

VOLVO PENTA TAD540VE 105kW/2200rpm	Document No 22419759	Issue Index 10
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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	16	
		US gal	4,23	
Oil sump capacity:	Max	liter	13,5	
		US gal	3,57	
	Min	liter	10	
		US gal	2,64	
Oil change intervals/specifications	VDS3, VDS4.5		h	500
	VDS3 with oil analysis		h	1000
Engine angularity limits:	front up		°	32
	front down		°	32
	side tilt		°	32
Oil pressure at rated speed		kPa	420	
		psi	61	

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	

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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		9 1,3		
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		10 1,5		
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	98%	μ	5		
(in accordance with ISO 19438)	96%	μ	4		
Governor type/make, standard	Volvo / EMS 2.3				
Injection pump type/make	Denso HP3				

Intake and exhaust system	Inlet air temp	rpm	1500	1800	2000	2200
Charge air consumption at: (+25°C and 100kPa)	ICFN Power 105 kW 25°C 77°F	m³/min cfm	9,1 321	10,5 371	11,3 399	12,4 438
 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 105 kW	kW BTU/min	69 3924	75 4265	81 4606	91 5175
Exhaust gas temperature after turbine at:	ICFN Power 105 kW	°C °F	366 691	347 657	349 660	358 676
 See front page for important information Max allowable back pressure in exhaust line (after turbine) Pipe dimension Ø: 127 mm		kPa psi	9 1,3	12 1,7	13 1,9	15 2,2
Exhaust gas flow at: (temp and pressure after turbine at the corresponding power setting)	ICFN Power 105 kW	m³/min cfm	19,7 696	21,7 766	23,1 816	25,1 886

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Cooling system		rpm	1500	1800	2000	2200
Heat rejection radiation from engine at:	ICFN Power 105 kW	kW	5	4	4	4,6
		BTU/min	267	227	227	262
Heat rejection to coolant at:	ICFN Power 105 kW	kW	50	54	58,3	65
		BTU/min	2855	3088	3315	3696
Radiator cooling system type			Closed circuit			
Standard radiator core area	ICFN Power 105 kW	m²	0,6			
		foot²	6,46			
Compact cooling package radiator core area	ICFN Power 105 kW	m²	0,28			
		foot²	3,01			
Fan diameter	600 mm ICFN Power 105 kW	mm	600			
		in	23,62			
Maximum fan power consumption	600 mm pull	kW	5,1	7,2	7,2	7,2
		hp	7	10	10	10
Fan drive ratio	fan Ø600		1:1.4			
	fan position high		1:1.1			
Coolant capacity:	engine	liter	13			
		US gal	3,4			
	engine + standard radiator with hoses and expansion tank	liter	47			
		US gal	12,4			
	engine + compact cooling package radiator with hoses and expansion tank	liter	31			
		US gal	8,2			
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				4,5
		US gal/s				1,2
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			

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10**Charge air cooler system**

		rpm	1500	1800	2000	2200
Heat rejection to charge air cooler	ICFN Power 105 kW	kW	22,4	25,8	27,6	31
		BTU/min	1274	1467	1570	1763
Charge air mass flow	ICFN Power 105 kW	kg/s	0,181	0,209	0,226	0,247
Charge air inlet temp.	ICFN Power 105 kW	°C	166	168	169	175
(Charge air temp after turbo compressor)		°F	331	334	336	347
						
See front page for important information						
Max allowable Charge air outlet temp.		°C	43	46	48	50
(Charge air temp after charge air cooler)		°F	109	115	118	122
						
See front page for important information						
Maximum pressure drop over charge air cooler incl. piping		kPa	6	8	11	12
		psi	0,9	1,2	1,6	1,7
Charge air pressure		kPa	182	182	178	179
(After charge air cooler)		psi	26,40	26,40	25,82	25,96
Standard charge air cooler core area		m ²	0,5			
		foot ²	5,38			
Compact charge air cooler core area		m ²	0,22			
		foot ²	2,37			

Cooling performance: 0,6 m² radiator and 600mm 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.

		ICFN Power 105 kW					
Engine speed	Engine power	Air on temp		Air flow		External restriction	
rpm	kW hp	°C	°F	m ³ /s	ft ³ /s	Pa	psi
2200	105	82,6	181	7,3	257,8	0	
	143	82,1	180	7,2	254,3	100	0,015
		81,6	179	7	247,2	200	0,029
		80,4	177	6,6	233,1	300	0,044

Cooling performance: 0,28 m² radiator and 600mm 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.

		ICFN Power 105 kW					
Engine speed	Engine power	Air on temp		Air flow		External restriction	
rpm	kW hp	°C	°F	m ³ /s	ft ³ /s	Pa	psi
2200	105	64	147	4,6	162,4	0	
	143	61,2	142	4,3	151,9	150	0,022
		57,6	136	4	141,3	300	0,044
		54,6	130	3,7	130,7	450	0,065

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10**Cooling performance: 0,28 m² radiator and 600mm 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.

		ICFN Power 105 kW					
Engine speed	Engine power	*Air on temp		Air flow		External restriction	
rpm	kW hp	°C	°F	m³/s	ft³/s	Pa	psi
2200	105	70,1	158	5,3	187,2	0	
	143	65,7	150	4,7	166,0	150	0,022
		60,6	141	4,3	151,9	300	0,044
		56,9	134	3,8	134,2	450	0,065

* AOT-temperatures are based upon simulations.

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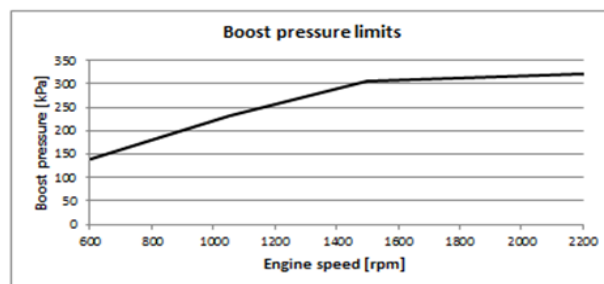
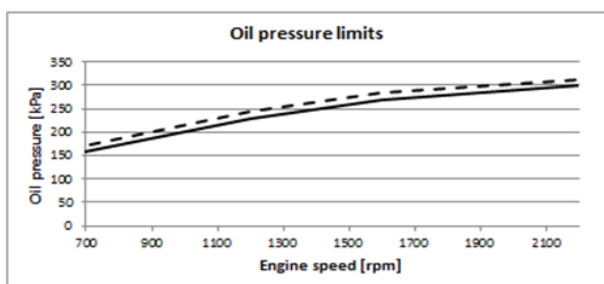
Engine management system

Functionality	Alternatives			Default setting
Governor mode	Droop	Isochronous		Isochronous
Governor droop	10	125	Nm/rpm	
Governor response	Adjustable PI constants			
Idle speed	600	900	rpm	700
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	kPa	150,0	150	Shut down
	Rated speed	kPa	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			



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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	5 / 5.5	
		hp	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:	Temperature	°C	25	0	-15
(5 mΩ main circuit resistance@	Battery	Ah / CCA	100/700	100/700	100/700
Crank speed		rpm	197	150	123
Crank current		A	173	265	320
Starter input power during crank		kW	3,90	4,70	5,20
Battery power during crank		kW	4,00	5,10	5,70
Min battery @ 0°C		Ah / CCA	100/700		

Power take off

		rpm	1500	1800	2000	2200
Front end in line with crank shaft max:* Flywheel! SAE 2, STD 10" & 11,5 ", 1.303 kgm ²	0.02 kgm ²	Nm lbf ft	866 639	817 611	750 546	610 451
	0.03 kgm ²	Nm lbf ft	866 639	748 611	711 500	457 387
	0.04 kgm ²	Nm lbf ft	866 639	695 572	645 461	399 320
Front end belt pulley load.	Max up (above or equal to horizontal line)	kW hp	3,4 4,6	4,1 5,6	4,5 6,1	5,0 6,8
	Max down (below horizontal line)	kW hp	28,4 38,6	34,0 46,2	37,8 51,4	41,6 56,6
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 then one PTO output is used simultaniously, calculations needs to be performed to determine available maximum. Available torque depends on application inertia.

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Performance	Power (kW)	Rpm
ICFN Power	105	2200

Sensors Alarm	Signal	Range	Alarm switch	Alarm Level	Derating level	Condition/Delay	Derating
Boost pressure	0,5-4,5 V	50 - 400 kPa	N/A	Alarm map value			Yes 60% of Eng_prot_map
Boost temperaure	50-0 kΩ	-40° - 130 °C	N/A	80	80		See soft derate 3
Coolant level switch	Digital		Alarm when closed	Low			
Coolant temperature	50-0 kΩ	-40° - 140 °C	N/A	107	107		See soft derate 1
Oil level sensor			N/A	Low level	N/A		
Oil temperature	50-0 kΩ	-40° - 140 °C	N/A	125	125		See soft derate 2
Water In fuel switch	Digital		Alarm when closed	Water in Fuel			

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Remarks

1) Soft derate Coolant temp	Speed / °C	107°C	108.5°C	110°C	
Remaining torque in %	700	100%	100%	100%	
	1500	100%	87%	75%	
	2200	100%	94%	88%	

Derate map R2			
°C	107	108,5	110
%	0	47,5	100

2) Soft derate Oil temp	Speed / °C	125°C	127.5°C	130°C	
Remaining torque in %	700	100%	100%	100%	
	1500	100%	88%	75%	
	2200	100%	94%	88%	

Derate map R2			
°C	125	127,5	130
%	0	50	100

3)Soft derate Boost Temp	Speed / °C	80°C	90°C	100°C	
Remaining torque in %	700	100%	100%	100%	
	1500	100%	88%	75%	
	2200	100%	94%	88%	

Derate map R2			
°C	80	90	100
%	0	50	100

Max Torque High Map R2	600	700	800	900	1000	1100	1200	1350	1400	1500	1600
	300	420	530	650	700	700	700	700	710	665	625
	1700	1800	1900	2000	2100	2200	2300	2400	2500		
	590	557	528	502	478	456	415	259	0		

Max Torque Engine Protection Map R2	700	800	1000	1200	1400	1600	1800	2000	2200	2400	2500
	450	475	500	500	500	500	475	430	400	250	0

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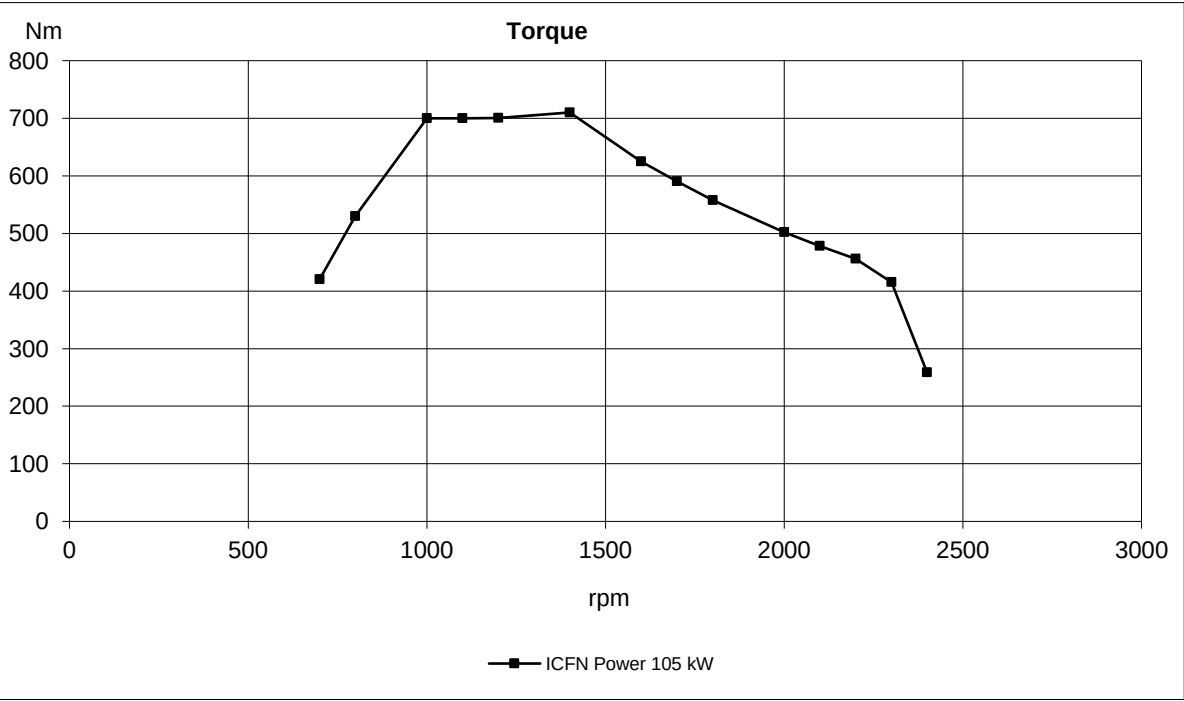
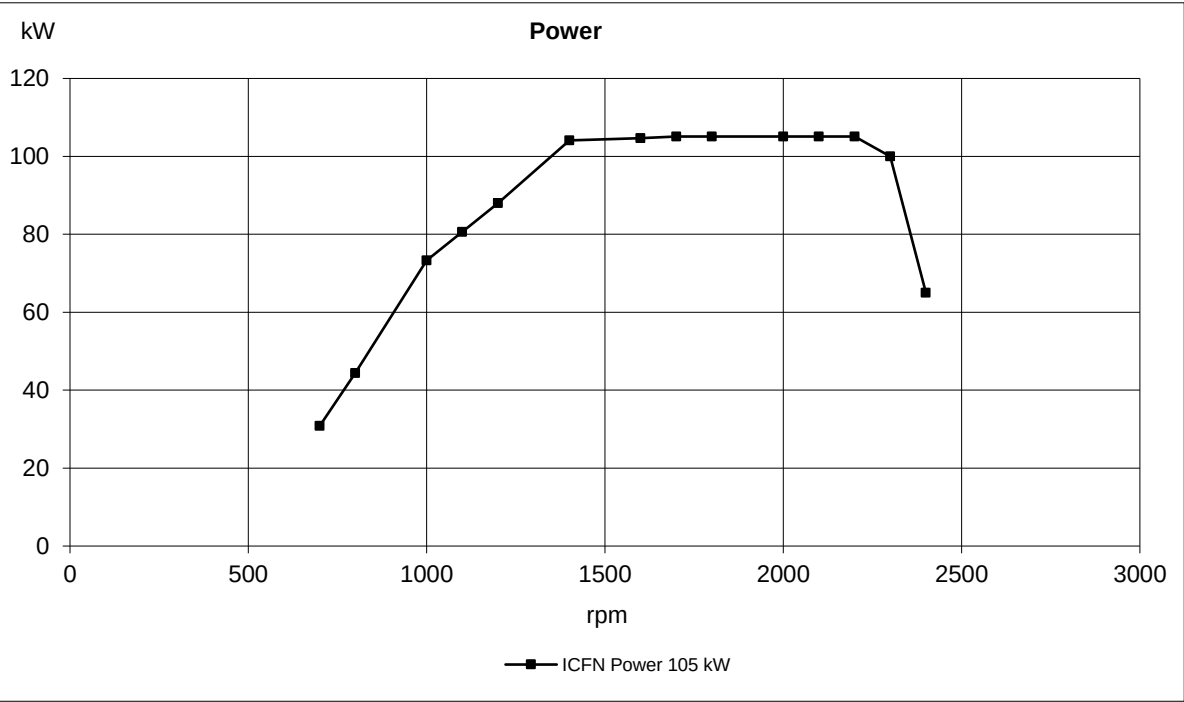
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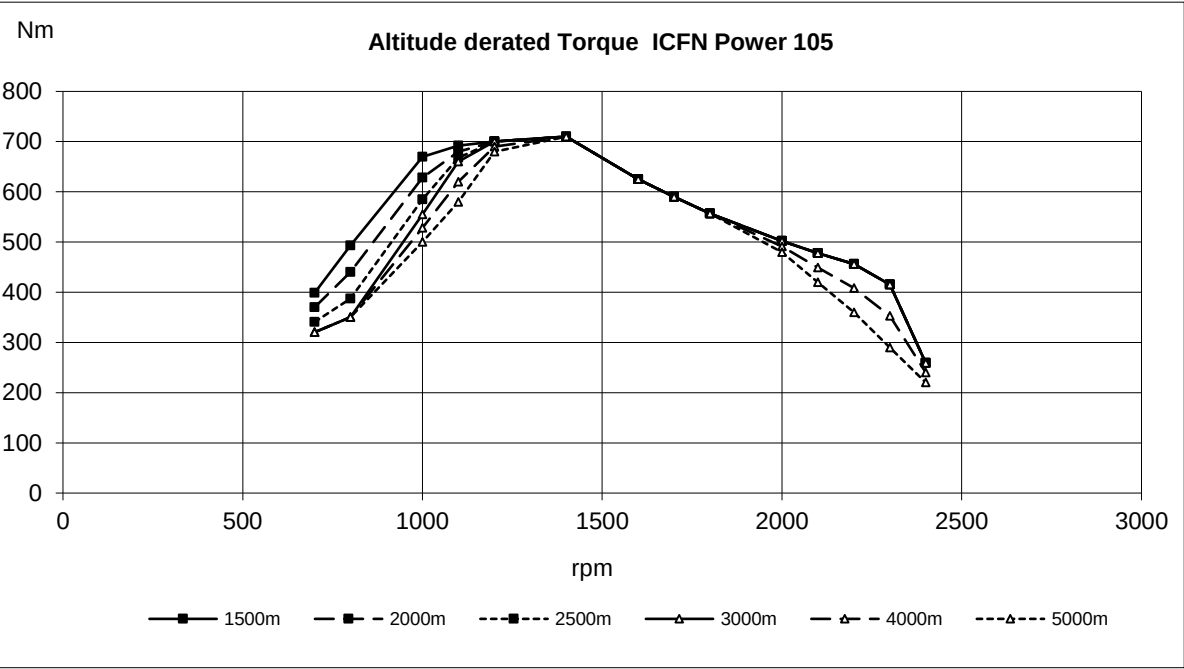
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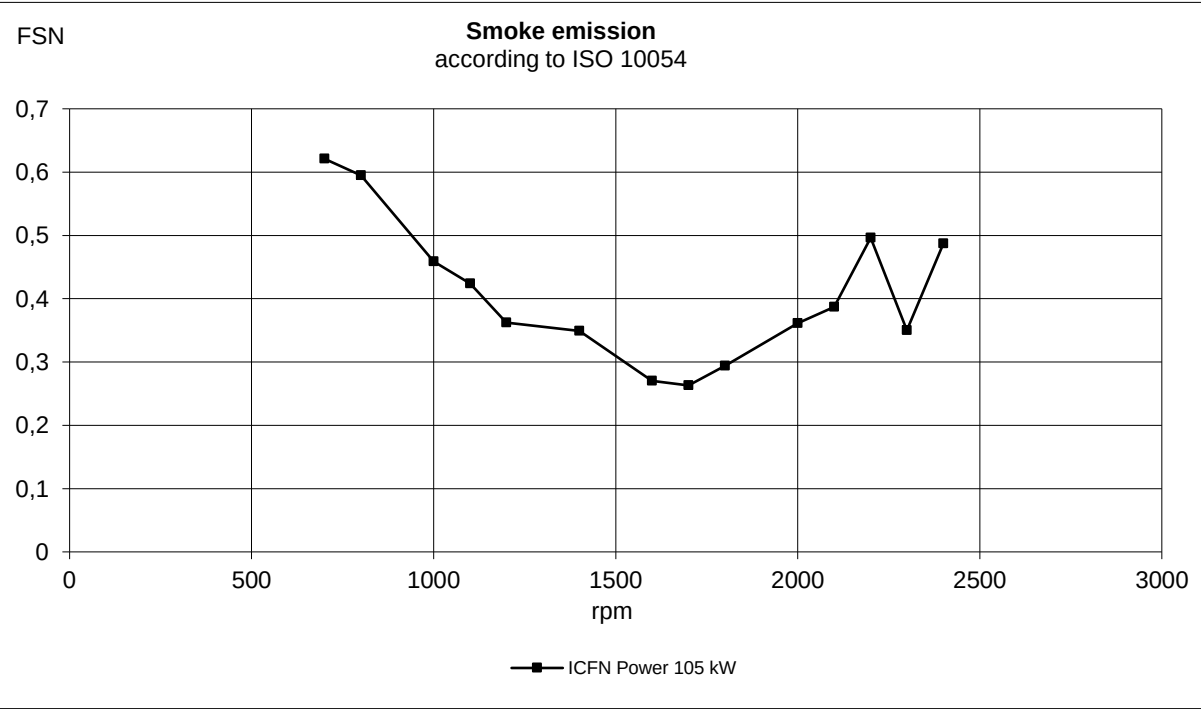
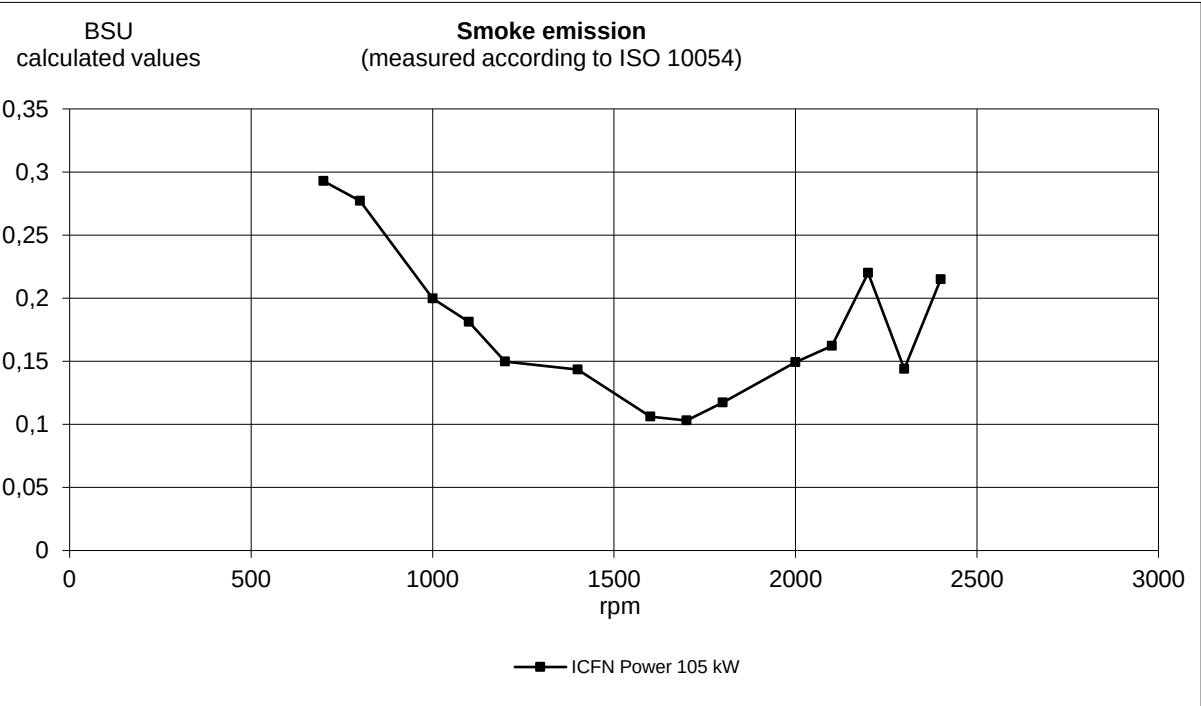
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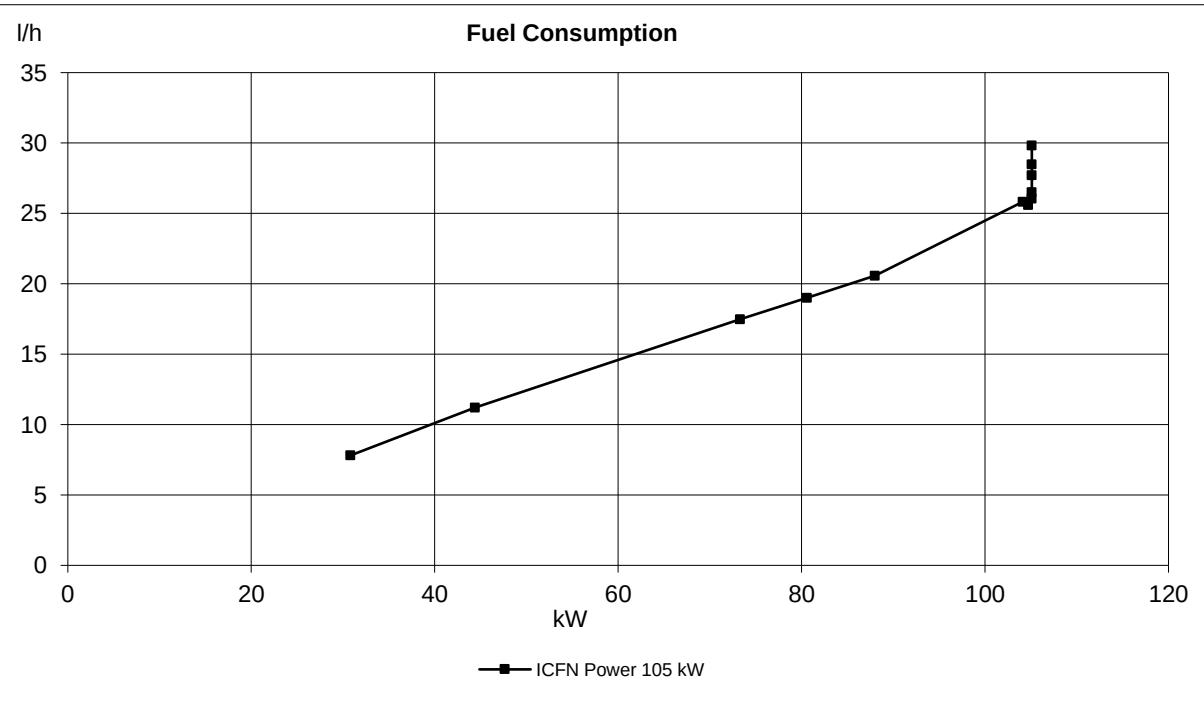
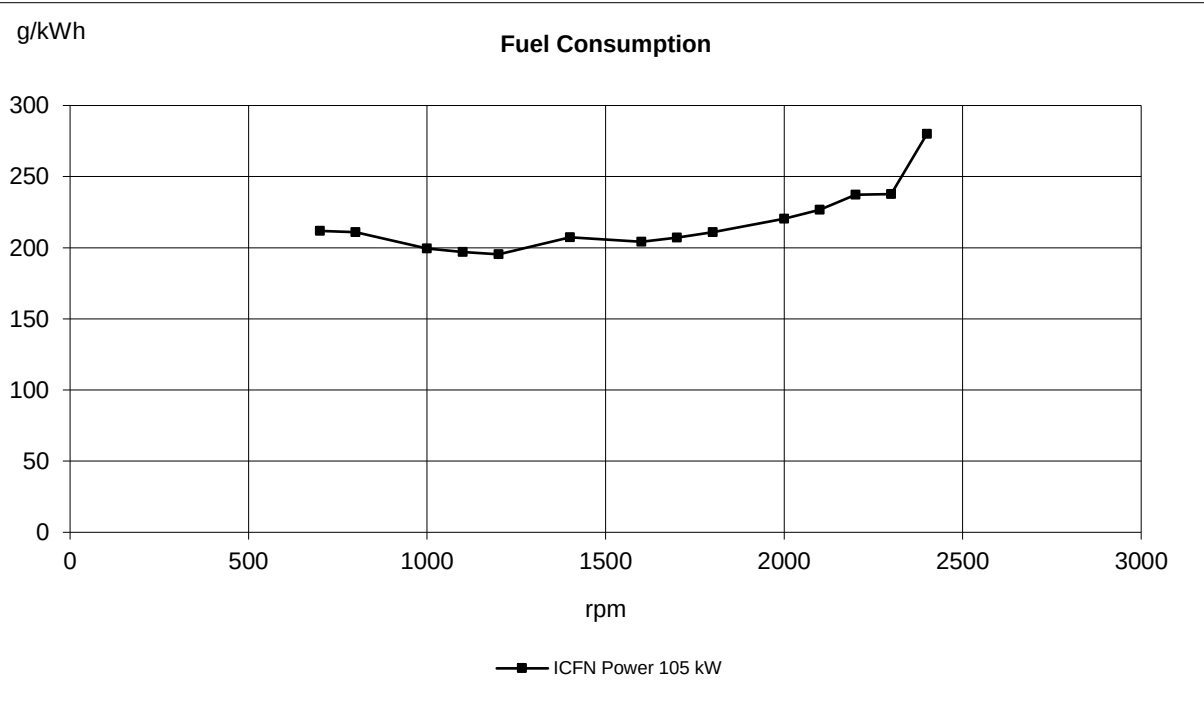
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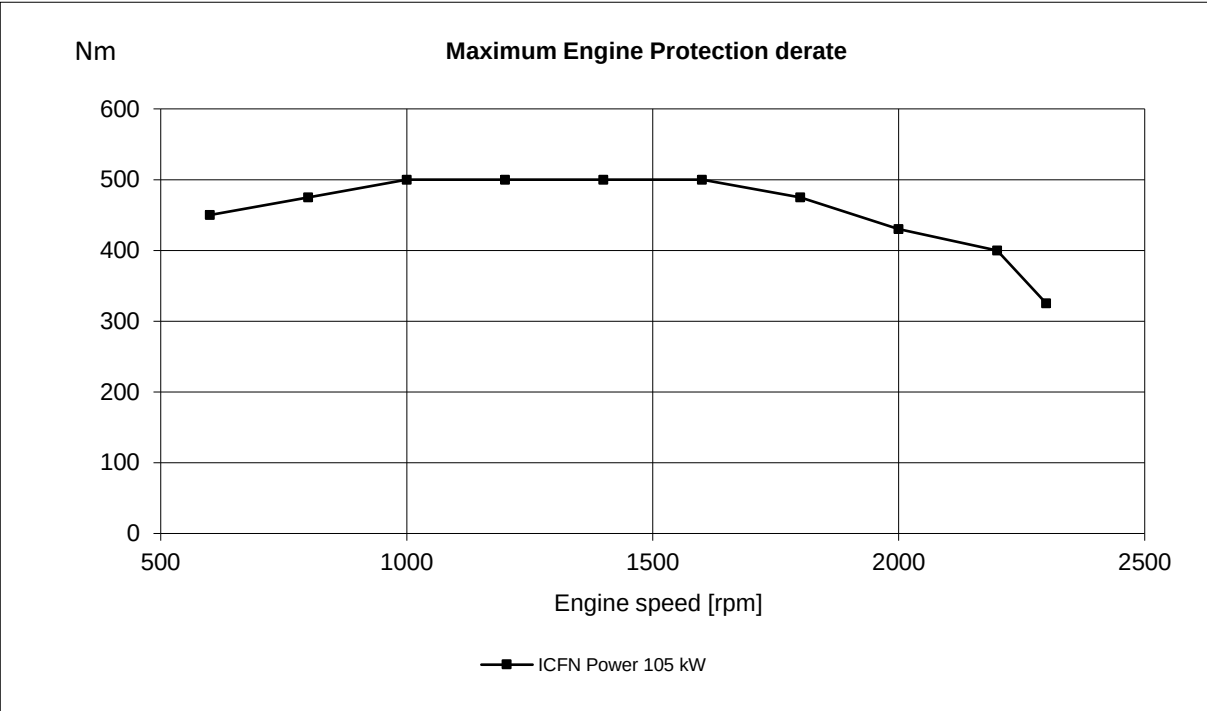
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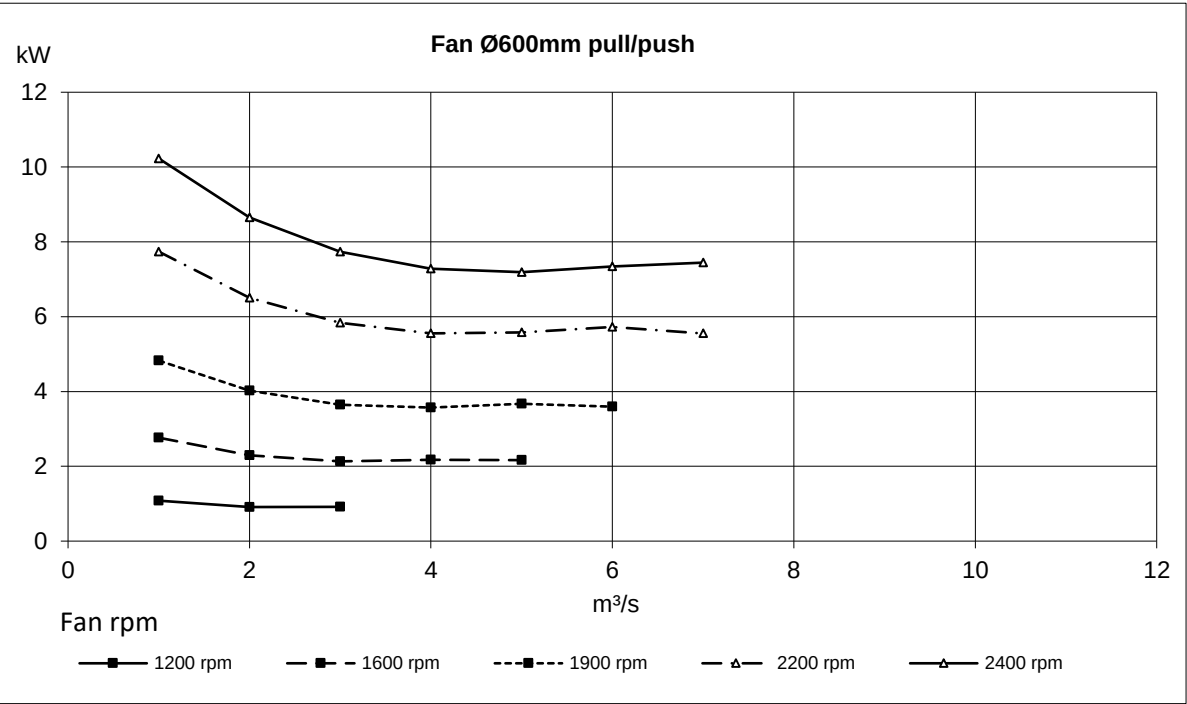
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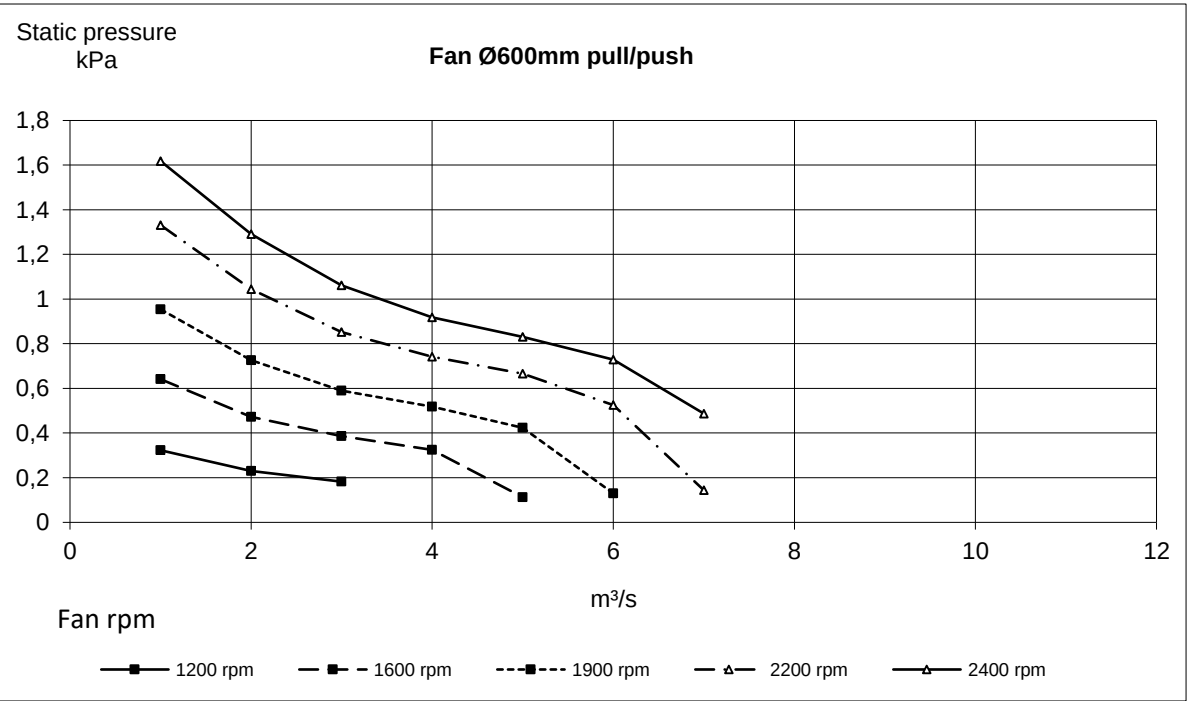


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Maximum fan speed with visco clutch: 2400rpm



Maximum fan speed with visco clutch: 2400rpm

