0	
	469	62	143	9,6	21,2	150	0,022
		60	140	9,1	20,0	300	0,044
		58	137	8,5	18,8	450	0,065

Cooling performance: 0,8 m² radiator and pull 890 Visco fan standard drive ratio 0.84

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	
	kW						
rpm	hp	°C	°F	kg/s	lb/s	Pa	psi
1900	345	58	136	7,7	17,0	0	
	469	54	130	6,9	15,2	150	0,022
		49	121	6,0	13,3	300	0,044
		42	107	5,0	11,1	450	0,065

Cooling performance: 0.8 m² radiator and push 890 fixed fan standard drive ratio 0.99

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	
rpm	hp	°C	°F	kg/s	lb/s	Pa	psi
1900	345	64	147	10,9	24,0	0	
	469	63	145	10,4	23,0	150	0,022
		62	143	10,0	22,0	300	0,044
		60	140	9,5	21,0	450	0,065

Cooling performance: 0,8 m² radiator and push 890 Visco fan standard drive ratio 0.84

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 kW	Air on temp		Air flow		External restriction	
rpm	hp	°C	°F	kg/s	lb/s	Pa	psi
1900	345	60	140	8,5	18,6	0	
	469	58	136	7,8	17,2	150	0,022
		55	130	7,1	15,6	300	0,044
		51	123	6,4	14,0	450	0,065

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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			Alarm level		Engine protection	
Parameter		**Unit**	**Setting range**	**Default setting**	**Level**	**Action. Default/Alternative**
Oil temp		°C	Setting +5	125		Shut down, ON/OFF*
Oil pressure	Low idle	kPa	50	25,0		Shut down, ON/OFF*
	Rated speed	kPa	300	275		Shut down, ON/OFF*
Oil level						
Piston cooling pressure >1000 rpm		kPa				
Coolant temp		°C	107	105		Shut down, ON/OFF*
Coolant level			See cooling system	On		
Fuel feed pressure	1200rpm	kPa	100			
Water in fuel			Alarm When Closed			
Crank case pressure		kPa	Rapid Pres inc			Shut down, ON/OFF*
Air filter pressure drop				5		
Altitude, above sea		m				Automatic derating, see section derating
Charge air temp		°C	85	80		Shut down, ON/OFF*
Charge air pressure		kPa	Alarm map value +30kPa	Warning map value +20kPa		Shut down, ON/OFF*
Engine speed		rpm	x % of rated speed	114% of rated speed	Alarm level	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 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	127°C	127°C	130°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

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Electrical system

Voltage and type					24V		
Alternator:	output	A			110/150		
	tacho output	Hz/alternator rev.			6		
	drive ratio				5,25		
Starter motor:		type			105P70 / (105P70 ISS för start/stop)		
		output	kW		7		
			hp		9,5		
Number of teeth on:		flywheel			153		
		starter motor			12		
Inlet manifold heater (at 20 V)			kW		3		
Power relay for the manifold heater			A		1		
Conditions:	**Temperature**		**°C**		**25**	**0**	**-15**
(4 mΩ main circuit resistance@	**Battery**		**Ah / CCA**		**235 / 1300**	**145 / 1050**	**145 / 1050**
Crank speed			rpm		171	118	98
Crank current			A		290	400	480
Starter input power during crank			kW		6,2	7,5	7,7
Battery power during crank			kW		6,5	8,1	8,5
Min battery			Ah / CCA		120 / 700	140 / 800	145 / 1050

Power take off		**rpm**	**1200**	**1500**	**1800**	**1900**
Front end in line with crank shaft max:*		Nm	2300	2140	1560	1620
(with a total added mass moment of inertia, J (mR2)≤ 0,05 kgm²)		lbf ft	1696	1578	1151	1195
Front end belt pulley load. Direction of load viewed from flywheel side:	max left	kW	42	53	62	68
		hp	57	72	84	92
	max down	kW	36	44	52	60
		hp	49	60	71	82
	max right	kW	42	53	62	68
		hp	57	72	84	92
Timing gear at servo pump PTO max:*****		Nm	100			
		lbf ft	74			
Speed ratio direction of rotation viewed from flywheel side			1,75:1/ccw			
Continuous torque on timing gear at rear PTO : ***, ****		Nm	650 / 1000			
DIN 5462 spline		lbf ft	479 / 739			
Speed ratio direction of rotation viewed from flywheel side			1,26:1/ccw			
Continuous torque on timing gear at rear PTO : ***, ****			600			
SAE B spline			442			
Speed ratio direction of rotation viewed from flywheel side			1,26:1/ccw			
Continuous torque, Timing gear at compressor PTO max:*****		Nm	300			
PTO SAE B		lbf ft	221			
Speed ratio direction of rotation viewed from flywheel side			1,31:1/ccw			
Max allowed bending moment in flywheel housing		Nm	15000			
		lbf ft	11063			
Max. rear main bearing load		N	4000			
		lbf	899,2			

**** 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 depending on application inertia.

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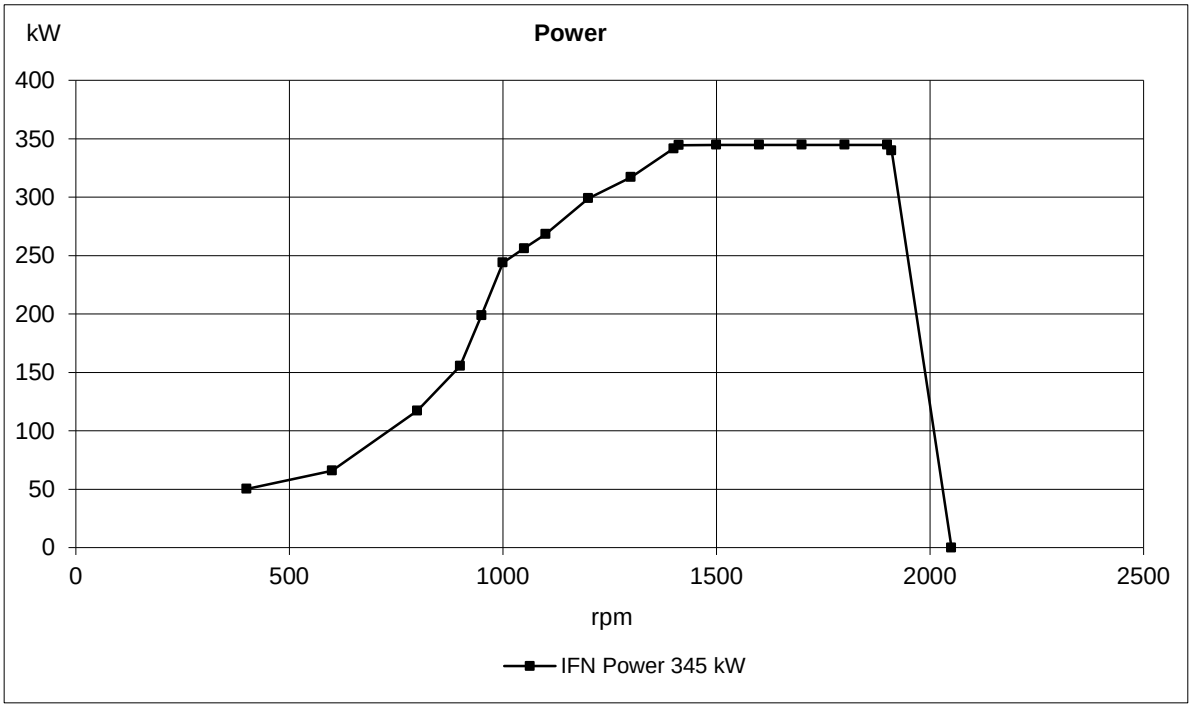

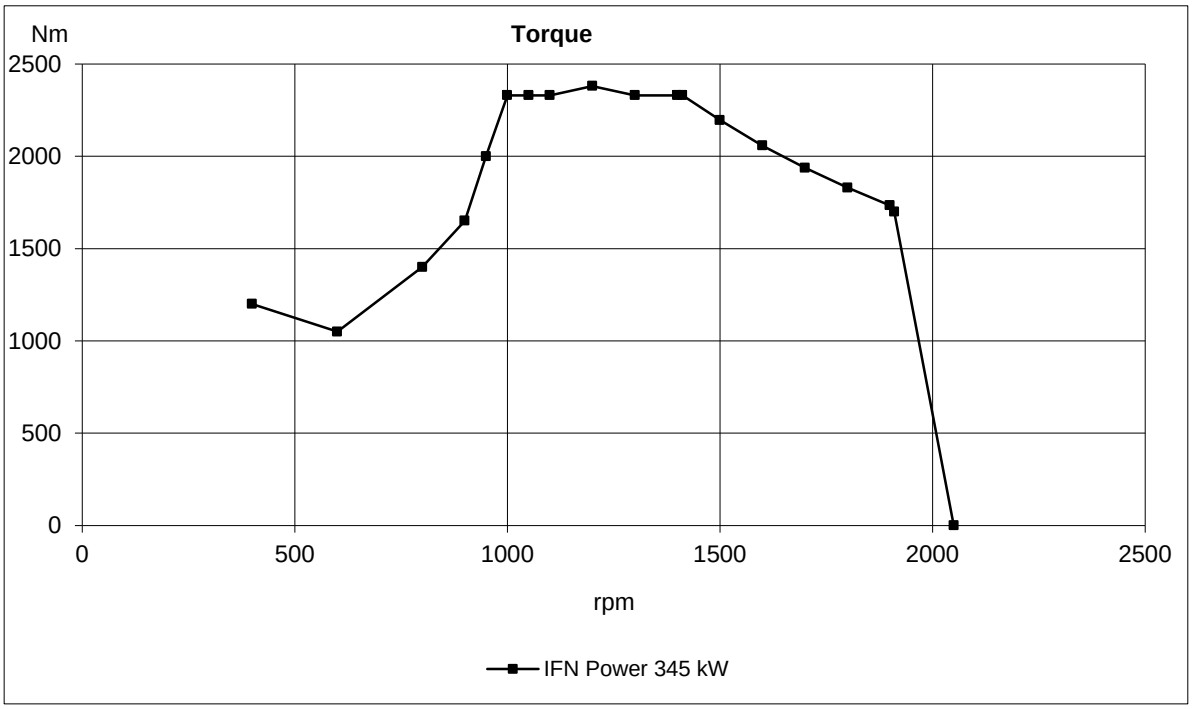

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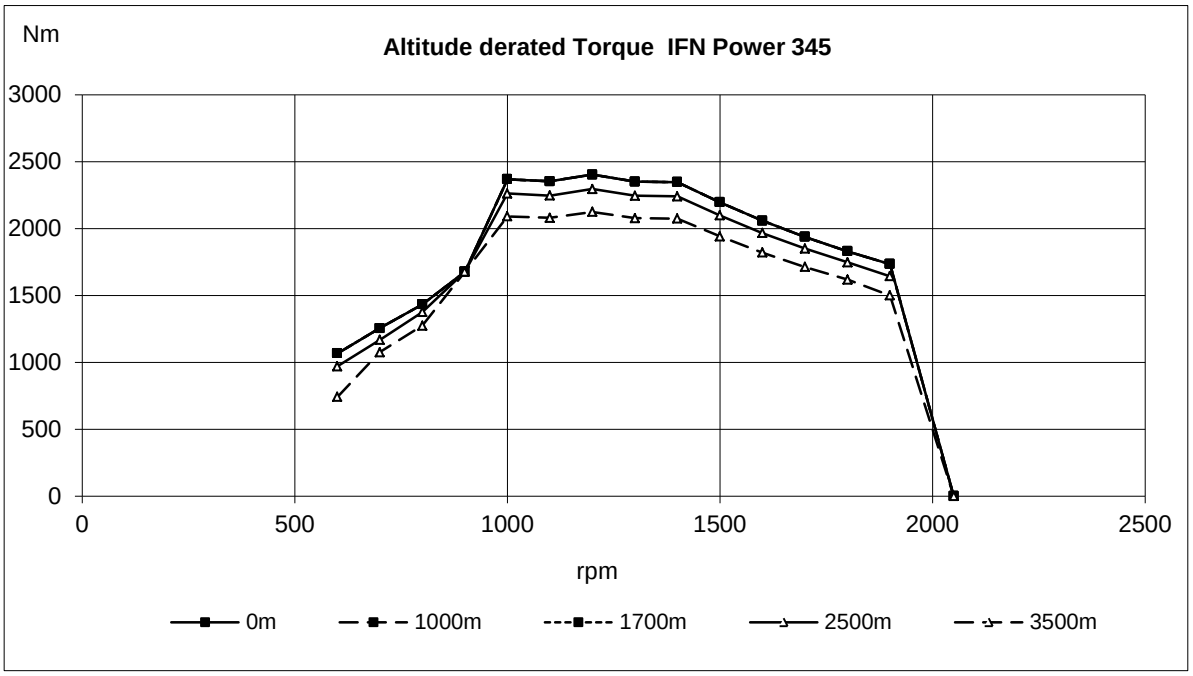

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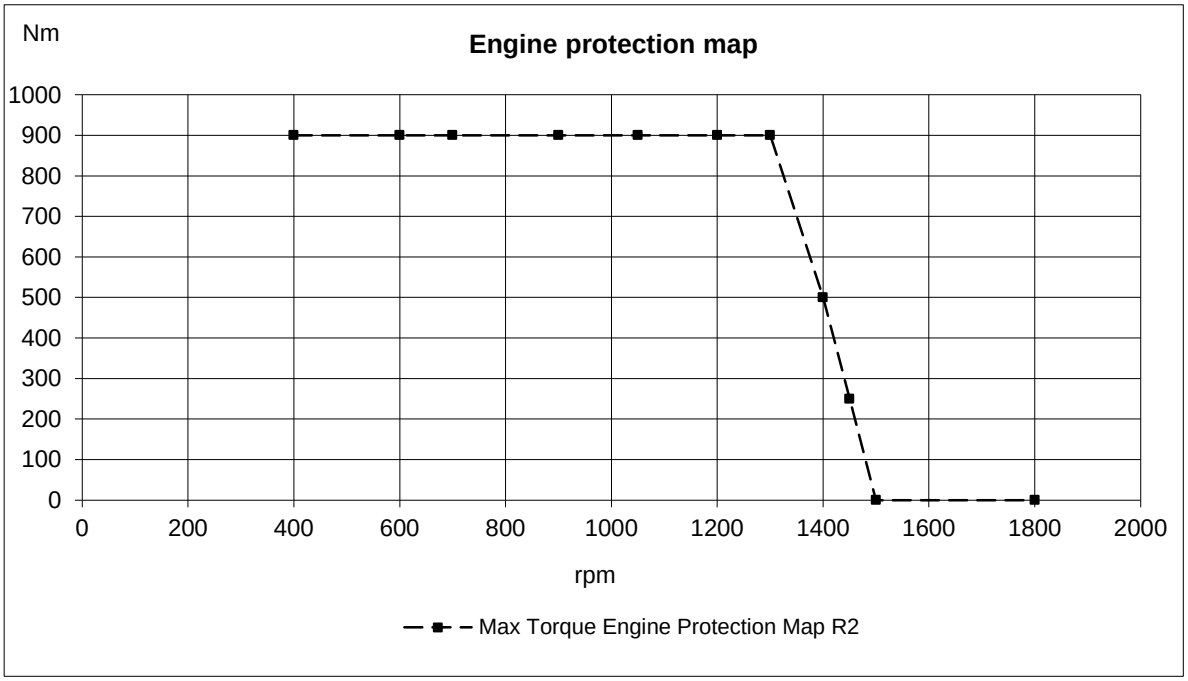

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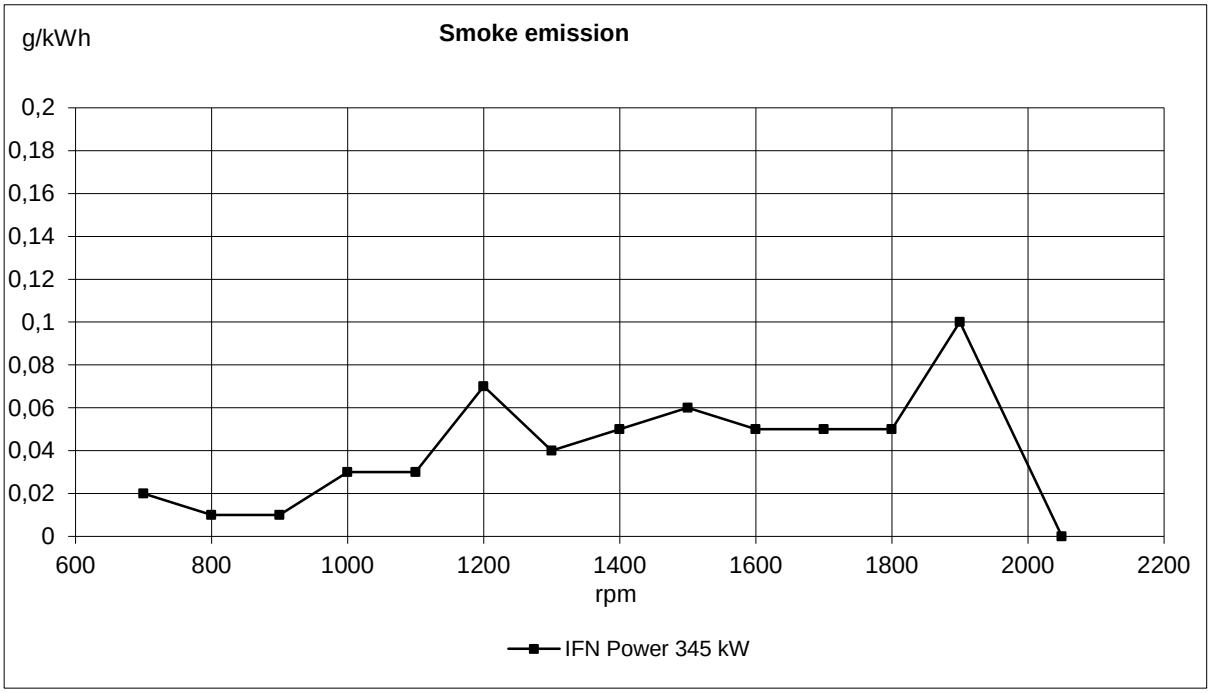

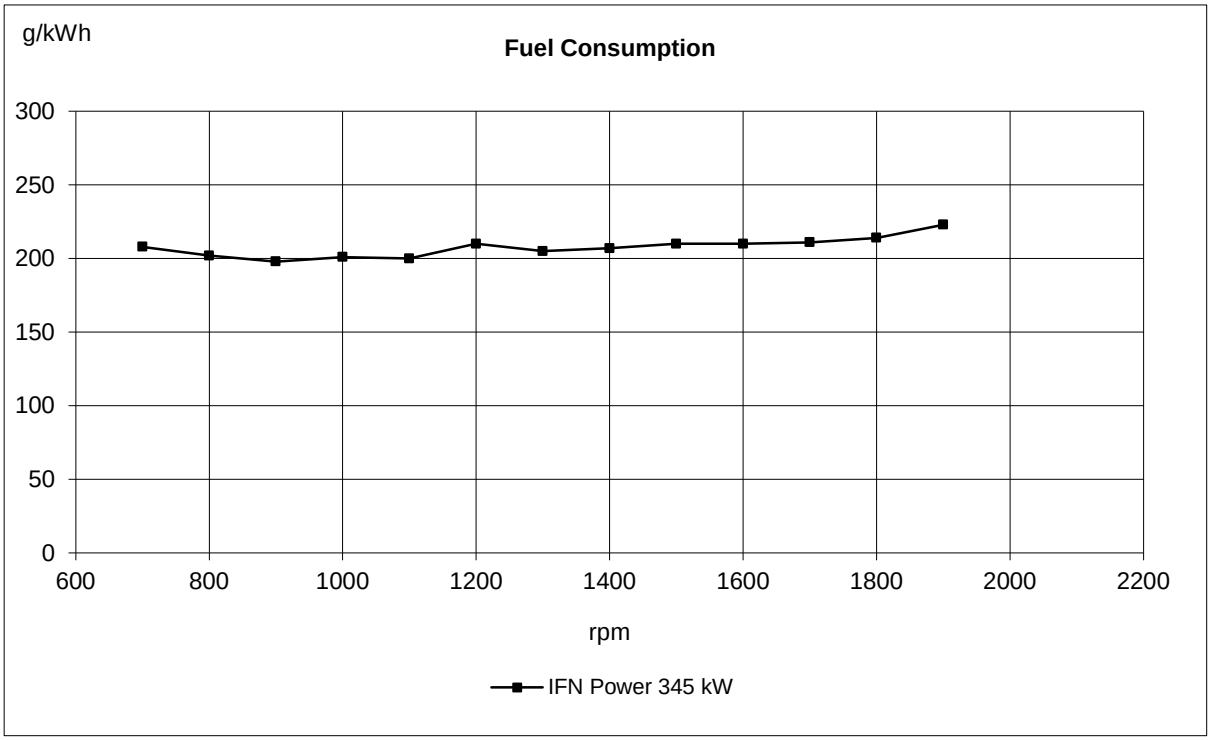

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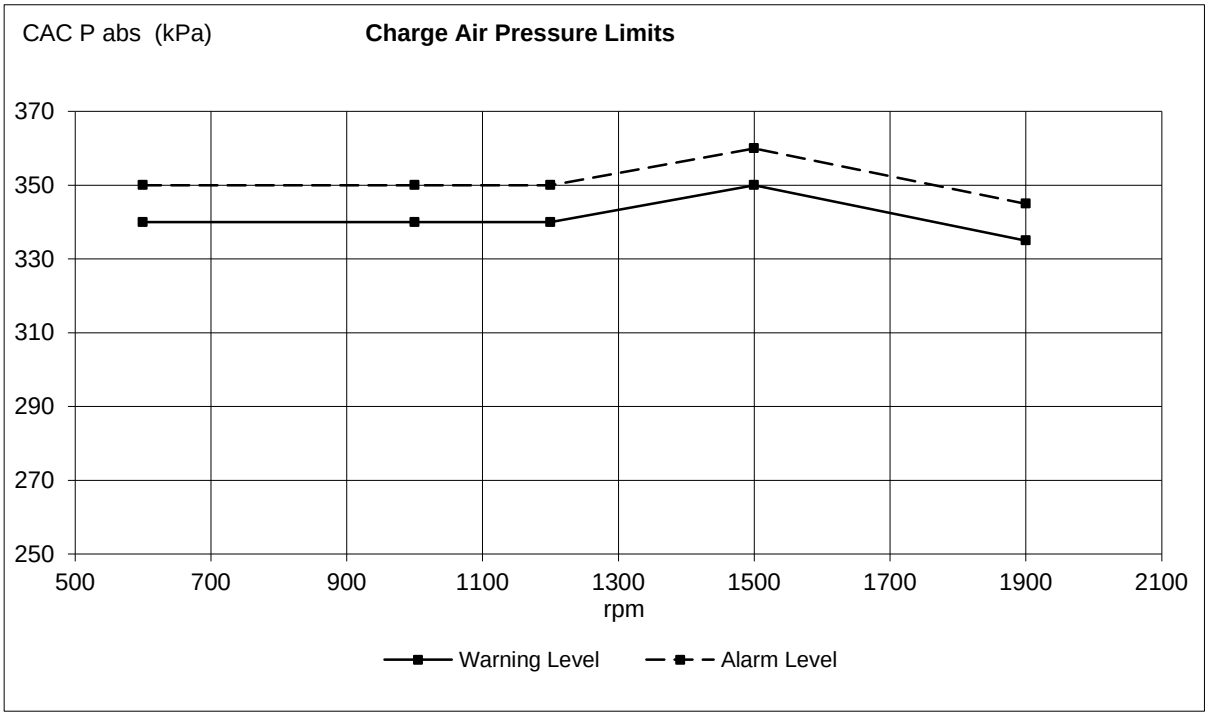

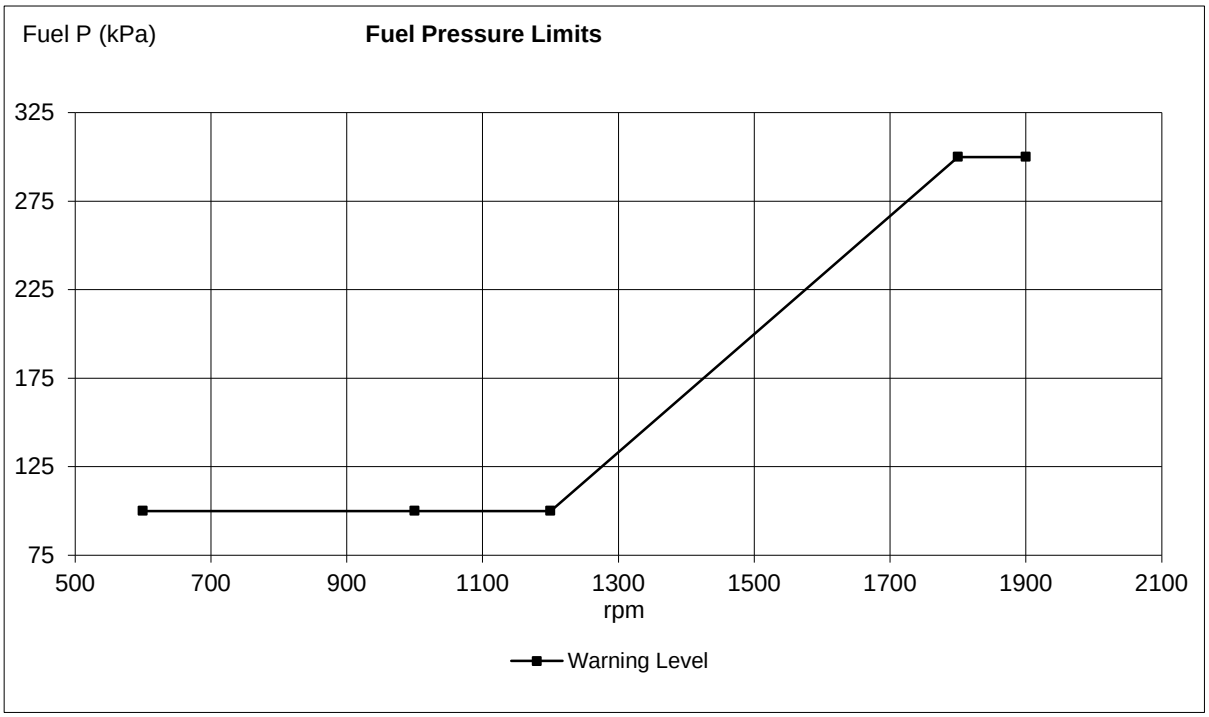

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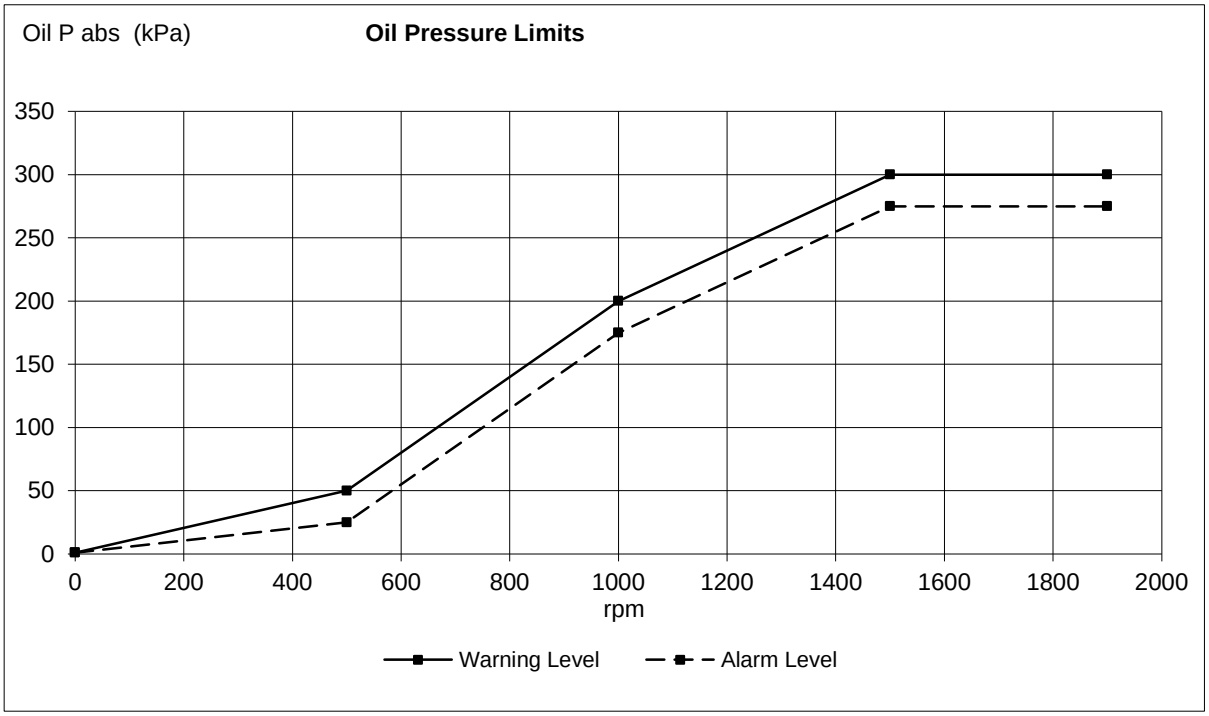

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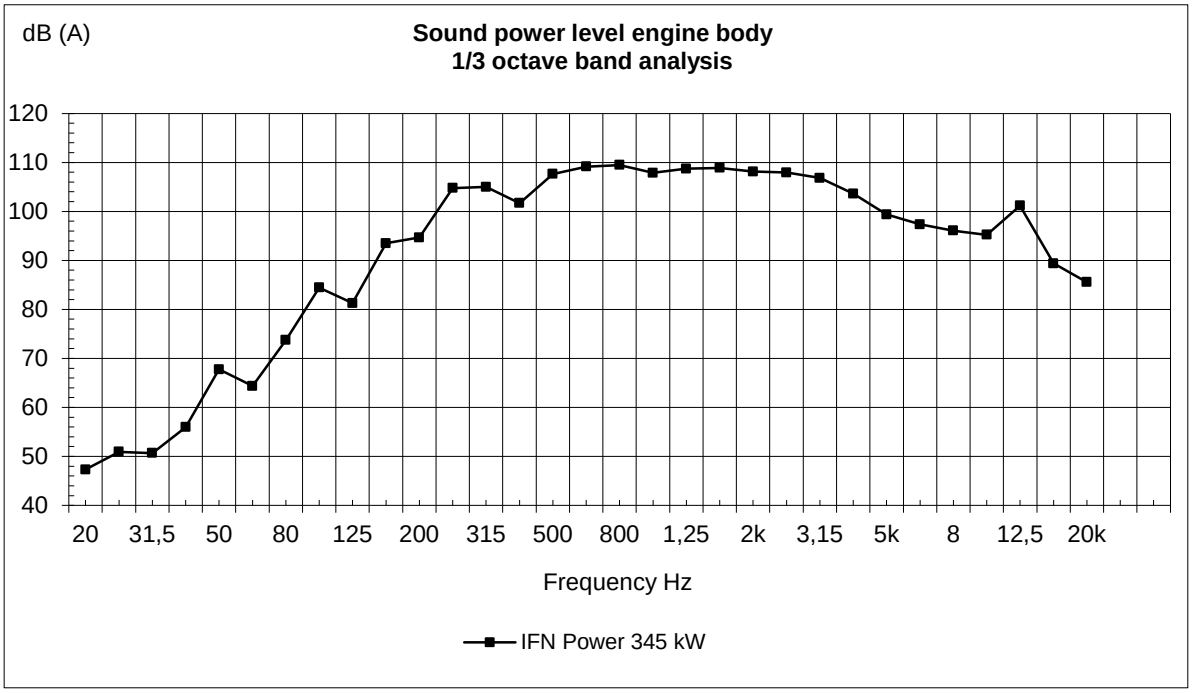

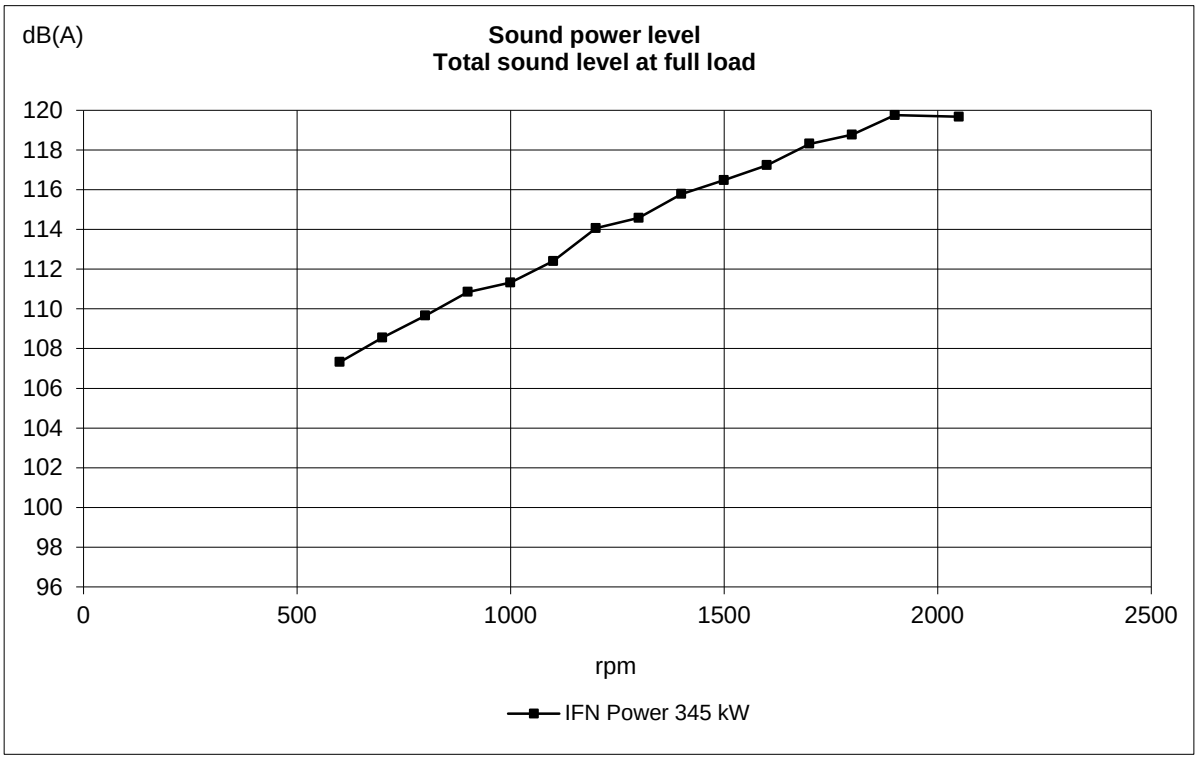

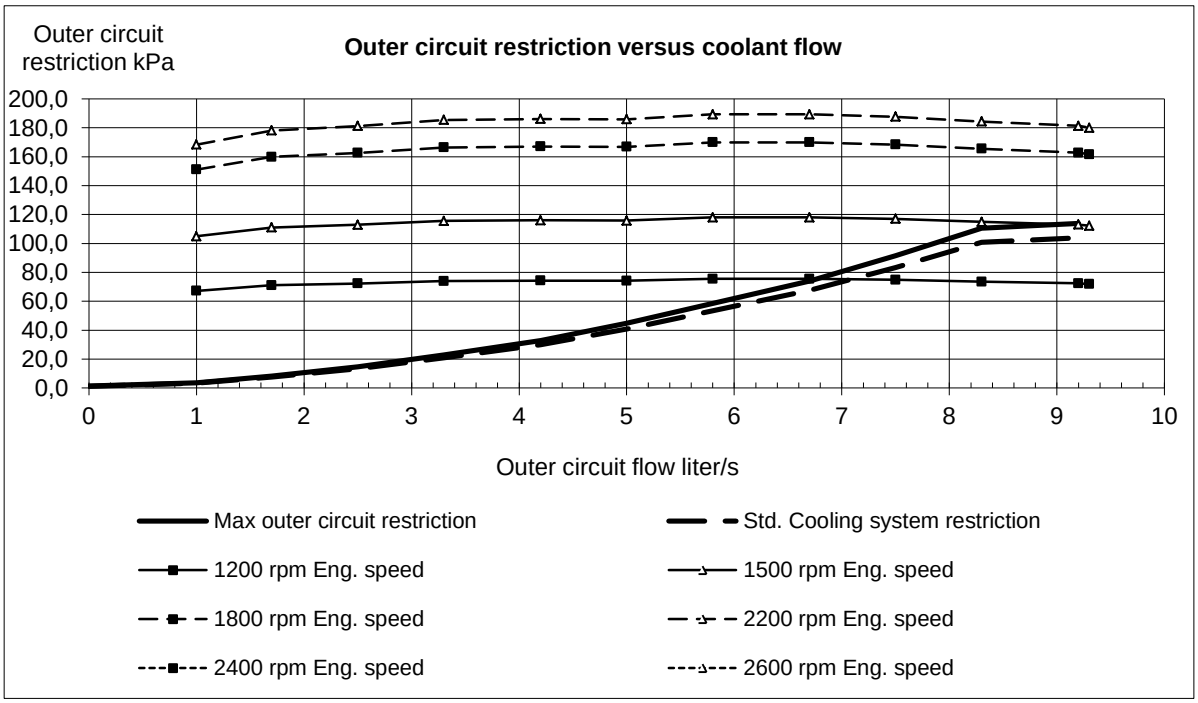
Outer circuit restriction kPa
Outer circuit restriction versus coolant flow
200,0
180,0
160,0
140,0
120,0
100,0
80,0
60,0
40,0
20,0
0,0
0
1
2
3
4
5
6
7
8
9
10
Outer circuit flow liter/s
Max outer circuit restriction
Std. Cooling system restriction
1200 rpm Eng. speed
1500 rpm Eng. speed
1800 rpm Eng. speed
2200 rpm Eng. speed
2400 rpm Eng. speed
2600 rpm Eng. speed

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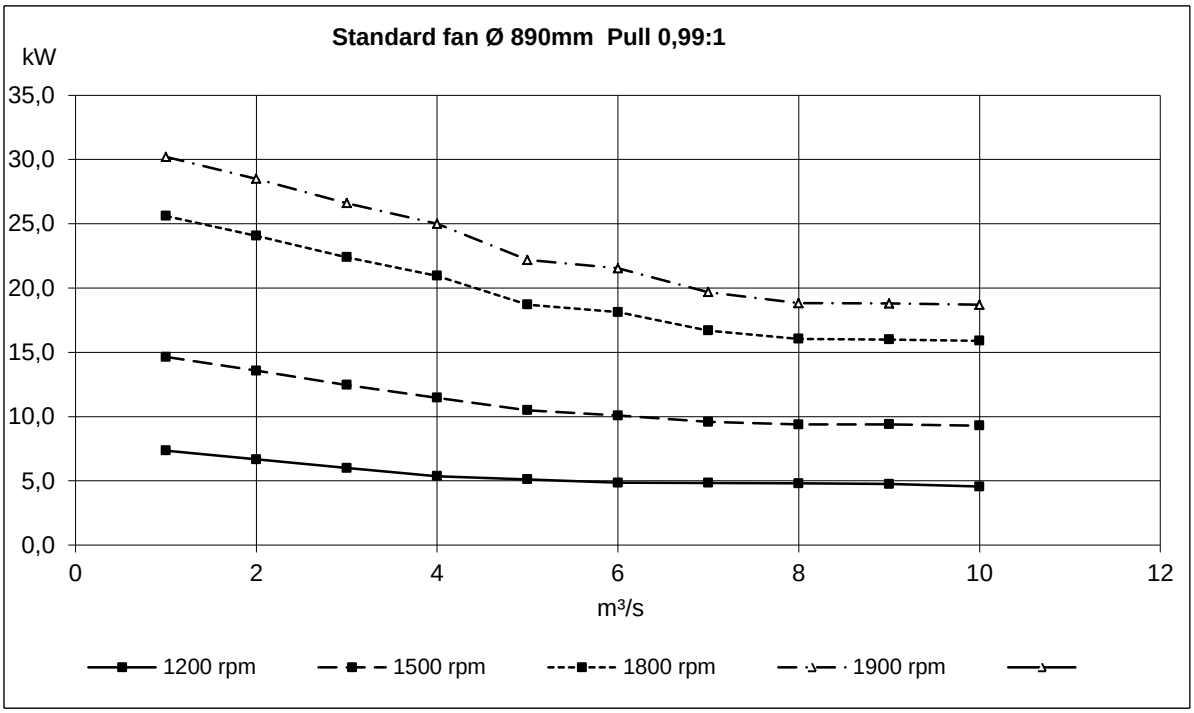

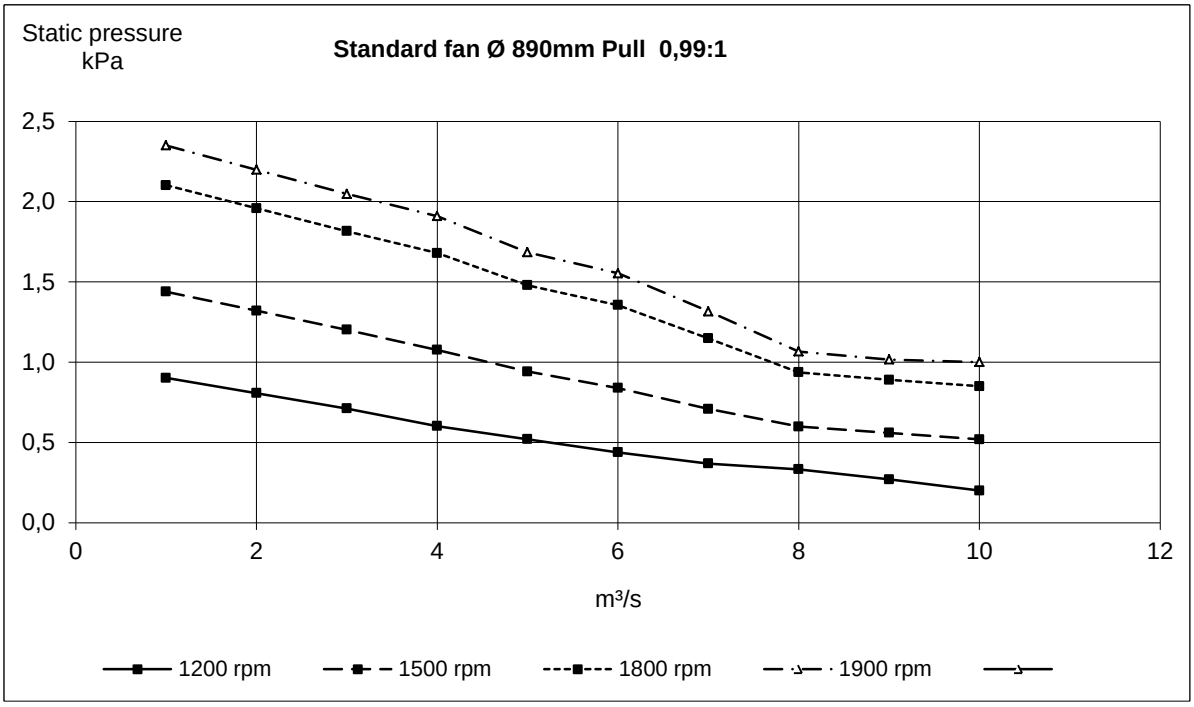

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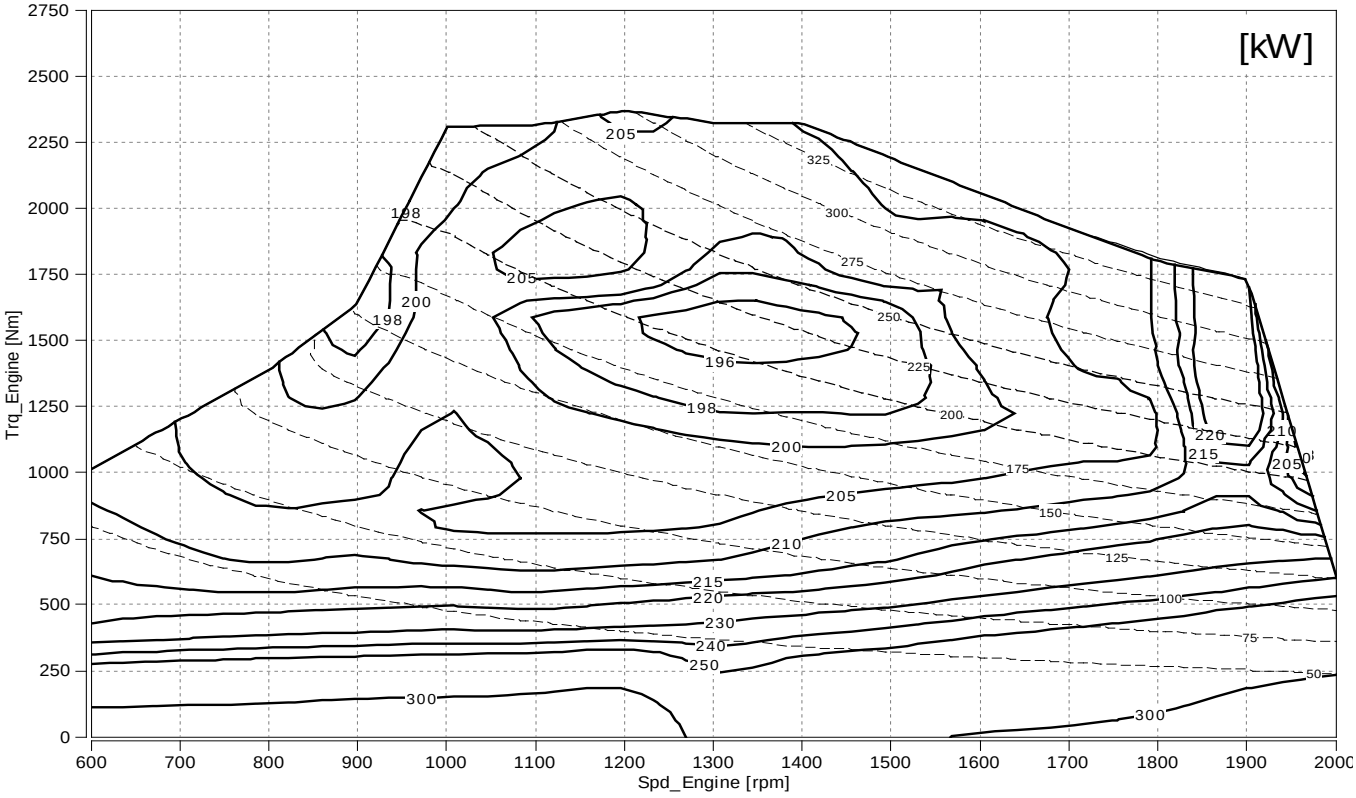
BSFC [g/kWh]



Fuel consumption [l/h]