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, anti-clockwise viewed towards flywheel

Number of cylinders			4
Displacement, total		liters in^3	5,13 313
Firing order			1-3-4-2
Bore		mm in	110 4,33
Stroke		mm in	135 5,31
Compression ratio			17.5:1
Wet weight (Not including after treatment system)	Engine only	kg lb	583 1285
	Power pac	kg lb	877 1933
	Power pac, compact cooling package	kg lb	802 1768

Performance				**rpm**	**1500**	**1800**	**2000**	**2300**
ICFN Power 129 kW		without fan		kW hp	126 171	129 175	129 175	129 175
		with fan 600 mm pull		kW hp	121 164	122 166	122 166	122 166
Torque at:		ICFN Power 129 kW		Nm lbf ft	800 590	685 505	616 454	536 395
Max torque at engine speed	ICFN Power		1200 rpm	Nm lbf ft	810 597			
Power tolerance				%	±3			
Mean piston speed				m/s ft/sec	6,8 22,1	8,1 26,6	9,0 29,5	10,4 34,0
Effective mean pressure at:		ICFN Power 129 kW		MPa psi	1,96 285	1,68 243	1,51 219	1,31 190
Total mass moment of inertia, J (mR^2) (not including flywheel)				kgm^2 $lbft^2$	0,253 6,0			
Friction Power				kW hp	12 16	16 22	20 27	26 35
Derating see Technical Diagrams								

Cold start performance

*Cold start limit temperature	without starting aid	°C °F	-15 5	
	with manifold heater 4 kW	°C °F	-30 -22	
	with manifold heater 4 kW and block heater	°C °F	-35 -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 US gal	16 4,23
Oil pan capacity:	Max	liter US gal	13,5 3,57
	Min	liter US gal	9,5 2,51
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 psi	425 62

Lubrication system

Lubrication oil temperature in sump:	max	°C °F	125 257
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	102 26,9
Fuel supply line max. restriction (Measured at fuel inlet connection)		kPa psi	25 3,6
Fuel supply line max. pressure, during engine stand still (meassured 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 HP3	

Intake and exhaust system		**Inlet air temp**	**rpm**	**1500**	**1800**	**2000**	**2300**
Charge air consumption at: (+25°C and 100kPa)	ICFN Power 129 kW	25°C 77°F	m³/min cfm	8,5 300	9,4 332	10,2 360	11,7 413
⚠ **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 129 kW		kW BTU/min	73 4146	74 4214	75,6 4299	86,9 4942
Exhaust gas temperature after turbine at:	ICFN Power 129 kW		°C °F	411 772	380 716	362 684	364 687
⚠ **See front page for important information** Max allowable back pressure in exhaust line (after turbine) Pipe dimension Ø: 102 mm			kPa psi	11 1,6	11 1,6	12 1,7	13 1,9
⚠ **See front page for important information** Max allowable temperature drop between turbine and SCR muffler inlet (in average over a typical customer cycle (not stationary points)).			Δ°C Δ°F	15 27			
SCR muffler pressure drop (at exhaust gas flow and exhaust temp given)			kPa psi	5 0,7	5 0,7	6 0,9	6 0,9
Exhaust gas flow at: (temp and pressure after turbine at the corresponding power setting)	ICFN Power 129 kW		m³/min cfm	18,6 657	19,5 689	20,3 717	23 812

Cooling system			rpm	1500	1800	2000	2300
Heat rejection radiation from engine at:		ICFN Power 129 kW	kW BTU/min	7 387	6 318	4,8 273	5 284
Heat rejection to coolant at:		ICFN Power 129 kW	kW BTU/min	70 3981	77 4356	80,9 4601	84,2 4788
Radiator cooling system type				Closed circuit			
Standard radiator core area		ICFN Power 129 kW	m² foot²	0,6 6,46			
Compact cooling package radiator core area		ICFN Power 129 kW	m² foot²	0,28 3,01			
Fan diameter	600 mm	ICFN Power 129 kW	mm in	600 23,62			
Maximum fan power consumption	600 mm pull		kW hp	5,1 7	7,2 10	7,2 10	7,2 10
Fan drive ratio	fan Ø600			1:1.4			
	fan position high			1:1.1			
Coolant capacity:	engine		liter US gal	13 3,4			
	engine + standard radiator with hoses and expansion tank		liter US gal	47 12,4			
	engine + compact cooling package radiator with hoses and expansion tank		liter US gal	31 8,2			
Coolant pump			drive/ratio	belt/1,40:1			
Coolant flow with standard system			l/s US gal/s	5,4 1,4	6,5 1,7	7,2 1,9	8,2 2,2
Minimum coolant flow			l/s US gal/s				4,5 1,2
Maximum outer circuit restriction incl. piping			kPa psi	40,0 5,8			
Thermostat:		start to open	°C °F	85 185			
		fully open	°C °F	95 203			
Maximum static pressure head (expansion tank height + pressure cap setting)			kPa psi	110 16,0			
Minimum static pressure head (expansion tank height + pressure cap setting)			kPa psi	85 12,3			
Standard pressure cap setting			kPa psi	100 14,5			
Maximum top tank temperature			°C °F	107 225			
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 US gal	2 0,5			

Charge air cooler system		rpm	1500	1800	2000	2300
Heat rejection to charge air cooler	ICFN Power 129 kW	kW	21,2	23,7	24,7	28,6
		BTU/min	1206	1348	1405	1626
Charge air mass flow	ICFN Power 129 kW	kg/s	0,165	0,184	0,198	0,228
Charge air inlet temp. (Charge air temp after turbo compressor)	ICFN Power 129 kW	°C	177	177	174	177
		°F	351	351	345	351
⚠ **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	8	9	10	12
		psi	1,16	1,31	1,45	1,74
Charge air pressure (relative) (After charge air cooler)		kPa	197	199	191	172
		psi	28,57	28,86	27,70	24,95
Standard charge air cooler core area		m²	0,5			
		foot²	5,38			
Compact charge air cooler core area		m²	0,22			
		foot²	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 std coolant. Valid at 1 atm.

		ICFN Power 129 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
1500	121	77	171	6,2	219,0	0	
	165	77	170	5,9	208,4	100	0,015
		76	169	5,8	204,8	200	0,029
		74	165	5,2	183,6	300	0,044
2300	129	76	169	7,6	268,4	0	
	175	76	168	7,4	261,3	100	0,015
		75	167	7,2	254,3	200	0,029
		75	166	7,1	250,7	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.

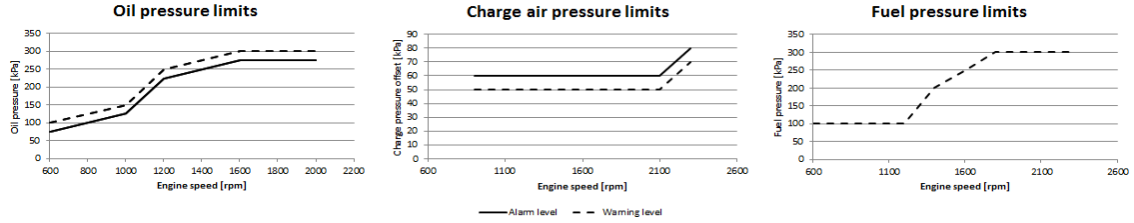
		ICFN Power 129 kW					
Engine speed	Engine power	Air on temp		Air flow		External restriction	
rpm	kW hp	°C	°F	m^3/s	ft^3/s	Pa	psi
1500	121	56	133	5,9	208,4	0	
	165	55	130	5,7	201,3	100	0,015
		52	126	5,4	190,7	200	0,029
		47	116	4,8	169,5	300	0,044
2300	129	55	131	7,0	247,2	0	
	175	54	130	6,9	243,7	100	0,015
		53	127	6,6	233,1	200	0,029
		51	123	6,2	219,0	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	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/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		



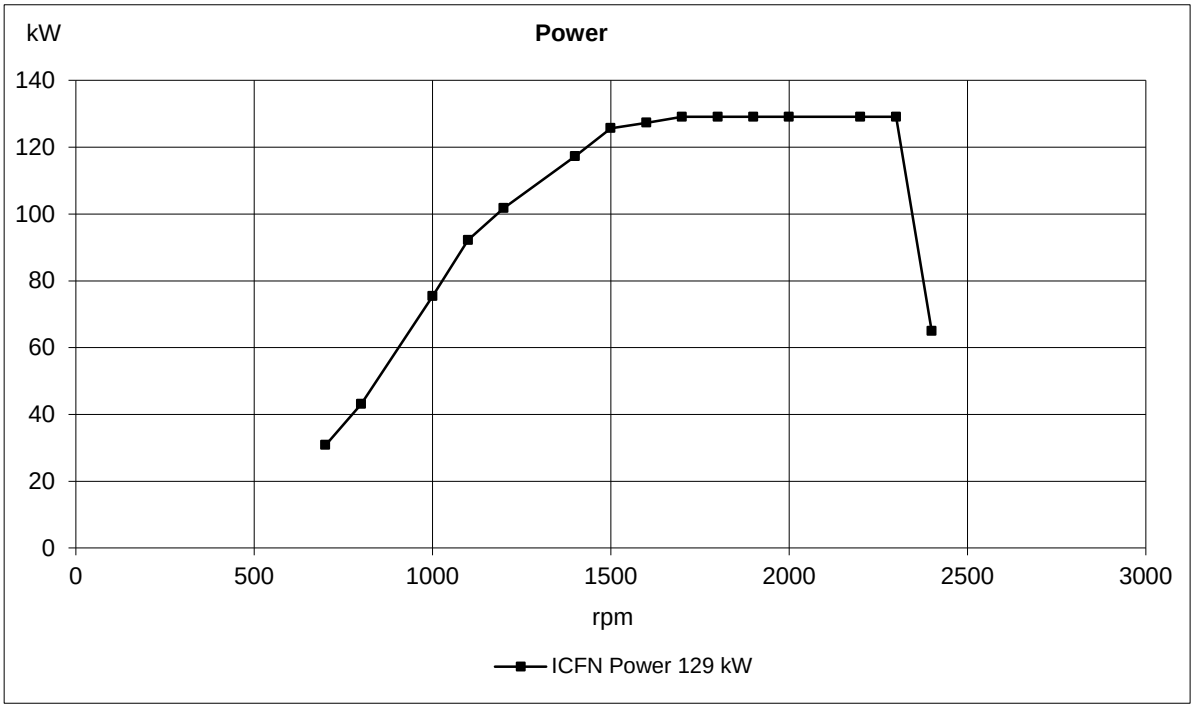
Electrical system

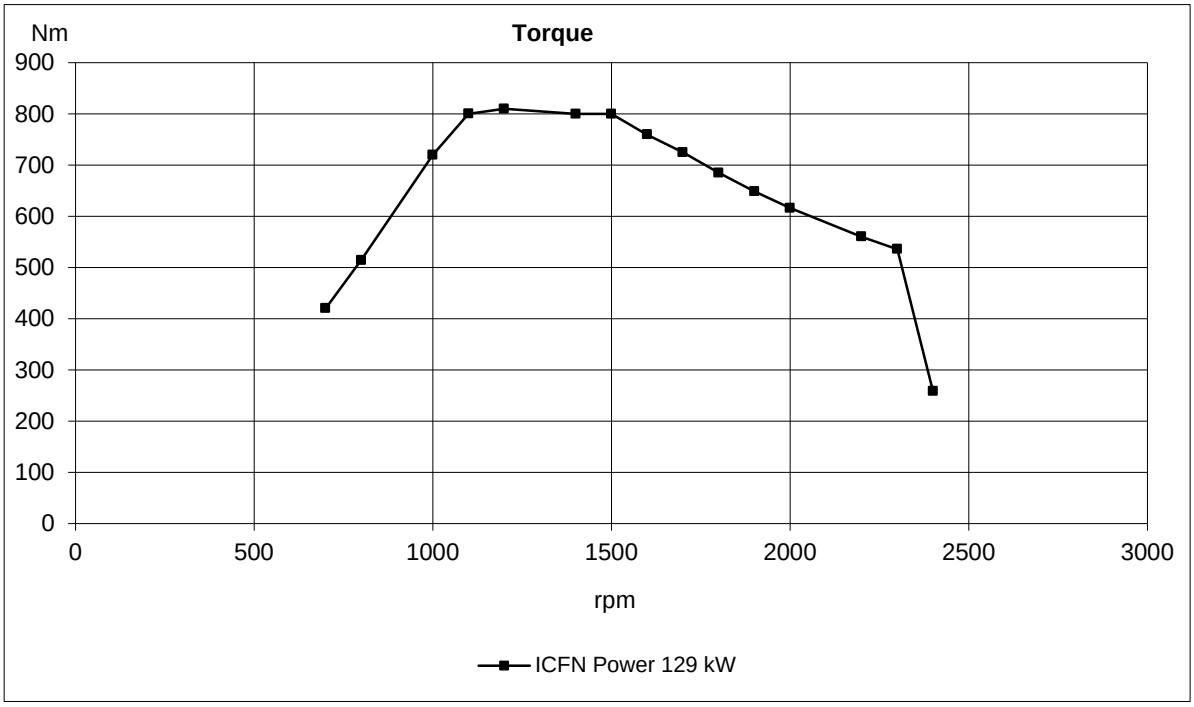
Voltage and type				24V
Alternator:	make			MELCO
	output	A		110/130
	tacho output	Hz/alternator rev.		
	drive ratio			
Starter motor:	make			MELCO
	type			**85P50**/90P55
	output		kW	5 / 5.5
			hp	6.8 / 7.5
Number of teeth on:	flywheel			137
	starter motor			10 / 12 teeth
Inlet manifold heater (at 20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

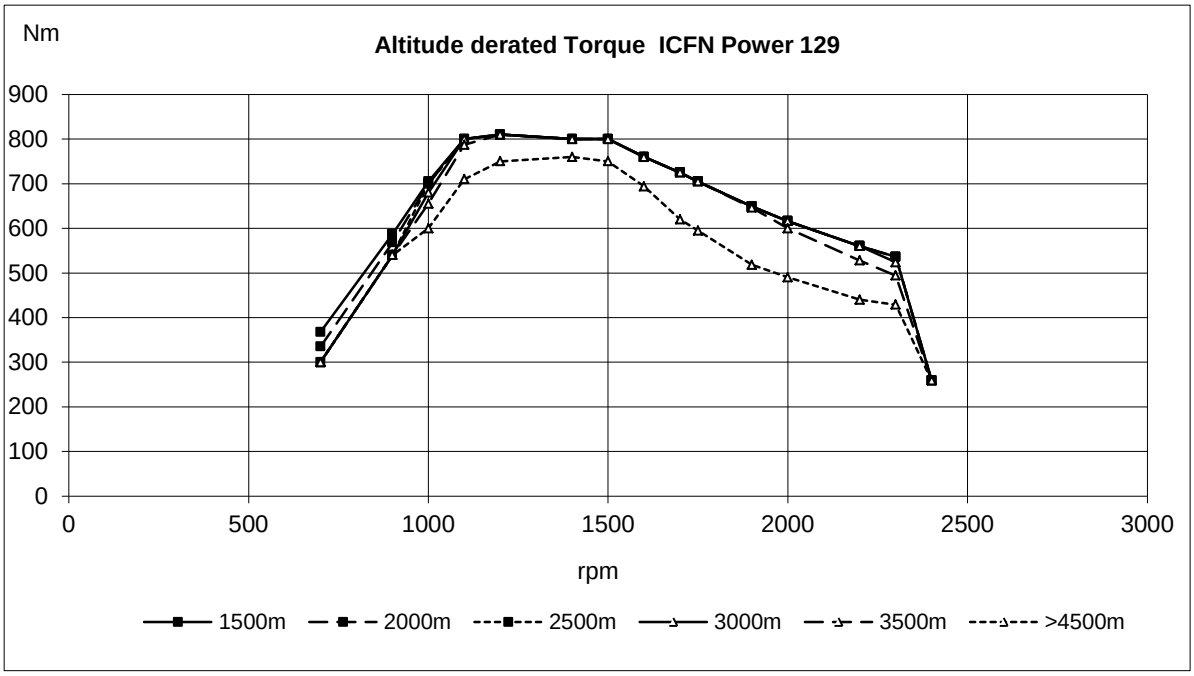
Conditions: (5 mΩ main circuit resistance@ 20°C)	**Temperature**	**°C**		**25**	**0**	**-15**
	Battery	**Ah / CCA**		**100/700**	**100/700**	**100/700**
Crank speed		rpm		197	150	123
Crank current		A		173	265	320
Starter input power during crank		kW		3,90	4,70	5,20
Battery power during crank		kW		4,00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

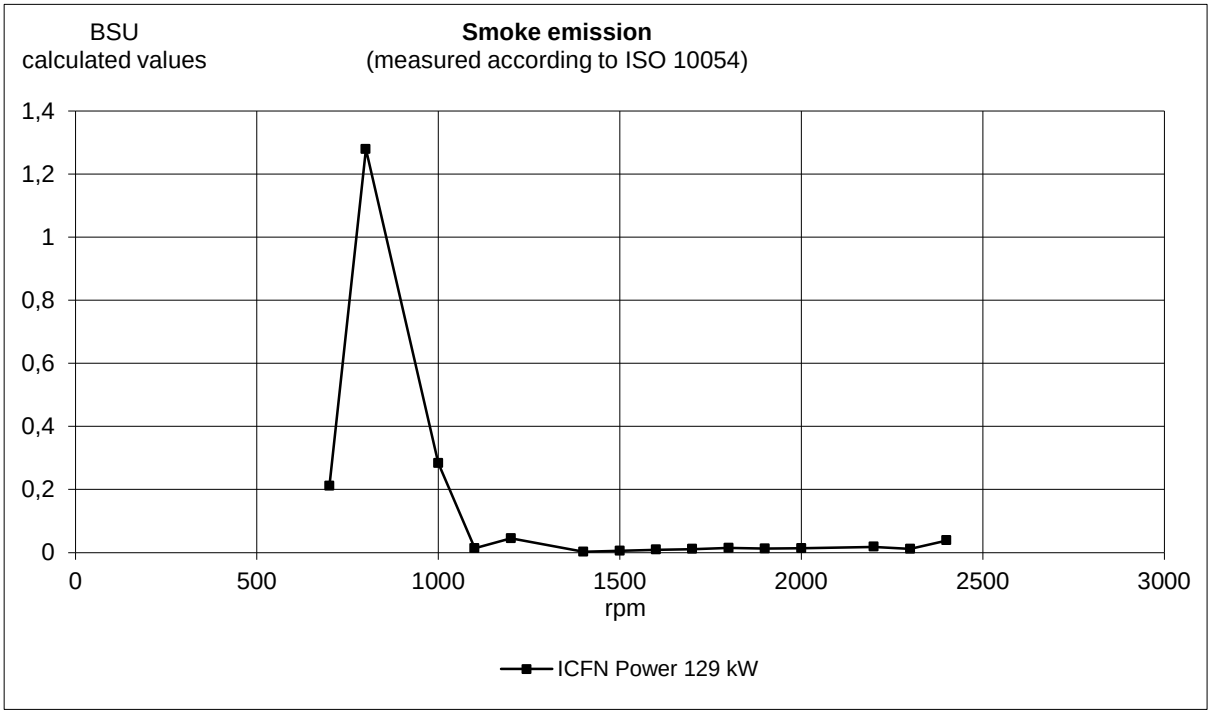
Power take off			**rpm**	**1400**	**1800**	**2000**	**2300**
Front end in line with crank shaft max:*		0.02 kgm^2	Nm	866	817	750	610
Flywheel			lbf ft	639	603	553	450
SAE 2, STD 10" & 11,5 ", 1.303 kgm2		0.03 kgm^2	Nm	866	748	711	457
			lbf ft	639	552	524	337
		0.04 kgm^2	Nm	866	695	645	399
			lbf ft	639	513	476	294
Front end belt pulley load.	Max up (above or equal to horizontal line)		kW	3,4	4,1	4,5	5,2
			hp	4,6	5,6	6,1	7,1
	Max down (below horizontal line)		kW	28,4	34,0	37,8	43,5
			hp	38,6	46,2	51,4	59,2
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	5000			
			lbf	1124,0			

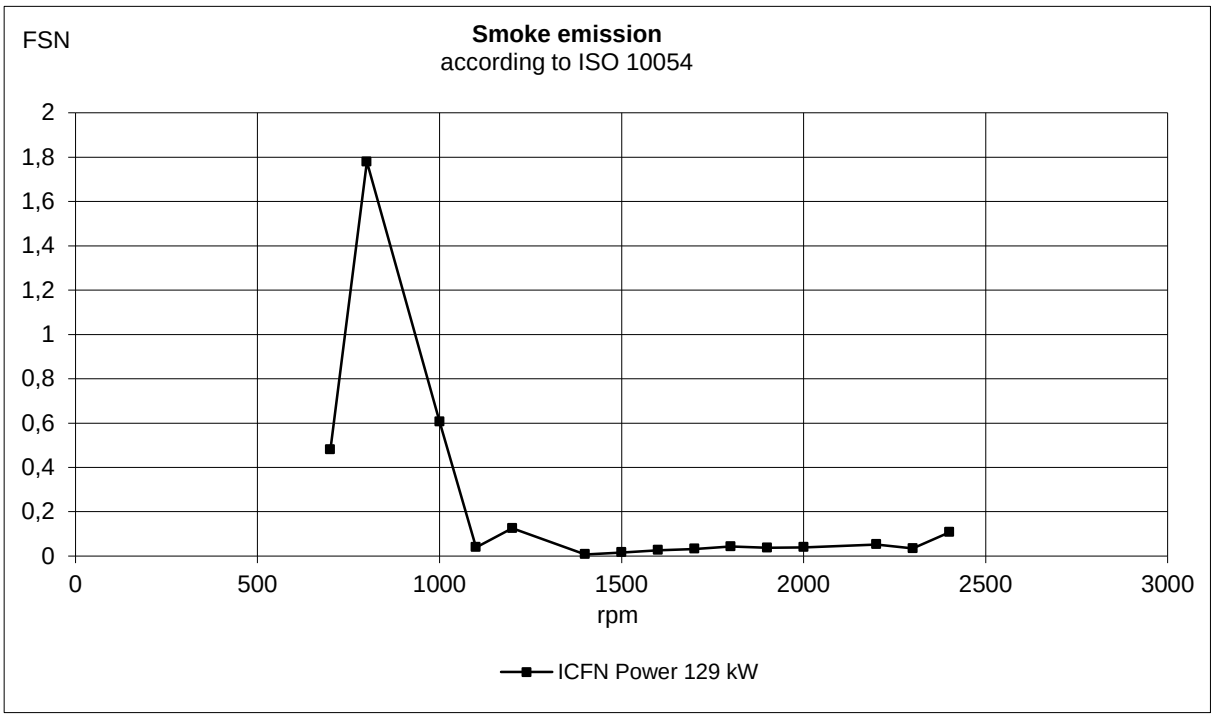
**** Maximum allowed torque at individual PTO´s.***
If more then one PTO output is used simultaniusly, calculations needs to be performed to determine available maximum. Available torque depends on application inertia.

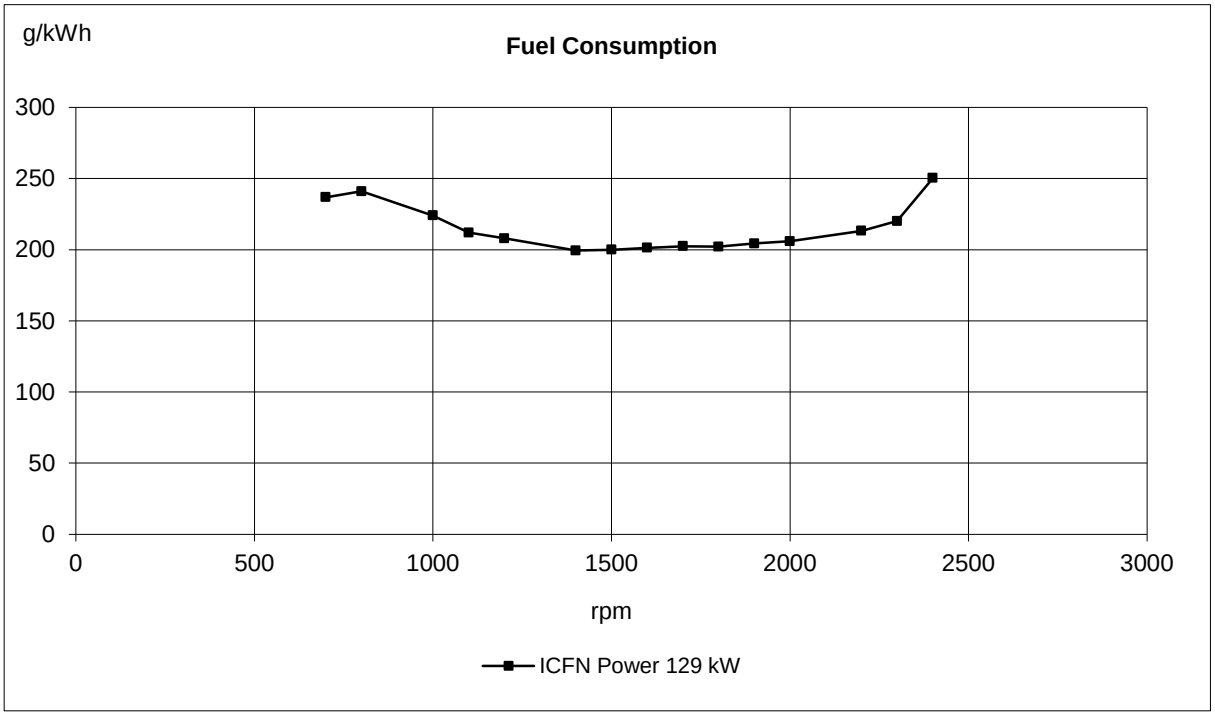

kW
Power
140
120
100
80
60
40
20
0
0
500
1000
1500
2000
2500
3000
rpm
ICFN Power 129 kW

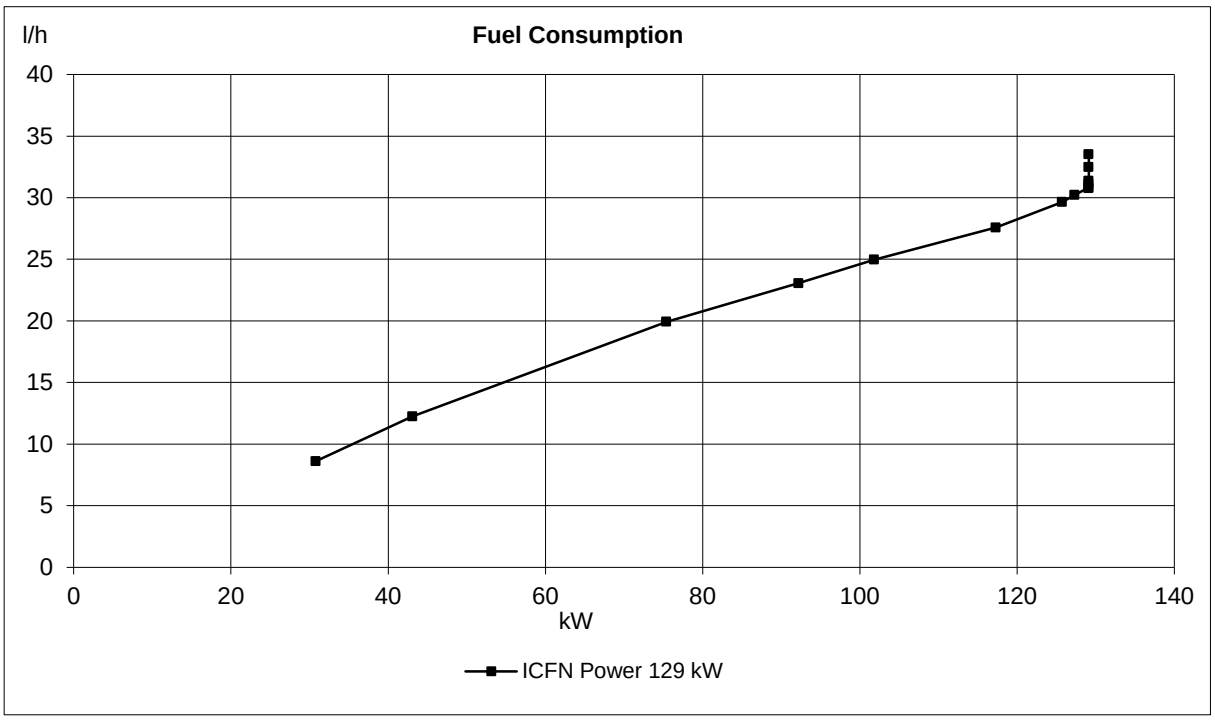

Nm
Torque
900
800
700
600
500
400
300
200
100
0
0
500
1000
1500
2000
2500
3000
rpm
ICFN Power 129 kW

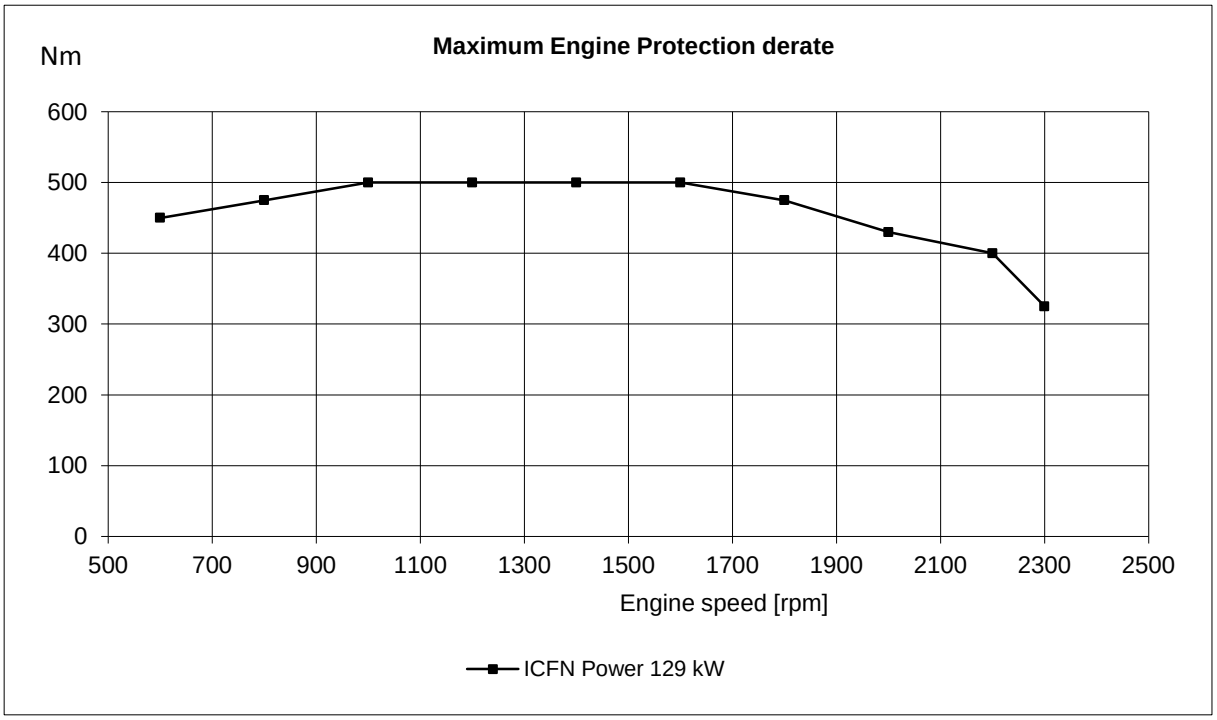

Nm
Altitude derated Torque ICFN Power 129
900
800
700
600
500
400
300
200
100
0
0
500
1000
1500
2000
2500
3000
rpm
1500m
2000m
2500m
3000m
3500m
>4500m

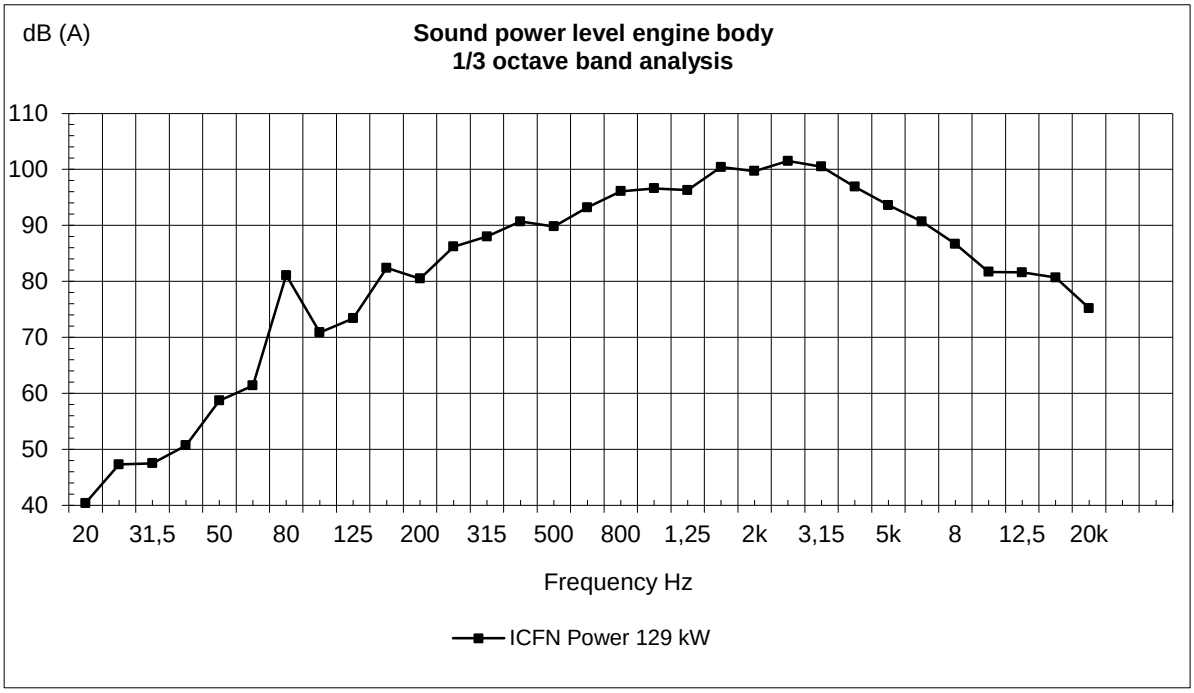

BSU
calculated values
Smoke emission
(measured according to ISO 10054)
1,4
1,2
1
0,8
0,6
0,4
0,2
0
0
500
1000
1500
2000
2500
3000
rpm
ICFN Power 129 kW

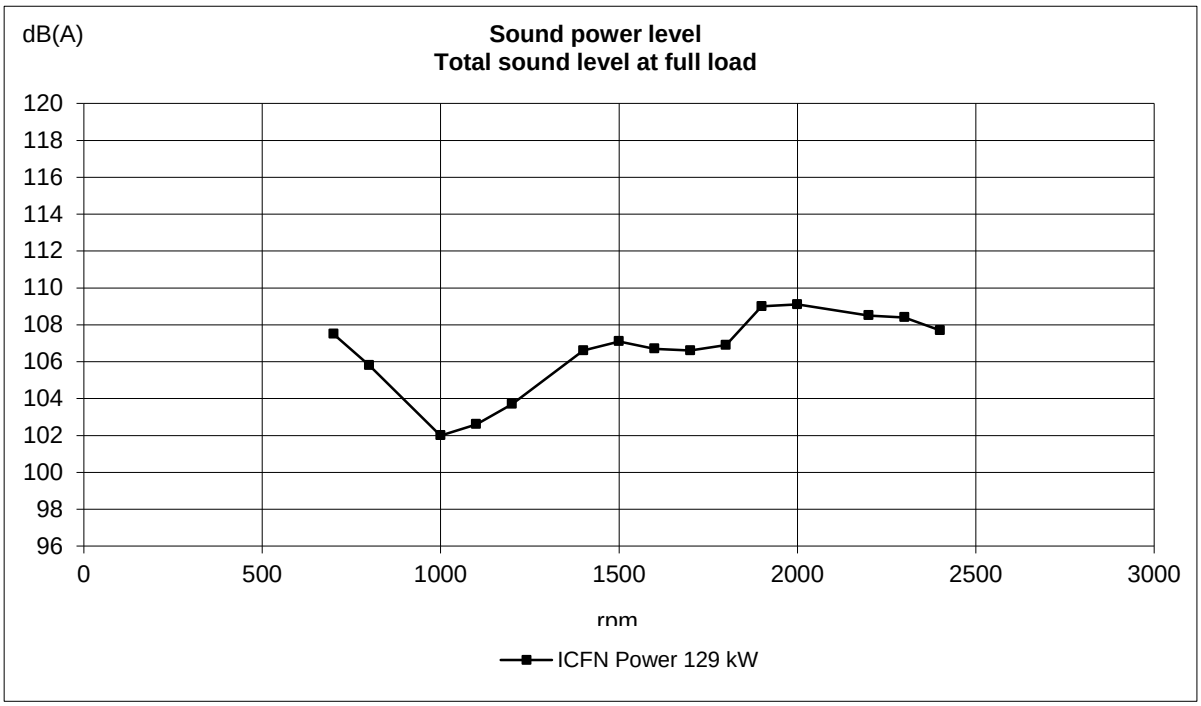

FSN
Smoke emission
according to ISO 10054
2
1,8
1,6
1,4
1,2
1
0,8
0,6
0,4
0,2
0
0
500
1000
1500
2000
2500
3000
rpm
ICFN Power 129 kW

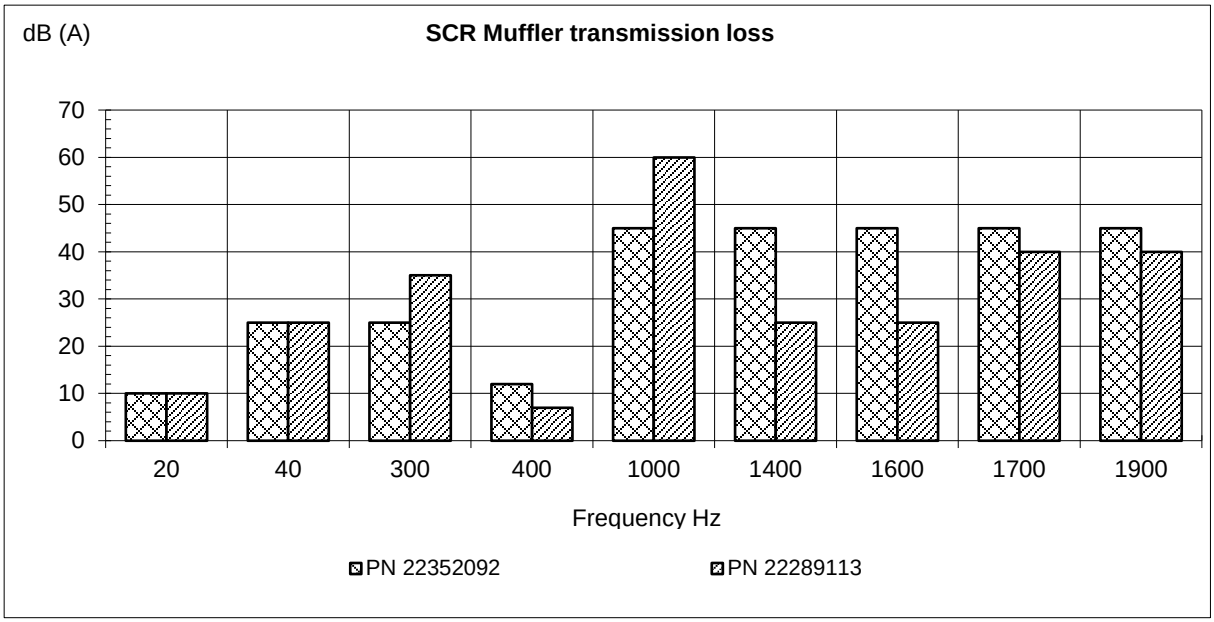

g/kWh
Fuel Consumption
300
250
200
150
100
50
0
0
500
1000
1500
2000
2500
3000
rpm
ICFN Power 129 kW

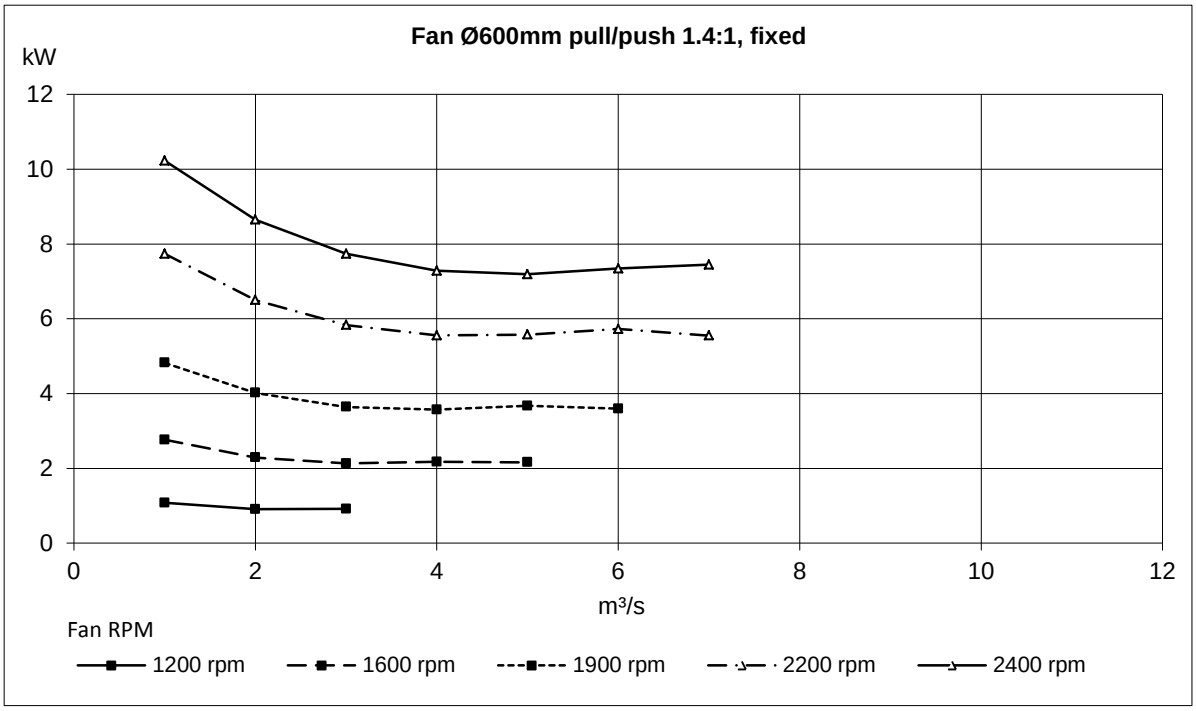

l/h
Fuel Consumption
40
35
30
25
20
15
10
5
0
0
20
40
60
80
100
120
140
kW
ICFN Power 129 kW


Maximum Engine Protection derate
Nm
600
500
400
300
200
100
0
500
700
900
1100
1300
1500
1700
1900
2100
2300
2500
Engine speed [rpm]
ICFN Power 129 kW

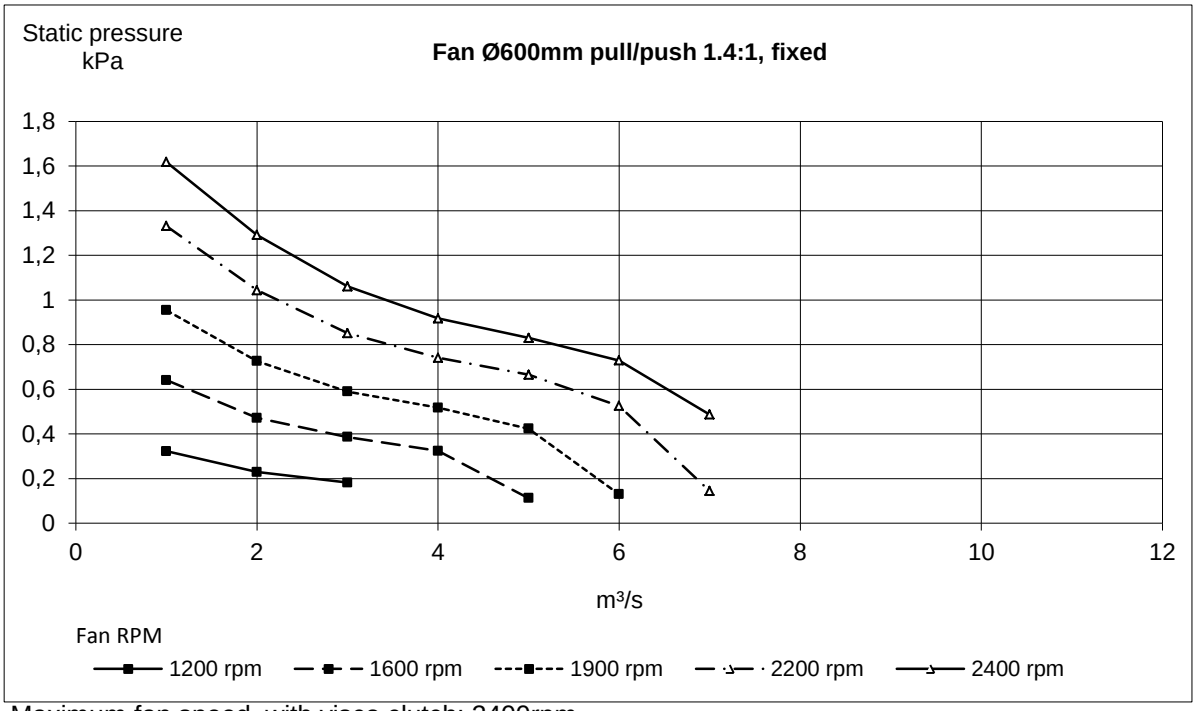

dB (A)
Sound power level engine body
1/3 octave band analysis
110
100
90
80
70
60
50
40
20
31,5
50
80
125
200
315
500
800
1,25
2k
3,15
5k
8
12,5
20k
Frequency Hz
ICFN Power 129 kW


dB(A)
Sound power level
Total sound level at full load
120
118
116
114
112
110
108
106
104
102
100
98
96
0
500
1000
1500
2000
2500
3000
rpm
ICFN Power 129 kW

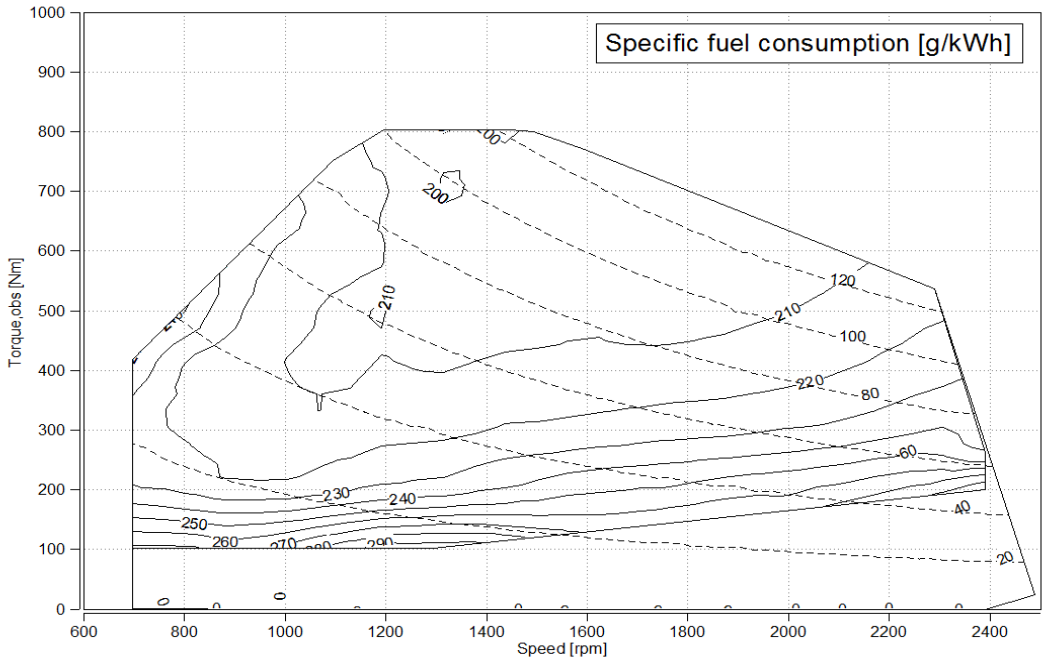

dB (A)
SCR Muffler transmission loss
70
60
50
40
30
20
10
0
20
40
300
400
1000
1400
1600
1700
1900
Frequency Hz
PN 22352092
PN 22289113

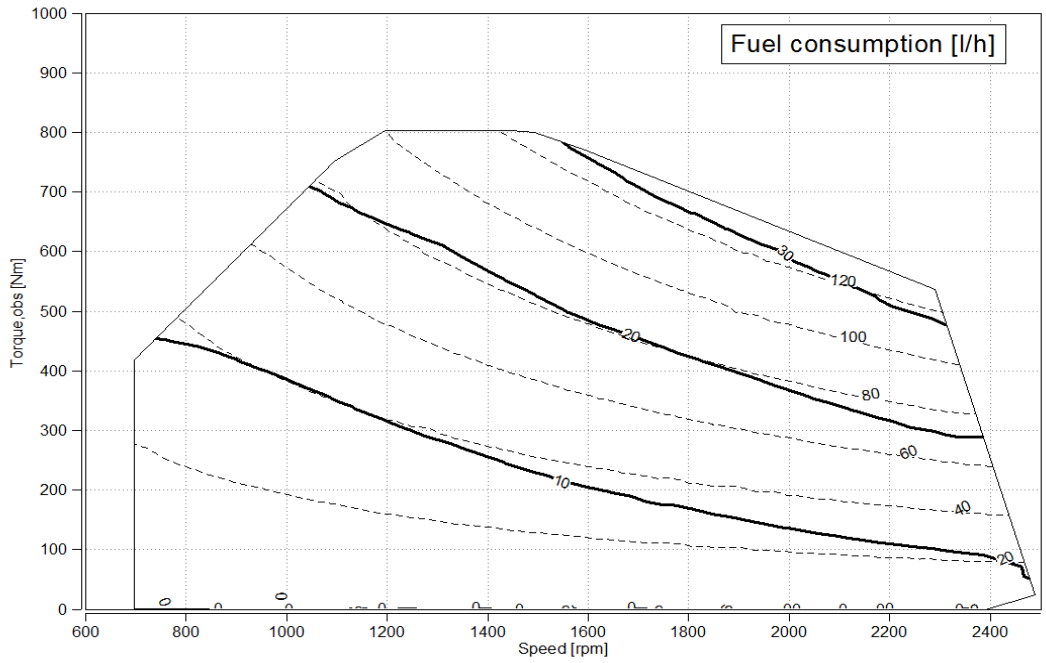


Maximum fan speed with visco clutch: 2400rpm



Maximum fan speed with visco clutch: 2400rpm


Specific fuel consumption [g/kWh]
Torque,obs [Nm]
Speed [rpm]
1000
900
800
700
600
500
400
300
200
100
0
600
800
1000
1200
1400
1600
1800
2000
2200
2400
200
210
120
100
220
80
60
230
240
40
250
260
20


Fuel consumption [l/h]
Torque,obs [Nm]
Speed [rpm]
1000
900
800
700
600
500
400
300
200
100
0
600
800
1000
1200
1400
1600
1800
2000
2200
2400
30
120
100
20
80
60
10
40
20