

General

4-stroke direct injected, turbocharged and aftercooled diesel engine

Engine Rating		5
Number of cylinders		6
No of valves		24
Displacement, total	litres in ³	7,70 469,7
Firing order		1-4-2-6-3-5
Rotational direction, viewed from the front		Clockwise
Bore	mm in	110 4,33
Stroke	mm in	135 5,31
Compression ratio		16,5:1
Compression pressure at 240 rpm	MPa psi	3,2 464
Max. static forward inclination:	°	0
Max. static backward inclination:	°	10
Max. intermittent forward inclination while running:	°	33
Max. intermittent backward inclination while running:	°	17
Max. intermittent side inclination while running:	°	30
Idling speed	rpm	600 ± 10
Rated speed R5	rpm	2900
Governed speed R5	rpm	2980
Propeller selection range R5	rpm	2850-2950
Dry weight engine BT, in basic configuration	kg lb	880 1940
Dry weight engine BT, in basic configuration incl. exhaust pipe/riser, coupling, prot.casing, excl. rear susp	kg lb	950 2094

Performance	rpm	600	800	1200	1700	2000	2400	2700	2800	2900	3000
Crankshaft power 1), 5)	kW	50	82	166	296	349	405	405	405	405	
	hp	68	112	226	403	475	551	551	551	551	
Propeller shaft power 1) (At full load) With drive	kW	48	78	158	281	332	385	385	385	385	
	hp	65	106	214	382	451	523	523	523	523	
Propellershaft power at prop. load x ^{2,5}	kW	7	15	42	101	152	240	322	352	385	
	hp	10	21	58	138	207	326	438	479	523	
Propellershaft power at prop. load x ³	kW	3	8	27	78	126	218	311	346	385	
	hp	5	11	37	105	172	297	422	471	523	
Torque at crankshaft 2)	Nm	800,1	978,8	1321	1663	1666	1611	1432	1381	1334	
	lbf ft	590	722	974	1226	1229	1189	1056	1019	984	
Mean piston speed	m/s	2,7	3,6	5,4	7,7	9,0	10,8	12,2	12,6	13,1	13,5
	ft/s	8,9	11,8	17,7	25,1	29,5	35,4	39,9	41,3	42,8	44,3
Effective mean pressure 2)	MPa	1,31	1,60	2,16	2,71	2,72	2,63	2,34	2,25	2,18	
	psi	189,4	231,8	312,8	393,7	394,5	381,5	339,2	327,0	315,8	
Max combustion pressure 2)	MPa	16,7	17,9	18,3	18,3	18,4	17,8	15,8	16,1	15,5	
	psi	2422	2596	2654	2654	2669	2582	2292	2335	2248	

1) ISO 3046, fuel temp 40°C.

ISO 8665 (=SAE J 1228=ICOMIA 28-83)

2) At power according to 1).

3) If reverse gear is used, 4% in heat rejection will be added for its oil cooler.

4) Acc. to ISO 3744

5) At installed back pressure

VOLVO PENTA D8-IPS700 R5	Document No	Issue Index
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Lubricating system

Specific lubricating oil consumption.	g/kWh	0,1
Max. oil volume including filters for all allowed installation inclinations:	litres	29,4
	US gal	7,8
Max. oil volume excluding filters for all allowed installation inclinations:	litres	28
	US gal	7,4
Min. oil volume excluding filters for all allowed installation inclinations:	litres	22
	US gal	5,8

Fuel system

	rpm	600	800	1200	1700	2000	2400	2700	2800	2900	3000
Specific fuel consumption 2) (max torque)	g/kWh	222	212	204	200	197	206	220	220	225	
	lb/hph	0,36	0,343	0,331	0,324	0,319	0,334	0,357	0,357	0,365	
Fuel consumption at Test cycle?	g/kWh lb/hph	NA									
Fuel consumption at prop. load x ^{2,5}	l/h	2,6	4,6	11,2	26,4	39,5	63,7	87,9	97,4	109,5	
	US gal/h	0,7	1,2	3,0	7,0	10,4	16,8	23,2	25,7	28,9	
Fuel consumption at prop. load x ³	l/h	1,6	3,0	7,8	20,5	33,3	58,9	85,4	96,0	109,5	
	US gal/h	0,4	0,8	2,1	5,4	8,8	15,6	22,6	25,4	28,9	
Fuel consumption at full load	l/h	13,4	20,8	40,6	70,9	82,2	100,0	106,8	106,7	109,2	
	US gal/h	3,5	5,5	10,7	18,7	21,7	26,4	28,2	28,2	28,8	

Full load performance at rated speed

Fuel inlet temperature	°C	40
	°F	104,0
Fuel return temperature from engine	°C	52
	°F	125,6
Fuel consumption	l/h	109
	US gal/h	28,8
Fuel inlet flow to engine	l/h	184
	US gal/h	48,6
Fuel return flow from engine	l/h	75
	US gal/h	19,8

Intake and exhaust system

	rpm	600	800	1200	1700	2000	2400	2700	2800	2900	3000
Specific exhaust heating effect in percent of crankshaft power	%	20	21	30	64	63	68	80	80	84	
Exhaust temperature at the exhaust pipe connecting flange after the turbo charger.	°C	309	350	446	545	470	448	503	489	517	
	°F	588	662	835	1013	878	838	937	912	963	
Permitted back pressure in the exhaust line at rated speed. (Installed back pressure)	kPa							Max	30		
	psi								4,4		
	kPa							Min	10		
	psi								1,5		

Intake and exhaust system

	rpm	600	800	1200	1700	2000	2400	2700	2800	2900	3000
Engine air consumption at 25°C / 77°F atmospheric pressure 100kPa	m³/min	4,48	6,68	10,72	16,55	22,42	29,83	30,62	31,4	31,22	
	cu.ft./min	158,2	235,9	378,6	584,5	791,8	1053	1081	1109	1103	
Charge air pressure Inlet manifold	kPa	206	231	256	278	322	363	334	332	322	
	psi	29,9	33,5	37,1	40,3	46,7	52,6	48,4	48,2	46,7	
Exhaust gas flow	m³/min	9,21	14,8	27,2	46,67	54,95	66,32	72,03	72,27	74,2	
	cu.ft./min	325,2	522,7	960,6	1648	1941	2342	2544	2552	2620	

1) ISO 3046, fuel temp 40°C.

ISO 8665 (=SAE J 1228=ICOMIA 28-83)

2) At power according to 1).

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5) At installed back pressure

Cooling system	rpm	600	800	1200	1700	2000	2400	2700	2800	2900	3000
Radiated heat of crankshaft power at full load.	kW	1,9	1,8	1,7	1,6	1,5	1,5	1,5	1,5	1,5	
Heat rejection to charge air cooler of crankshaft power at full load.	kW	18	21	18	15	20	25	24	25	24	
Coolant heat rejection to HE, incl. engine oil cooler and excl. charge air cooler, of crankshaft power at full load.	kW	72	60	56	48	43	47	51	47	53	
Coolant flow with fully open thermostat and std cooling system	l/min	66	88	129	182	212	244	265	269	272	
	cu.ft./min	2,3	3,1	4,6	6,4	7,5	8,6	9,4	9,5	9,6	
Max. permissible temperature on coolant in engine outlet	°C	NA									
	°F	NA									
Coolant volume engine, including heat exchanger and charge air cooler	litres	25									
	US gal.	6,60									
Max. additional coolant for cabin heater etc. with std. Expansion tank	litres	20									
	US gal.	5,28									
Maximum coolant flow to cabin heater etc.	l/min	34,2									
	cu.ft./min	1,21									
Thermostat, start open at	°C	76									
	°F	169									
Thermostat, fully open at	°C	86									
	°F	187									

Raw water circuit	rpm	600	800	1200	1700	2000	2400	2700	2800	2900	3000
Nominal raw water design flow	l/min	66	88	129	165	200	240	250	255	257	
	cu.ft./min	2,3	3,1	4,6	5,8	7,1	8,5	8,8	9,0	9,1	
Nominal raw water pump pressure head at design flow.	kPa	5	11	27	50	67	87	101	105	107	
	psi	0,7	1,6	3,9	7,3	9,7	12,6	14,6	15,2	15,5	
Maximum raw water pump suction head	kPa	-30									
	psi	-4,4									
Maximum additional pressure drop excl. reverse gear oil cooler	kPa	97	93	83	63	50	31	20	16	14	
	psi	14,1	13,5	12,0	9,1	7,3	4,5	2,9	2,3	2,0	
Pressure drop over reverse gear oil cooler (optional equipment)	kPa	1	1	2	4	5	7	8	9	9	9
	psi	0,1	0,1	0,3	0,6	0,7	1,0	1,2	1,3	1,3	1,3
Maximum raw water temperature entering heat exchanger	°C	32									
	°F	90									

Emissions	rpm	600	800	1200	1700	2000	2400	2700	2800	2900	3000
Smoke at prop. load x ^{2.5}	*BSU	0,1	0,1	0,1	0,5	0,4	0,2	0,2	0,2	0,3	
Smoke at prop. load x ³	*BSU	0,1	0,1	0,1	0,3	0,3	0,3	0,2	0,2	0,3	
Noise at prop. load x ^{2.5} . 4)	dBA	96,5	99,8	100,6	103,5	107,1	109	111,9	112,1	112,3	
Noise at prop. load x ³ . 4)	dBA	95,8	98,5	101	103,2	107,4	109,1	111,9	112,1	112,4	

*NB.! BSU are calculated values. Measured values are acc. to ISO 10054 in FSN units

1) ISO 3046, fuel temp 40°C.

ISO 8665 (=SAE J 1228=ICOMIA 28-83)

2) At power according to 1).

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5) At installed back pressure

Sensors Control and Monitoring System							Switches Engine Shutdown System	
Sensors	Signal	Unit	Range	Warning Initial Delay / Fault detection time Warning Delay	Warning Level	Derating Level	Shutdown Initial Delay / Shutdown Delay	Shutdown Level (Tolerance)
Charge air pressure	0,5-4,5 V	kPa	50 - 400 (150-500)	30 sec from start / 3 sec	300 (400 absolute)	310 (410 abs.) *	NA	NA
Charge air temperature	50-0 kΩ	°C	-40 - 130	30 sec from start / 3 sec	80	90 (soft 3)	NA	NA
Coolant level switch	Digital		ON/OFF	30 sec from start / 5 sec	Low (ON / Closed)	NA	NA	NA
Coolant temperature	50-0 kΩ	°C	-40 - 140	30 sec from start / 3 sec	98	103 (soft 1)	NA	NA
Engine speed cam	Frequency	rpm		Instant	Lost signal	NA	NA	NA
Engine speed crank	Frequency	rpm		Instant	Lost signal	NA	NA	NA
Exhaust gas temperature wet	PT200	°C	0 - 850	30 sec from start / 3 sec	200	225(soft 4)	NA	NA
Exhaust gas temperature dry	PT200	°C	0 - 850	30 sec from start / 3 sec	650	665(soft 5)**	NA	NA
Oil level sensor	Digital		ON/OFF	30 sec from start / 5 sec	Low level	NA	NA	NA
Oil temperature	50-0 kΩ	°C	-40 - 140	30 sec from start / 5 sec	125	127 (soft 2)	NA	NA
Water In fuel switch	Digital		ON/OFF	All the time	Water in fuel	NA	NA	NA

NA = Not applicable

* Yes, 50% of engine prot. map.

** Max 1200 rpm at 675°C

Sensors (rpm dependent)	Signal	Unit	Range	Initial Delay / Fault detection time Delay	Warning Level / Derating Level rpm Map					Switches Shutdown System
					600 rpm	1000 rpm	1500 rpm	2000 rpm	3000 rpm	
Fuel pressure	0,5-4,5 V	kPa	0-700							
Warning Level		kPa		30 sec from start / 5 sec	300	335	370	420	450	
Derating Level		kPa		NA	NA	NA	NA	NA	NA	
Oil pressure	0,5-4,5 V	kPa	0-700							
Warning Level		kPa		30 sec from start / 2 sec	-50	100	150	200	300	
Derating Level (100% derate)		kPa		10% trq. decr. per sec	-10	75	125	175	275	
Engine speed		kPa		Max 1000 rpm	0	70	120	170	270	

Warning = Yellow Lamp active

Derating = Red Lamp active

Remarks

	Speed / °C	103°C	105.5°C	108°C
Soft 1) Soft derate Coolant temp				
Remaining torque in %	600	100%	100%	100%
	1200	100%	85%	70%
	1800	100%	50%	0%

	Speed / °C	127°C	129°C	131°C
Soft 2) Soft derate Oil temp				
Remaining torque in %	600	100%	100%	100%
	1200	100%	85%	70%
	1800	100%	50%	0%

	Speed / °C	90°C	95°C	100°C
Soft 3) Soft derate Charge Air Temp				
Remaining torque in %	600	100%	100%	100%
	1200	100%	85%	70%
	1800	100%	50%	0%

	Speed / °C	225°C	235°C	245°C	255°C
Soft 4) Soft derate Exhaust Temp wet					
Remaining torque in %	600	100%	100%	100%	100%
	1200	100%	85%	78%	70%
	1800	100%	50%	25%	0%

	Speed / °C	665°C	675°C	680°C	685°C	690°C
Soft 5) Soft derate Exhaust Temp dry						max 1000rpm
Remaining torque in %	600	100%	100%	100%	100%	100%
	1200	100%	85%	78%	0%	NA
	1800	100%	50%	25%	0%	NA

Technical data - Drive unit

Drive line		D8-IPS700 & D8-IPS800
Transmission type		IPS15-A
Gear ratio (total)		1,84:1
Steering angle, max.		+/- 34°
Total weight of drive unit (1)	kg	470
Oil capacity, approx.	litres	23
Oil volume difference MIN-MAX	litres	0,5
Oil type		Volvo Penta API GL5 75W/90
Propeller range		NS4-NS5, N1-N7

(1) Including oil, exhaust pipe and elbow, clamping ring and various installation components. Propellers are not included in total weight

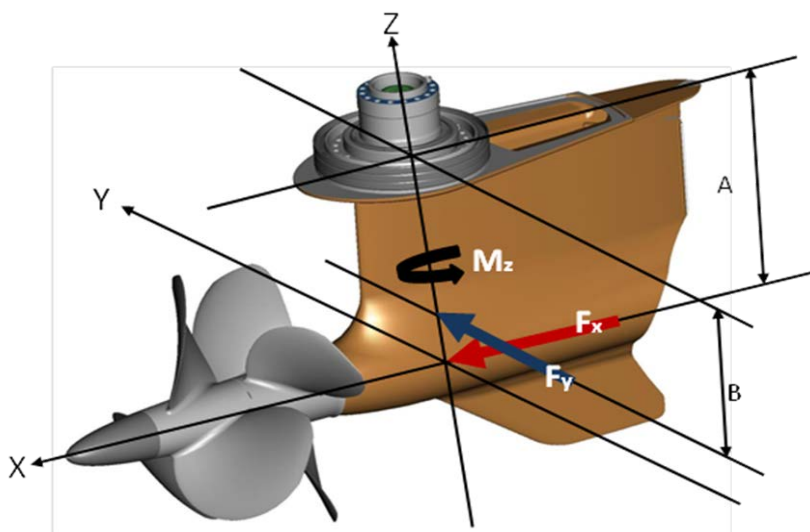
Generalized maximum load document for IPS 15

Valid products	Drive Unit	Gear Ratio
D8-IPS700	IPS 15	1,84:1
D8-IPS800	IPS 15	1,84:1

Loads provided in chart are single maximum loads i.e. not to be used for fatigue calculations

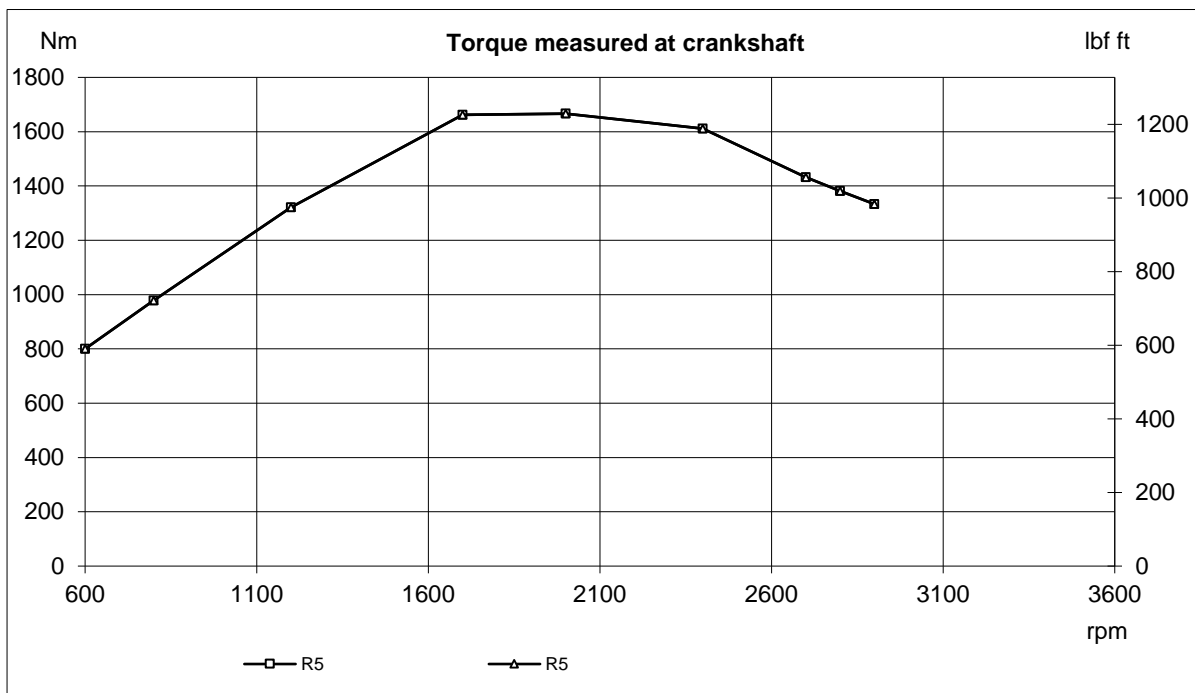
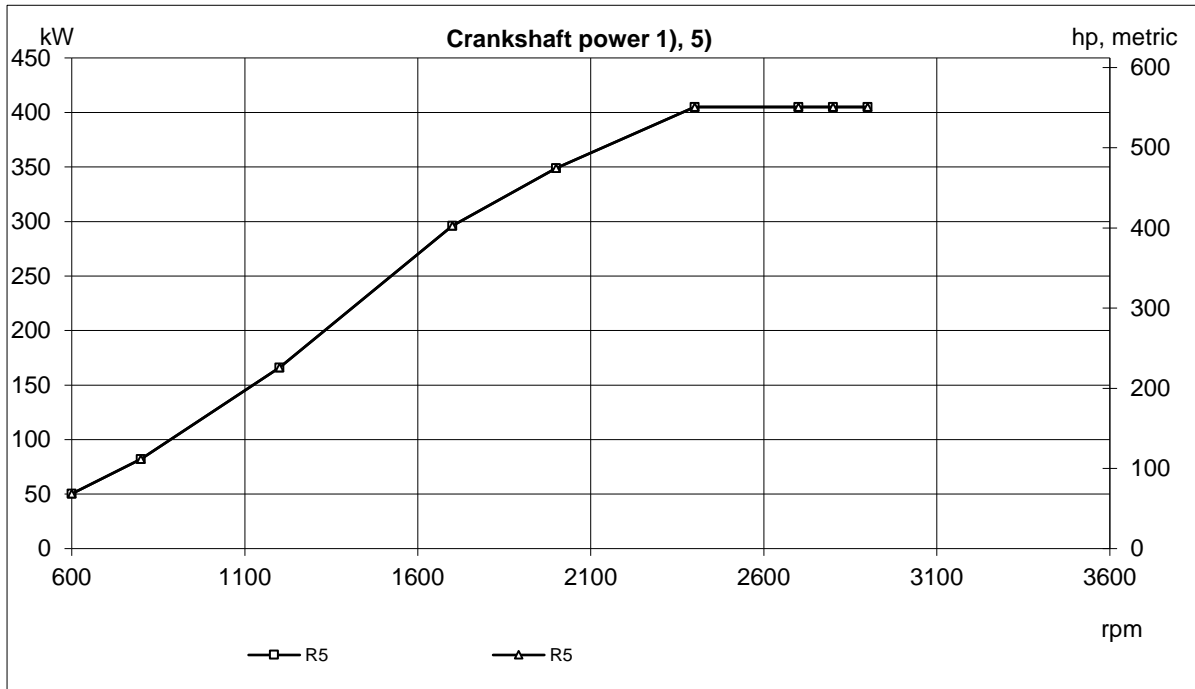
Speed range (top speed)	Load vektor	Maximum load
20-28 kn	F _x	19 kN
	F _y (+/-)	24 kN
	M _z (+/-)	9,5 kNm
28-42 kn	F _x	15 kN
	F _y (+/-)	48 kN
	M _z (+/-)	9,5 kNm

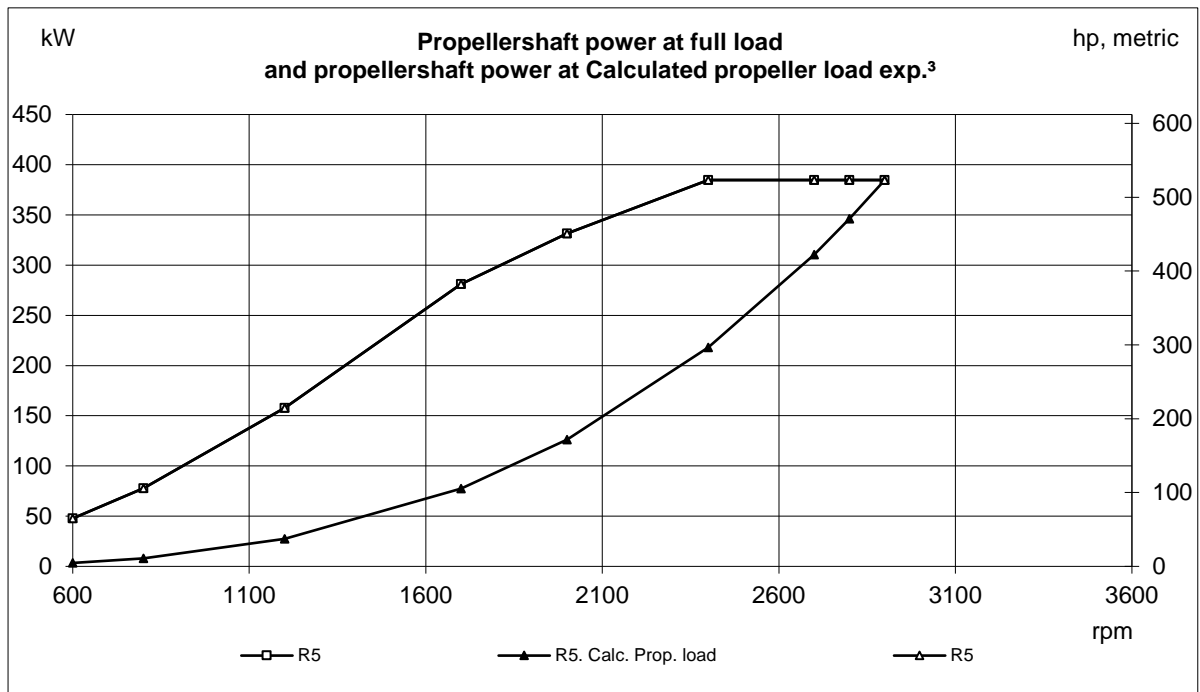
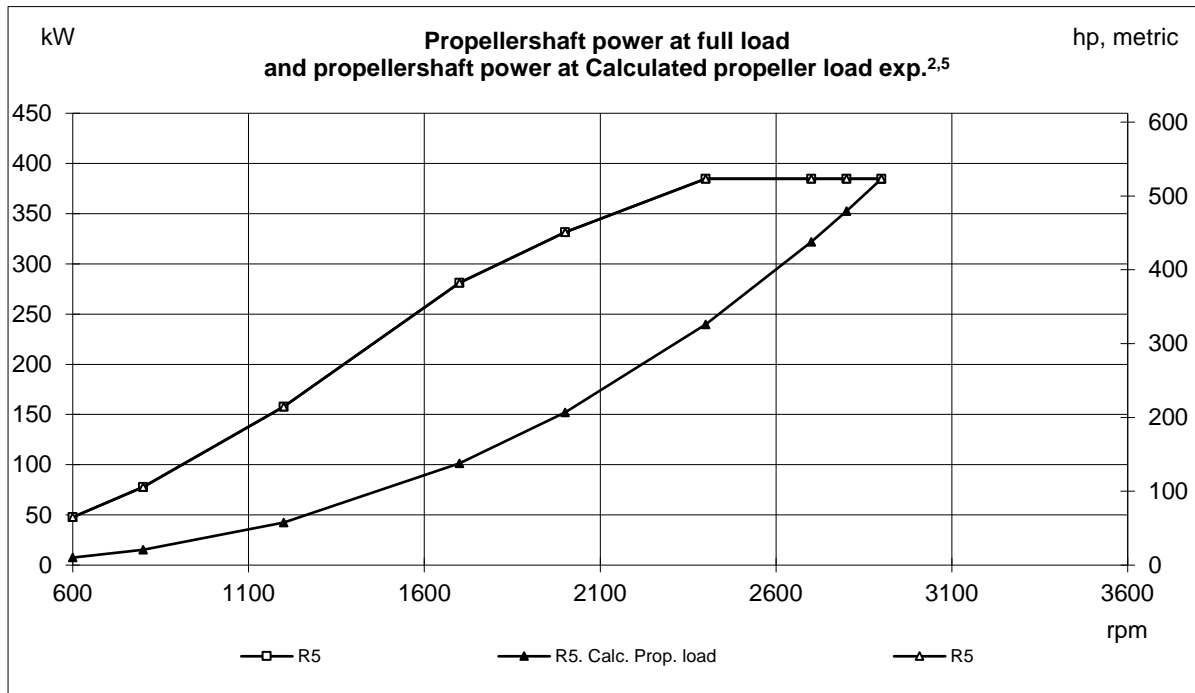
A	425 mm
B	320 mm

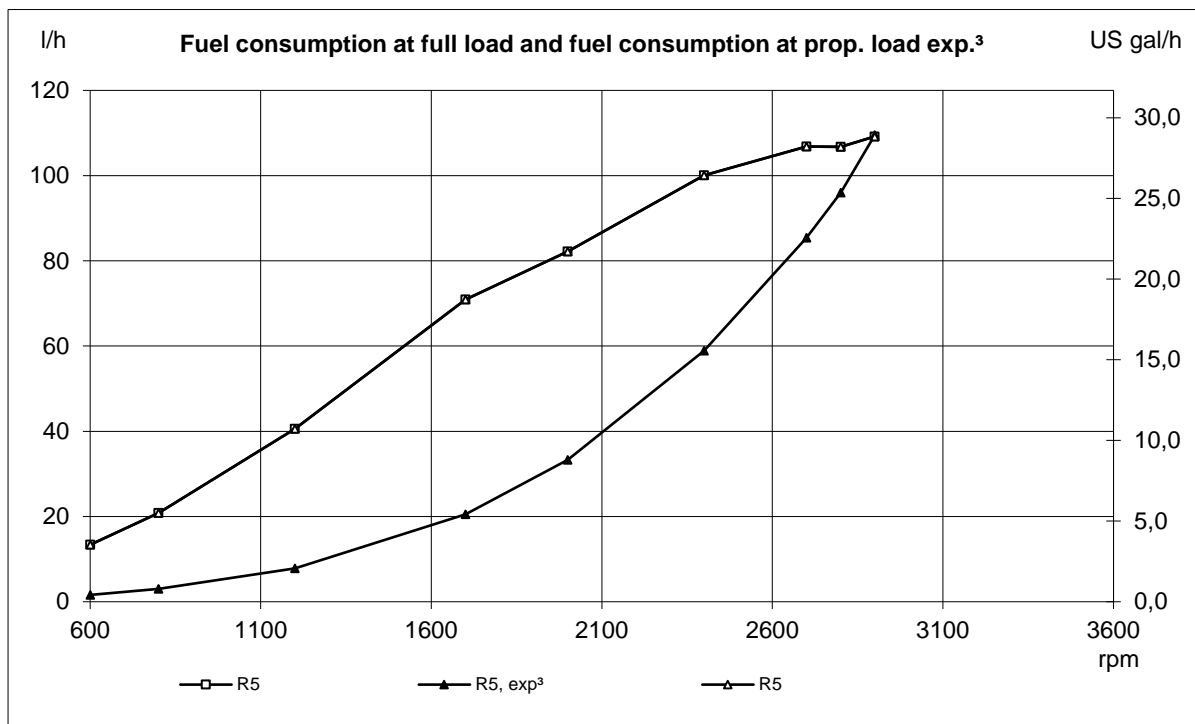
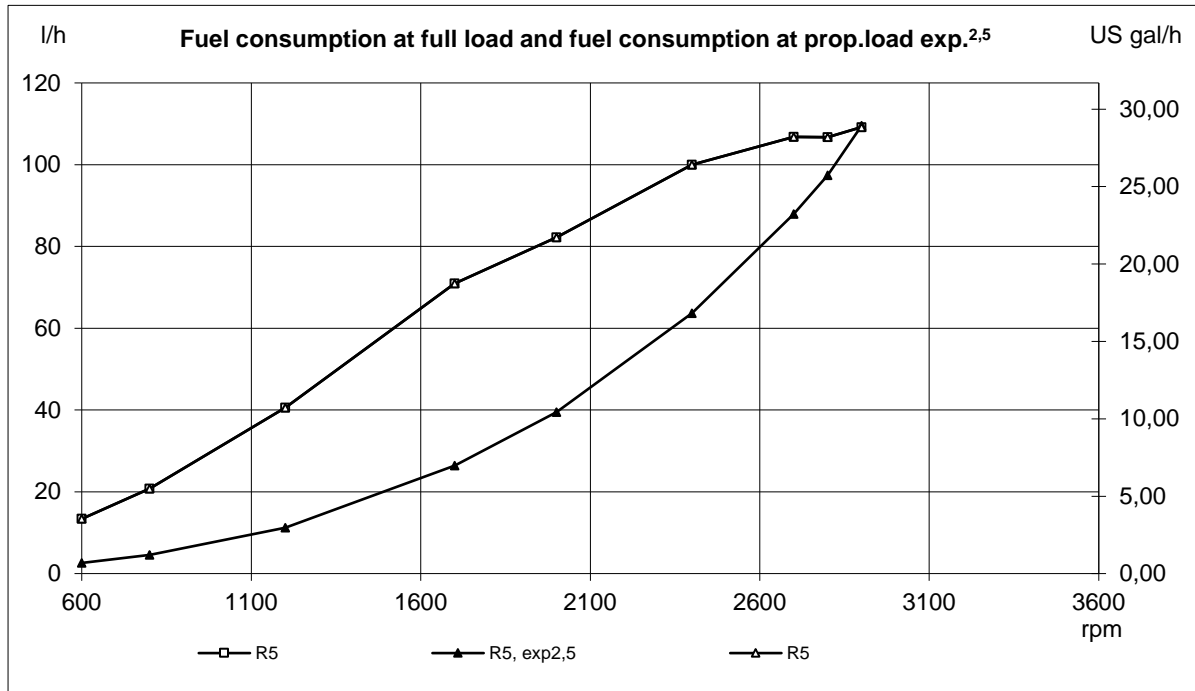


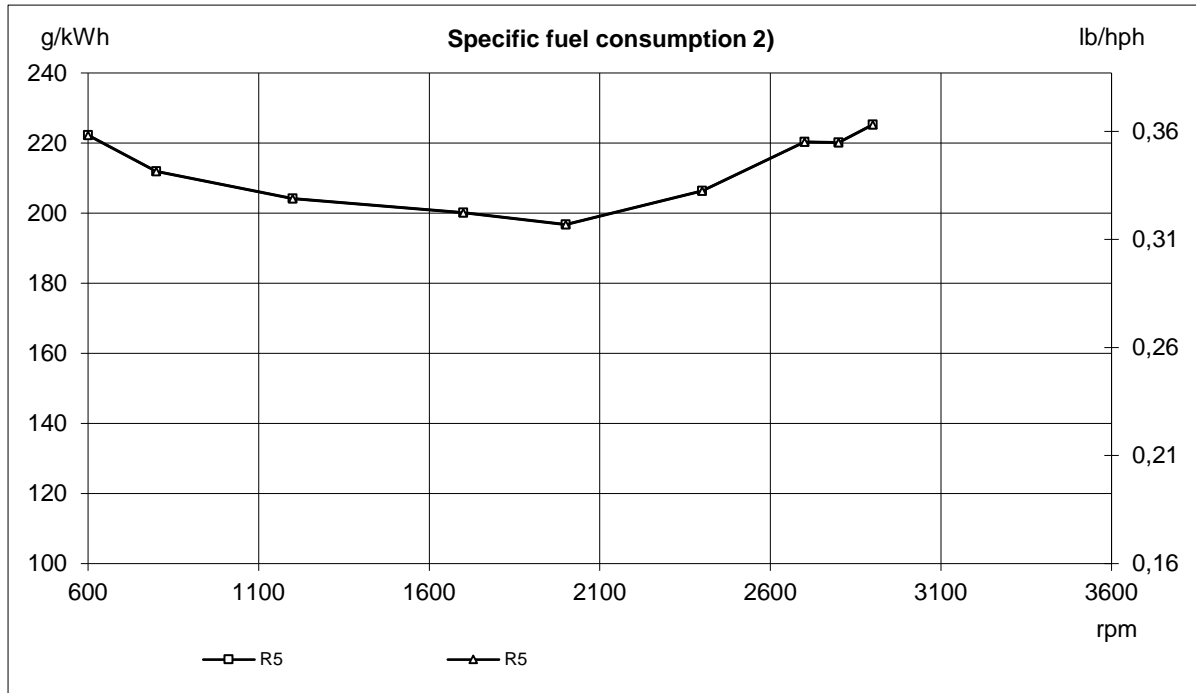
Important Note!

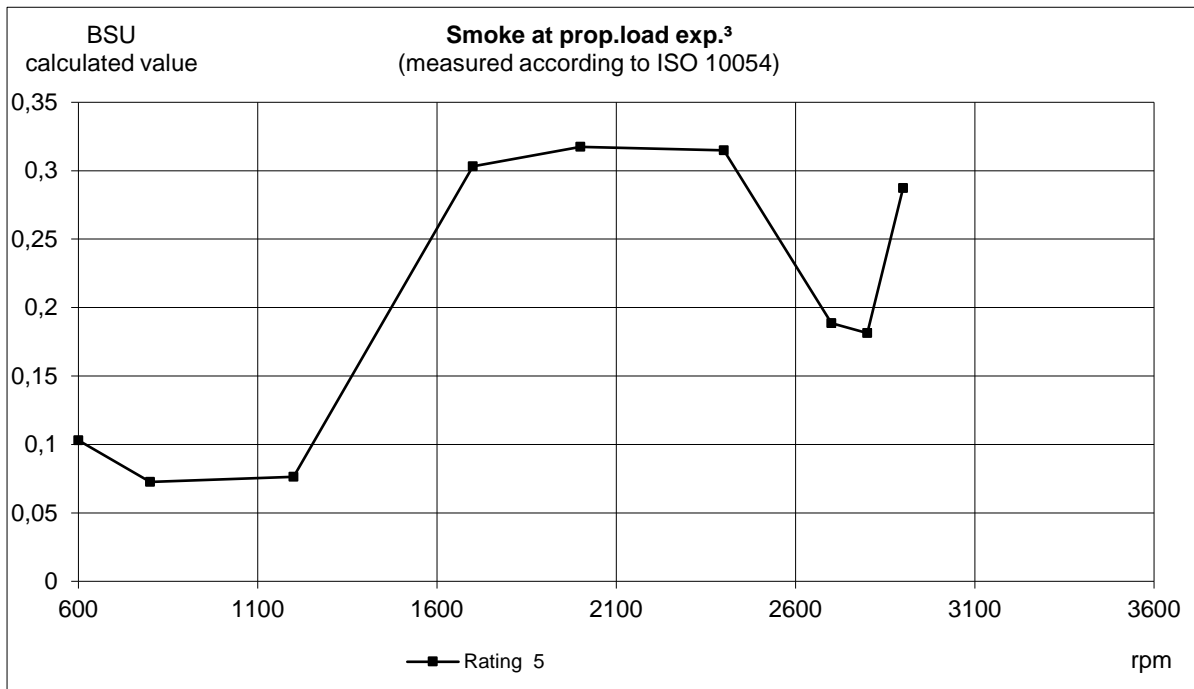
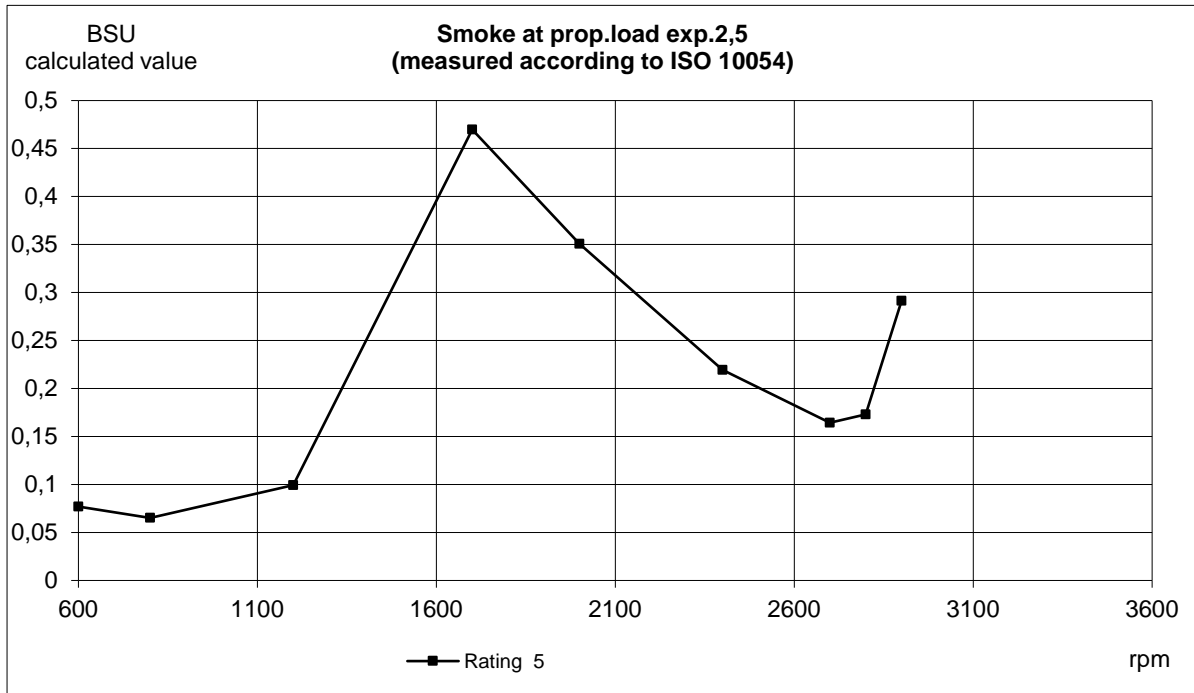
The above forces and torque are to be used as the base for maximum load in normal operations. Volvo Penta requires however that the detailed guidelines for the structure around the IPS unit are followed in order to ensure structural strength in case of grounding.

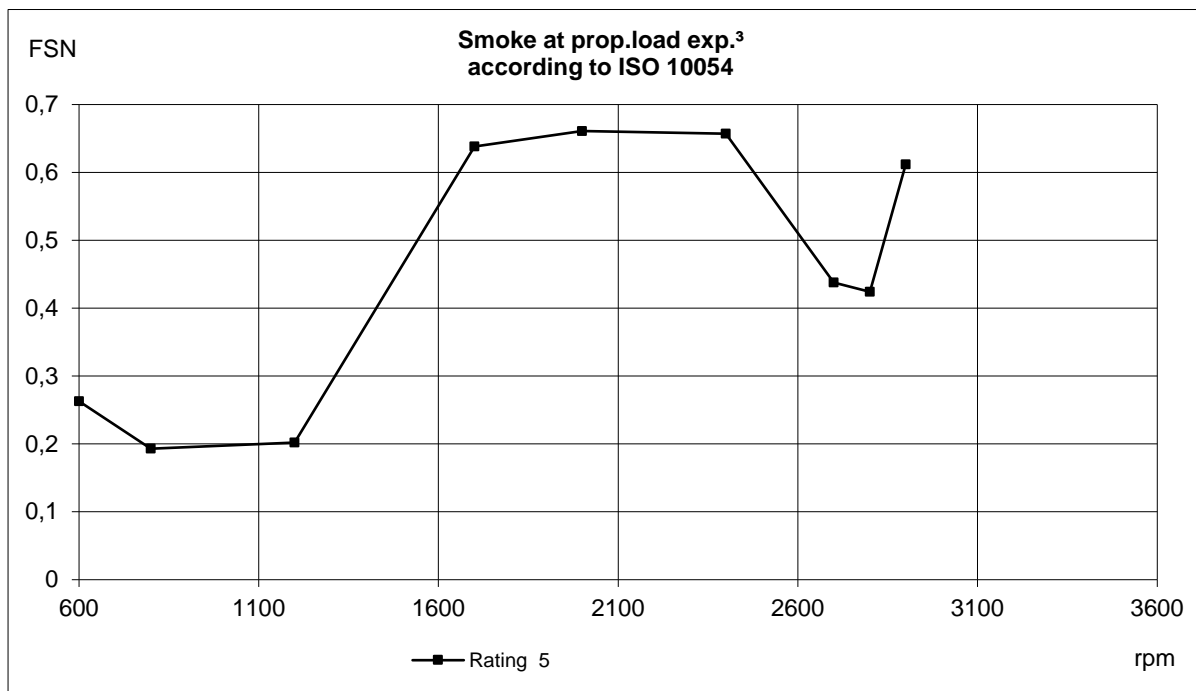
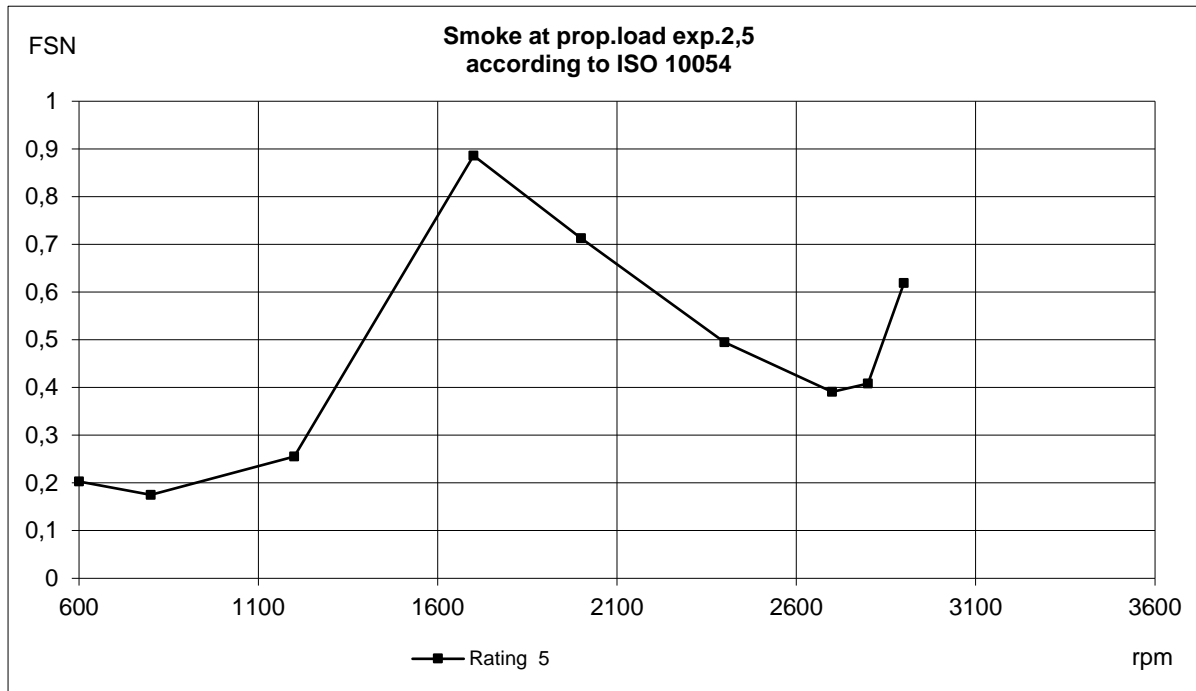


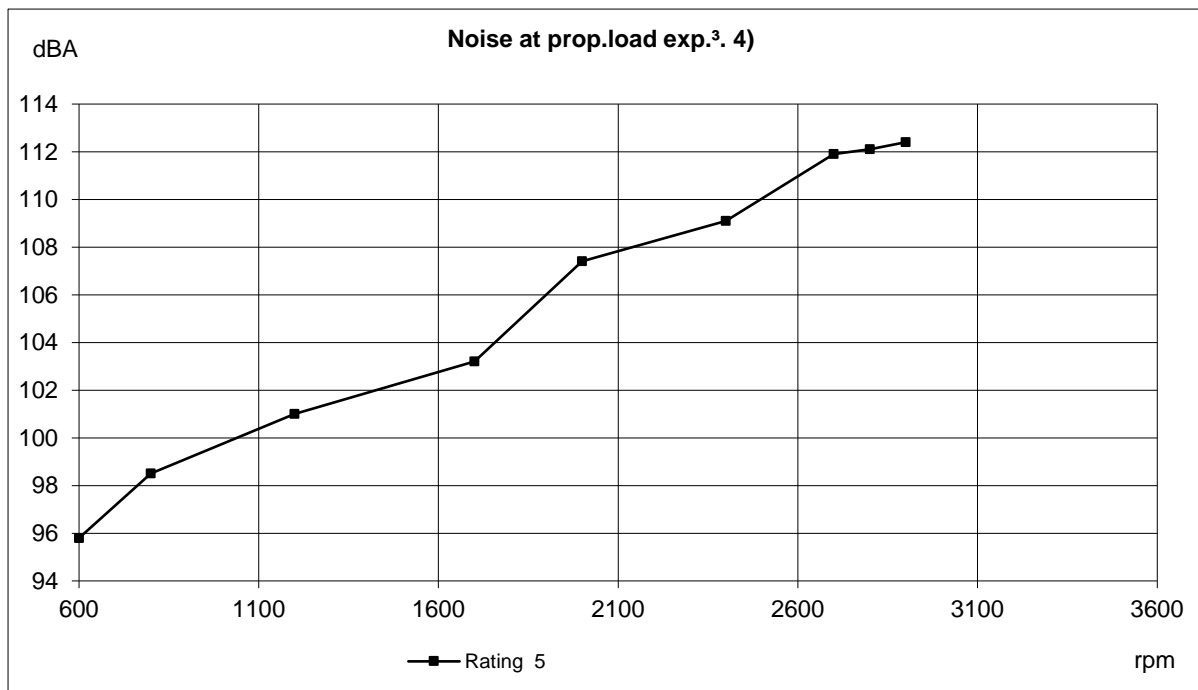
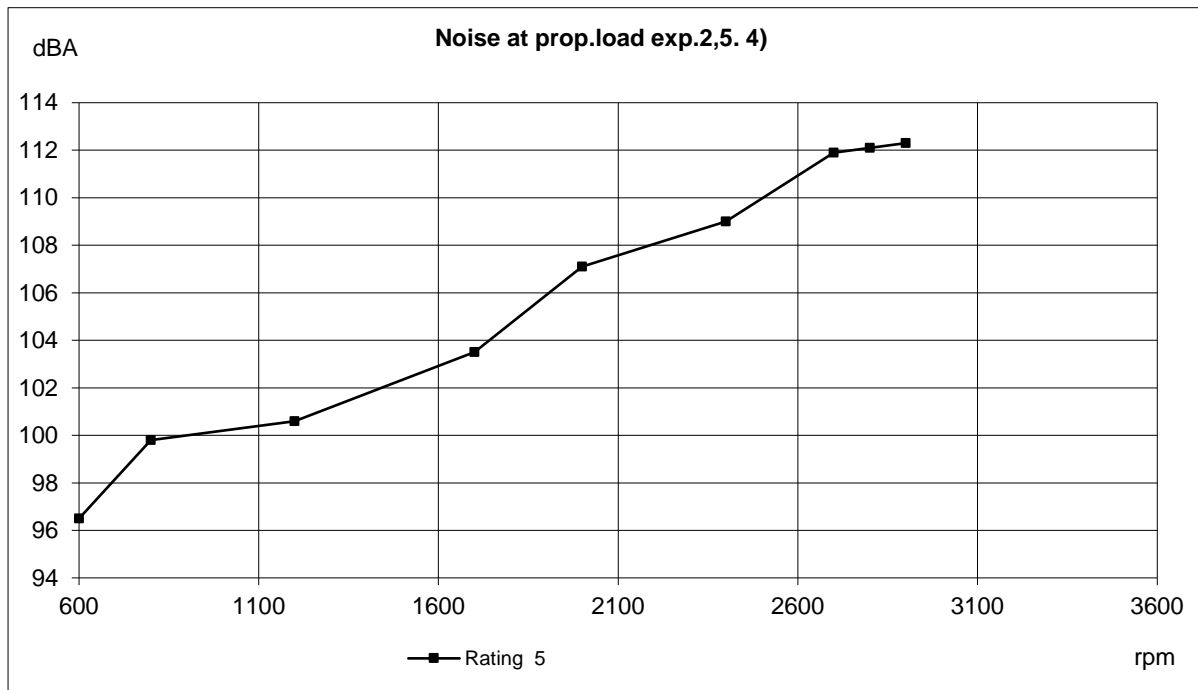








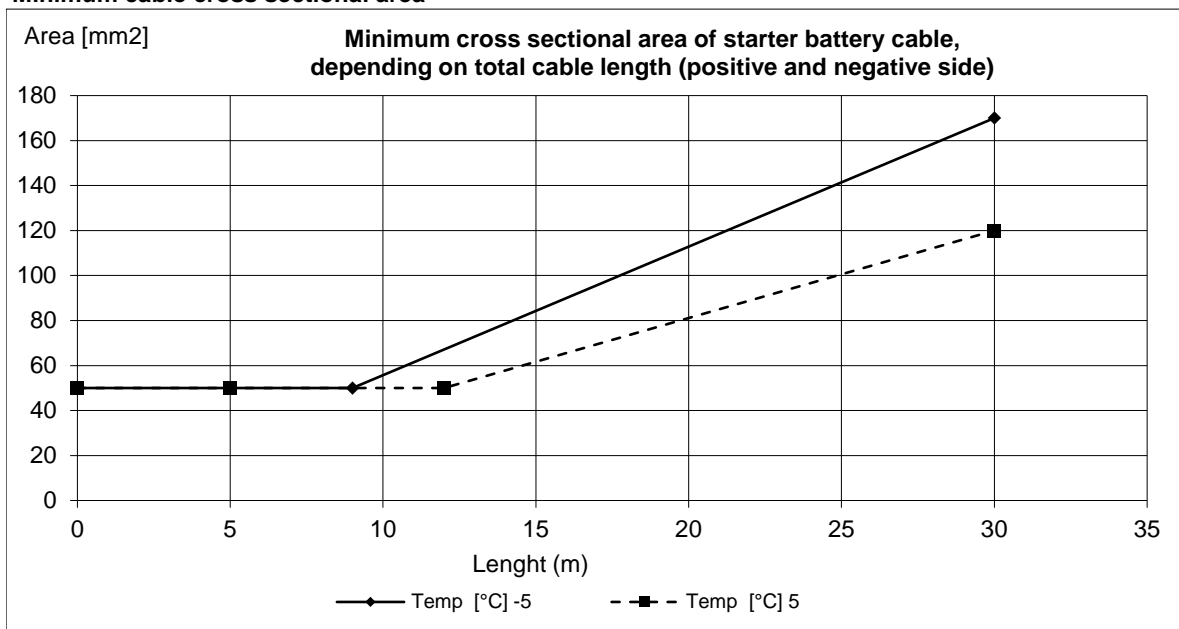




Battery capacity

Temp [°C]	Min battery size [Ah]	CCA EN (Cold cranking Amps) [A]	Max line resistance @ 20°C [mΩ]	Recommended max cable resistance @ 20°C [mΩ]	Min cross sectional area (due to heat increase) [mm ²]
5	90	670 EN	5	4	50
-5	100	720 EN	4	3	50

Minimum cable cross sectional area



Fuses size:

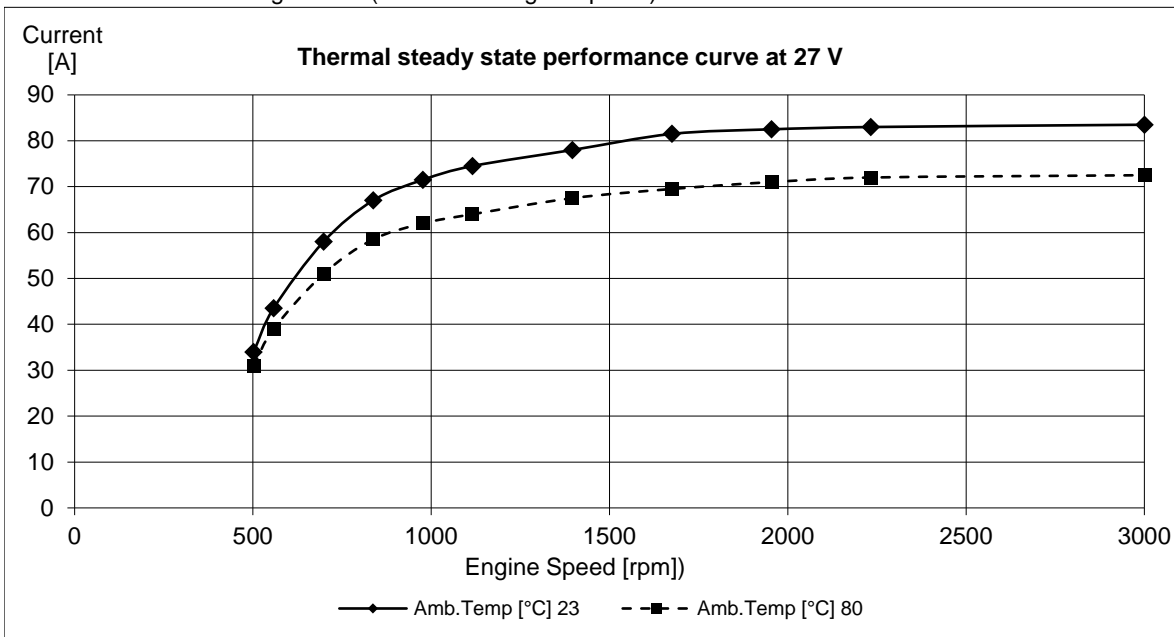
	[A]
Engine:	10
Control system:	10

Max current consumption during normal operation:

	[A]
Engine :	4,5

Alternator data:

Standard alternator charge curve (current vs. engine speed.)



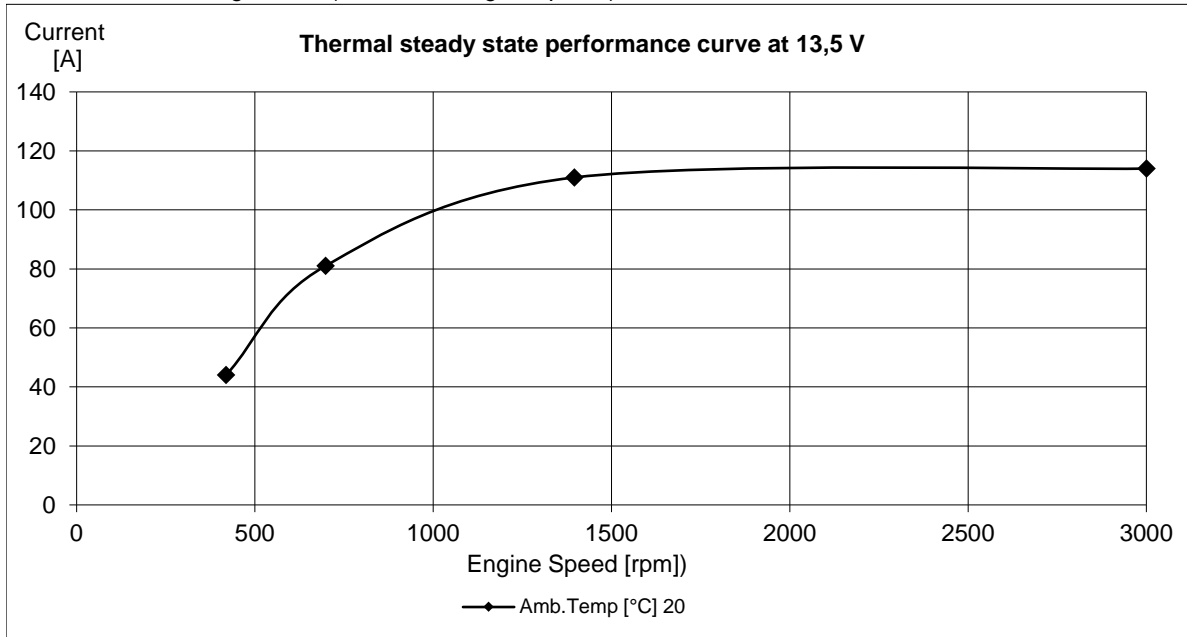
Constant charge voltage: [V]

28,3

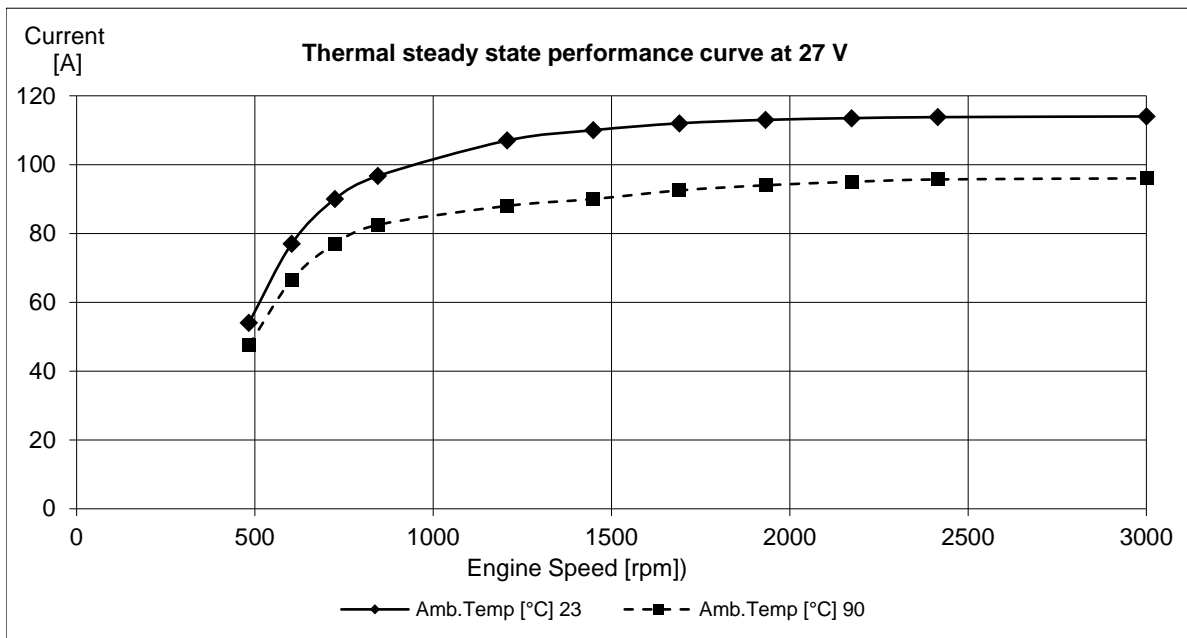
+/- 0,3

Alternator data:

Extra alternator charge curve (current vs. engine speed.)



Constant charge voltage: [V]	14,3	+/- 0,3
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Constant charge voltage: [V]	28,3	+/- 0,3
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