VOLVO PENTA D6-480 INB	Document No 23609281	Issue Index 03

General

4-stroke direct injected, turbocharged and aftercooled diesel engine

Engine Rating		5
Number of cylinders		6
No of valves		24
Displacement, total	litres in³	5.50 335.6
Firing order		1-5-3-6-2-4
Rotational direction, viewed from the front		Clockwise
Bore	mm in	103 4.06
Stroke	mm in	110 4.33
Compression ratio		18.0:1
Compression pressure at 240 rpm	MPa psi	
Max. static forward inclination:	°	5
Max. static backward inclination:	°	10
Max. intermittent forward inclination while running:	°	10
Max. intermittent backward inclination while running:	°	20
Max. intermittent side inclination while running:	°	22,5 or 30 for max 30 sec
Idling speed	rpm	600-650
Rated speed R5	rpm	3700
Governed speed R5	rpm	3830
Propeller selection range R5		3650-3830
Dry weight engine BT	kg lb	645 1422
Dry weight with reverse gear HS85A	kg lb	725 1598
Dry weight with reverse gear HS85IV	kg lb	755 1664
	kg lb	
	kg lb	

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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Performance	rpm	1000	1500	2000	2500	2800	3000	3200	3500	3700	3800
Crankshaft power 1), 5)	kW	78	148	230	288	323	346	351	353	353	353
	hp	106	201	313	392	439	471	477	480	480	480
Propeller shaft power 1) (At full load)	kW	75	142	221	276	310	332	337	339	339	339
	hp	102	193	300	376	422	452	458	461	461	461
Propellershaft power at prop. load $x^{2,5}$	kW	13	35	73	127	169	201	236	295	339	339
	hp	18	48	99	173	230	273	321	401	461	461
Propellershaft power at prop. load x^3	kW	7	23	54	105	147	181	219	287	339	339
	hp	9	31	73	142	200	246	298	390	461	461
Torque at crankshaft 2)	Nm	744.8	942.2	1098	1100	1102	1101	1047	963.1	911.1	887.1
	lbf ft	549	695	810	811	812	812	773	710	672	654
Mean piston speed	m/s	3.7	5.5	7.3	9.2	10.3	11.0	11.7	12.8	13.6	13.9
	ft/s	12.0	18.0	24.1	30.1	33.7	36.1	38.5	42.1	44.5	45.7
Effective mean pressure 2)	MPa	1.70	2.15	2.51	2.51	2.52	2.52	2.39	2.20	2.08	2.03
	psi	246.9	312.3	364.0	364.6	365.1	365.0	347.1	319.2	301.9	294.0
Max combustion pressure 2)	MPa	16.7	18.6	19.7	19.9	19.5	19.6	19.2	18.8	18.8	18.8
	psi	2421	2696	2851	2880	2830	2836	2791	2733	2729	2729

Lubricating system

Specific lubricating oil consumption.	g/kWh	< 0.2
Max. oil volume including filters for all allowed installation inclinations:	litres	20
	US gal	5.28
Max. oil volume excluding filters for all allowed installation inclinations:	litres	18.5
	US gal	4.89
Min. oil volume excluding filters for all allowed installation inclinations:	litres	15
	US gal	3.96

Fuel system	rpm	1000	1500	2000	2500	2800	3000	3200	3500	3700	3800
Specific fuel consumption 2)	g/kWh	222	214	213	208	203	206	207	216	223	227
	lb/hph	0.36	0.347	0.345	0.337	0.329	0.334	0.335	0.35	0.361	0.368
Fuel consumption, Test cycle E5 EU	g/kWh	219									
	lb/hph	0.35									
Fuel consumption at prop. load $x^{2,5}$	l/h	4.0	9.5	19.1	32.8	43.4	53.3	61.7	79.4	94.2	95.9
	US gal/h	1.1	2.5	5.1	8.7	11.5	14.1	16.3	21.0	24.9	25.3

Fuel system	rpm	1000	1500	2000	2500	2800	3000	3200	3500	3700	3800
Fuel consumption at prop. load x^3	l/h	2.6	6.7	14.5	27.6	38.6	48.2	57.7	77.6	94.2	95.9
	US gal/h	0.7	1.8	3.8	7.3	10.2	12.7	15.2	20.5	24.9	25.3
Fuel consumption at full load	l/h	20.7	37.9	58.6	71.7	78.5	85.3	87.0	91.2	94.2	95.9
	US gal/h	5.5	10.0	15.5	18.9	20.7	22.5	23.0	24.1	24.9	25.3

Full load performance at rated speed

Fuel inlet temperature	°C	40
	°F	104
Fuel return temperature from engine	°C	64
	°F	147.2
Fuel consumption	l/h	94.2
	US gal/h	24.89
Fuel inlet flow to engine	l/h	133
	US gal/h	35.13
Fuel return flow from engine	l/h	39
	US gal/h	10.30

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Intake and exhaust system	rpm	1000	1500	2000	2500	2800	3000	3200	3500	3700	3800
Specific exhaust heating effect in percent of crankshaft power	%	22	29	42	50	56	58	58	63	66	69
Exhaust temperature at the exhaust pipe connecting flange after the turbo charger.	°C	334	395	441	421	405	401	389	389	394	401
	°F	633	743	826	790	761	754	732	732	741	754
Permitted exhaust back pressure after turbocharger at rated speed. (Installed back pressure)	kPa							Max		30	
	psi									4.4	
	kPa							Min		15	
	psi									2.2	

Intake and exhaust system	rpm	1000	1500	2000	2500	2800	3000	3200	3500	3700	3800
Engine air consumption at 25°C / 77°F atmospheric pressure 100kPA	m³/min	5.2	9.6	13.8	17.7	20.4	22.9	24.2	26.4	27.6	28.1
	cu.ft./min	183.6	339	487.3	625.1	720.4	808.7	854.6	932.3	974.7	992.3
Charge air pressure Inlet manifold	kPa	112	158	189	200	210	227	227	229	232	232
	psi	16.2	22.9	27.4	29.0	30.5	32.9	32.9	33.2	33.6	33.6
Exhaust gas flow	m³/min	11.1	22.2	33.3	40	43.7	47.1	48.2	50.9	52.6	53.7
	cu.ft./min	392	784	1176	1413	1543	1663	1702	1798	1858	1896

Cooling system	rpm	1000	1500	2000	2500	2800	3000	3200	3500	3700	3800
Radiated heat of crankshaft power at full load.	kW	3.765	6.708	8.658	8.5	9.5	10.3	10.6	10.6	10.6	10.6
Heat rejection to charge air cooler of crankshaft power at full load.	kW	12.67	27.41	43.09	50.8	67.8	81.3	88.7	100.3	108.2	112.8
Coolant heat rejection to HE, incl. engine oil cooler and excl. charge air cooler, of crankshaft power at full load.	kW	61	103	153	196	213	223	233	231	250	254
Coolant flow with fully open thermostat and std cooling system	l/min	96	144	192	240	269	289	308	334	349	358
	cu.ft./min	3.4	5.1	6.8	8.5	9.5	10.2	10.9	11.8	12.3	12.6
Extra water pump flow through charge air cooler	l/min										
	cu.ft./min										
Max. pump pressure at extra pump pressure side (pressure set system)	kPa										
	psi										
Max. permissible temperature on coolant in engine outlet	°C	55									
	°F	131									
Coolant volume engine, including heat exchanger and charge air cooler	litres	16									
	US gal.	4.23									
Max. additional coolant for cabin heater etc. with std. Expansion tank	litres	5									
	US gal.	1.32									
Maximum coolant flow to cabin heater etc.	l/min	30									
	cu.ft./min	1.06									
Thermostat, start open at	°C	78									
	°F	172									
Thermostat, fully open at	°C	90									
	°F	194									

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Raw water circuit	**rpm**	**1000**	**1500**	**2000**	**2500**	**2800**	**3000**	**3200**	**3500**	**3700**	**3800**
Nominal raw water design flow	l/min	77	111	144	174	189	198	207	218	222	225
	cu.ft/min	2.7	3.9	5.1	6.1	6.7	7.0	7.3	7.7	7.8	7.9
Nominal raw water pump pressure head at design flow.	kPa	26	46	79	119	138	149	161	177	189	195
	psi	3.8	6.7	11.5	17.3	20.0	21.6	23.4	25.7	27.4	28.3
Maximum raw water pump suction head	kPa	-30									
	psi	-4.4									
Maximum additional pressure drop excl. reverse gear oil cooler	kPa										
	psi										
Pressure drop over reverse gear oil cooler (optional equipment)	kPa										
	psi										
Maximum raw water temperature entering heat exchanger	°C	32									
	°F	90									

1 circuit keel cooling system	**rpm**	**1000**	**1500**	**2000**	**2500**	**2800**	**3000**	**3200**	**3500**	**3700**	**3800**
Design point for keel cooler, engine outlet temperature	°C										
	°F										
Maximum temperature to engine from external cooling system circuit	°C										
	°F										
Maximum temperature to engine inlet from external cooling system circuit	°C										
	°F										
Coolant flow through keel cooler at design point	l/min										
	cu.ft./min										
Maximum coolant flow through keel cooler	l/min										
	cu.ft./min										
Pressure drop in external circuit, including piping	kPa										
	psi										
Coolant volume engine	litres										
	US gal.										

1 1/2 circuit keel cooling system (Two circuit	**rpm**	**1000**	**1500**	**2000**	**2500**	**2800**	**3000**	**3200**	**3500**	**3700**	**3800**
Design point for keel cooler, engine outlet temperature	°C										
	°F										
Maximum temperature to charge air cooler from external cooling system circuit	°C										
	°F										
Coolant flow through keel cooler at design point	l/min										
	cu.ft./min										
Maximum coolant flow through keel cooler	l/min										
	cu.ft./min										
Pressure drop in external circuit, including piping	kPa										
	psi										
Coolant volume engine	litres										
	US gal.										

2 circuit keel cooling system, LT	**rpm**	**1000**	**1500**	**2000**	**2500**	**2800**	**3000**	**3200**	**3500**	**3700**	**3800**
Maximum temperature to charge air cooler from external LT-cooling system	°C										27
	°F										81
Coolant flow through keel cooler, LT-cooling system circuit	l/min										225
	cu.ft./min										7.9
Pressure drop in external LT-cooling system circuit, including piping	kPa	50									
	psi	7.3									
Coolant volume charge air cooler	litres	2									
	US gal.	0.53									

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2 circuit keel cooling system, HT	rpm	1000	1500	2000	2500	2800	3000	3200	3500	3700	3800
Design point for keel cooler, engine outlet temperature	°C										83
	°F										181
Maximum temperature to engine from external HT-cooling system circuit	°C										58
	°F										136
Coolant flow through keel cooler, HT-cooling system circuit at design point	l/min										160
	cu.ft./min										5.7
Maximun coolant flow through keel cooler, HT-cooling system circuit	l/min										358
	cu.ft./min										12.6
Pressure drop in external HT-cooling system circuit, including piping	kPa	70									
	psi	10.2									
Coolant volume engine	litres	16									
	US gal.	4.23									

Emissions	rpm	1000	1500	2000	2500	2800	3000	3200	3500	3700	3800
Smoke at prop. load $x^{2,5}$	*BSU	0.1	0.2	0.2	0.3	0.2	0.2	0.2	0.4	0.7	0.7
Smoke at prop. load x^3	*BSU	0.1	0.1	0.2	0.3	0.2	0.2	0.3	0.4	0.7	0.7
Noise at prop. load $x^{2,5}$. 4)	dBA	99.5	102.9	105.8	109.1	110.3	111.8	112.3	114.7	116.2	115.2
Noise at prop. load x^3. 4)	dBA	98.5	102.8	104.7	108.2	109.5	111.2	112.3	114.7	116.2	115.2

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

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Sensors : Control and Monitoring System							
Sensors	**Signal**	**Range**	**Unit**	**Warning Initial Delay / Warning Delay**	**Warning Level**	**Derating Level**	**Engine protection action**
Coolant level switch	Digital	ON/OFF		30 sec from start / 5 sec	Low (ON / Closed)	NA	Warning only
Coolant temperature	50-0 kΩ	-40 - 140	°C	30 sec from start / 5 sec	96	99	See derating map
Fuel temperature	50-0 kΩ	-40 - 140	°C		60	NA	Warning only
Engine speed cam	Frequency		rpm	Instant	Lost signal	NA	Warning only
Engine speed crank	Frequency		rpm	Instant	Lost signal	NA	Warning only
Oil level sensor	Digital	ON/OFF		30 sec from start / 5 sec	Low level	NA	Warning only
Oil temperature	PT1000	-40 - 150	°C	30 sec from start / 5 sec	132	135	See derating map
Water In fuel switch	Digital	ON/OFF		All the time	Water in fuel	NA	Warning only
Wet Exhaust temp	PT200	0 - 850	°C	30 sec from start / 5 sec	90	95	See derating map

Sensors (rpm dependent)	**Signal**	**Range**	**Unit**	**Initial Delay / Delay**	**Warning Level / Derating Level / Shutdown Level rpm Map**					**Comment**
Charge air temperature	50-0 kΩ	-40 - 130	°C		**0 rpm**	**1200 rpm**	**2000 rpm**	**2500 rpm**	**3600 rpm**	
Warning Level			°C	30 sec from start / 5 sec	100	100	70	70	70	
Derating Level			°C							**See derating map**
Fuel pressure	0,5-4,5 V	0-200	kPa		**0 rpm**	**600 rpm**	**1600 rpm**	**2600 rpm**	**3600 rpm**	
Warning Level			kPa	30 sec from start / 5 sec	50	50	50	50	50	
Derating Level			kPa	NA	NA	NA	NA	NA	NA	
Oil pressure	0,5-4,5 V	0-700	kPa		**0 rpm**	**600 rpm**	**1200 rpm**	**2000 rpm**	**3600 rpm**	
Warning Level			kPa	30 sec from start / 5 sec	-50	75	150	200	230	
Derating Level (30% remain trq.)			kPa	10% trq. decr. per sec	-50	70	120	170	200	

Warning = Yellow Lamp active

Derating = Red Lamp active

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Derating map

Charge Air Temp [°C]	rpm	75°C	80°C	85°C
Remaining torque in %	600	100%	100%	100%
	1600	100%	100%	100%
	2200	100%	75%	50%

Coolant temp [°C]	rpm	99°C	104°C	108°C
Remaining torque in %	600	100%	100%	100%
	1600	100%	85%	75%
	2200	100%	75%	50%

Oil temp [°C]	rpm	135°C	137.5°C	140°C
Remaining torque in %	600	100%	100%	100%
	1600	100%	85%	75%
	2200	100%	75%	50%

Oil pressure [kPa]	rpm	
Remaining torque in %	600	85%
	1600	70%
	2200	50%

Wet exhaust temp [°C]	rpm	95°C	105°C	115°C	125°C
Remaining torque in %	600	100%	100%	100%	100%
	1600	100%	85%	80%	75%
	2200	100%	75%	65%	50%

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Transmission: Control and Monitoring System: DPI Drive							Engine protection action
Sensors	**Signal**	**Range**	**Unit**	**Warning Initial Delay / Warning Delay**	**Warning Level**	**Derating Level**	
Gear oil temperature (EVC)	50-0 kΩ	-30 - 130±4%	°C	N/A	95		Warning only
Gear oil pressure (EVC)	Frequency	0-3000±3%	kPa	60 sec from start / 7 sec	700		Warning only

Transmission: Control and Monitoring System: Reverse Gear							Engine protection action
Sensors	**Signal**	**Range**	**Unit**	**Warning Initial Delay / Warning Delay**	**Warning Level**	**Derating Level**	
Gear oil temperature (EVC)	50-0 kΩ	-30 - 130±4%	°C	N/A	95		Warning only

Transmission: Control and Monitoring System: IPS Drive							Engine protection action
Sensors	**Signal**	**Range**	**Unit**	**Warning Initial Delay / Warning Delay**	**Warning Level**	**Derating Level**	
Gear oil temperature (EVC)	50-0 kΩ	-30 - 130±4%	°C	N/A	95		Warning only
Gear oil pressure (EVC)	Frequency	0-3000±3%	kPa	60 sec from start / 7 sec	700		Warning only

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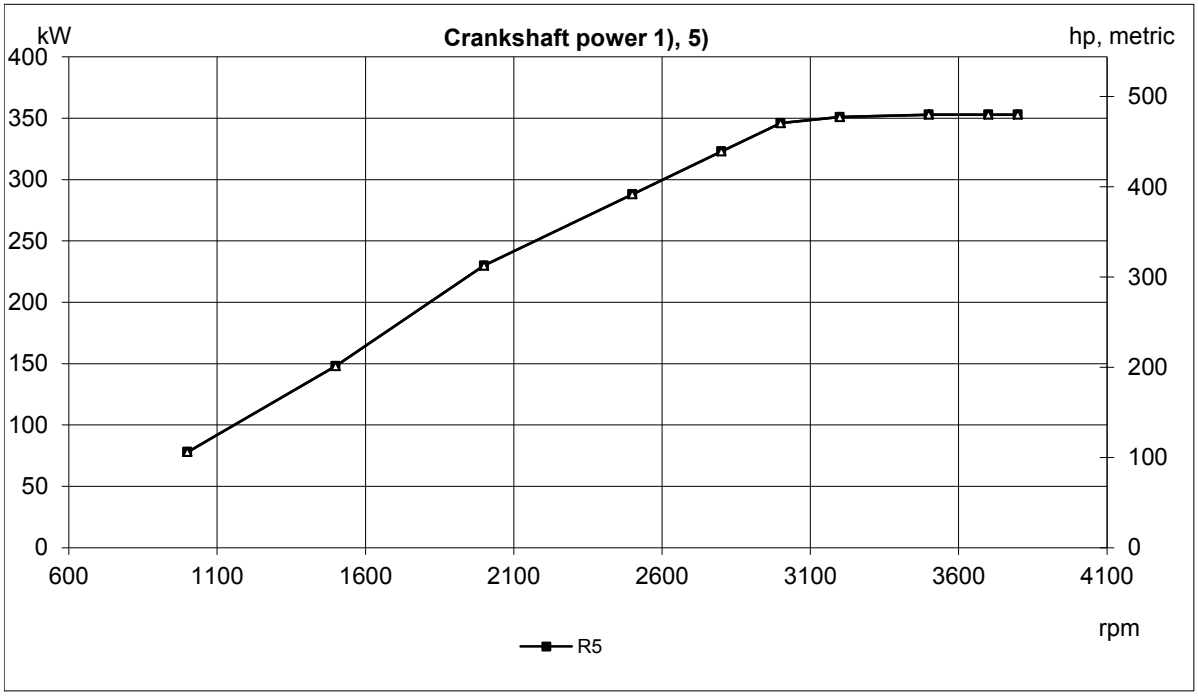

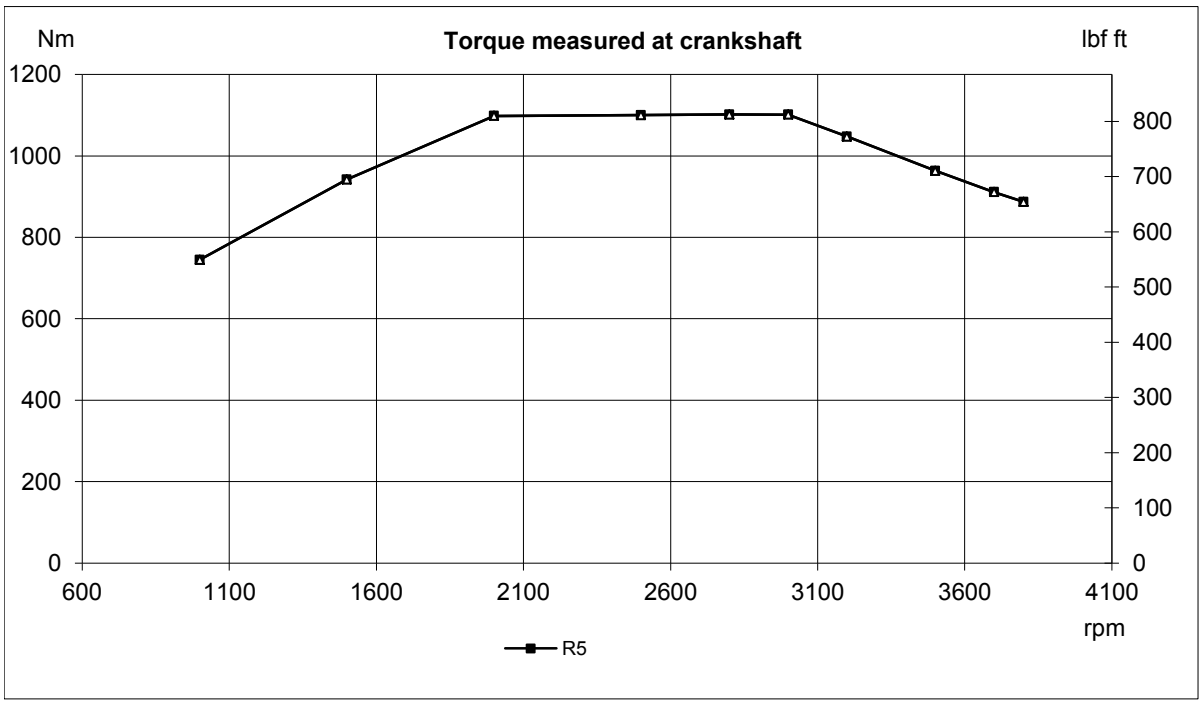

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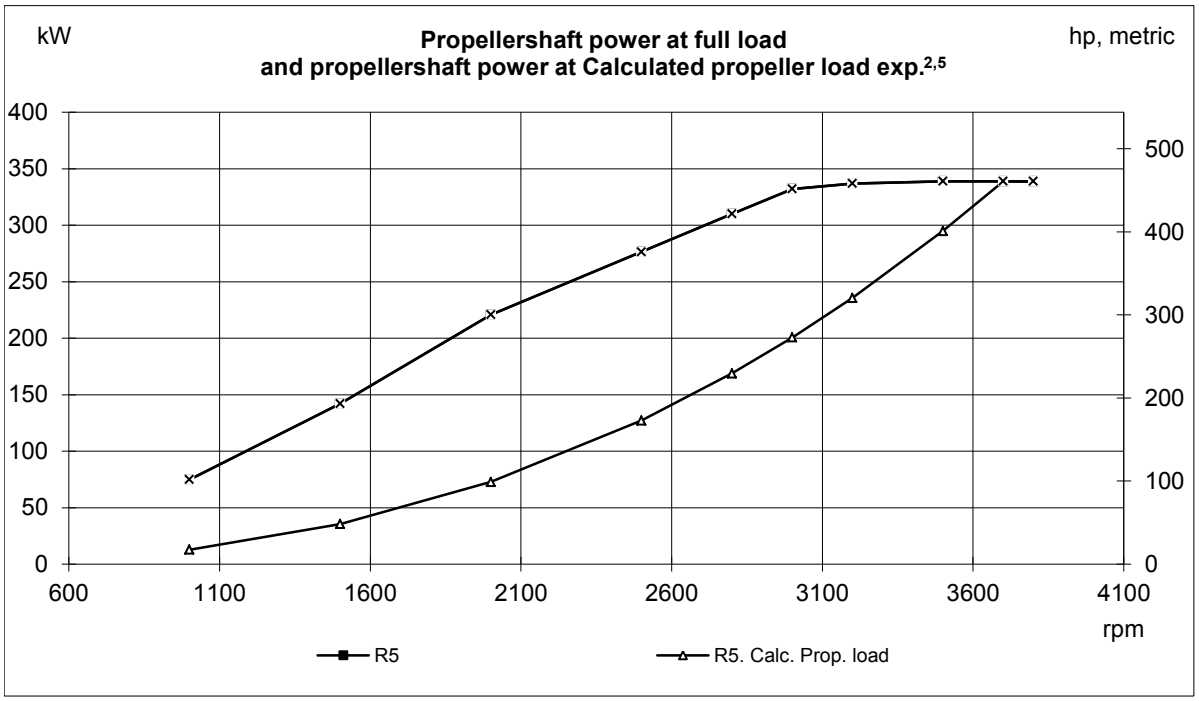

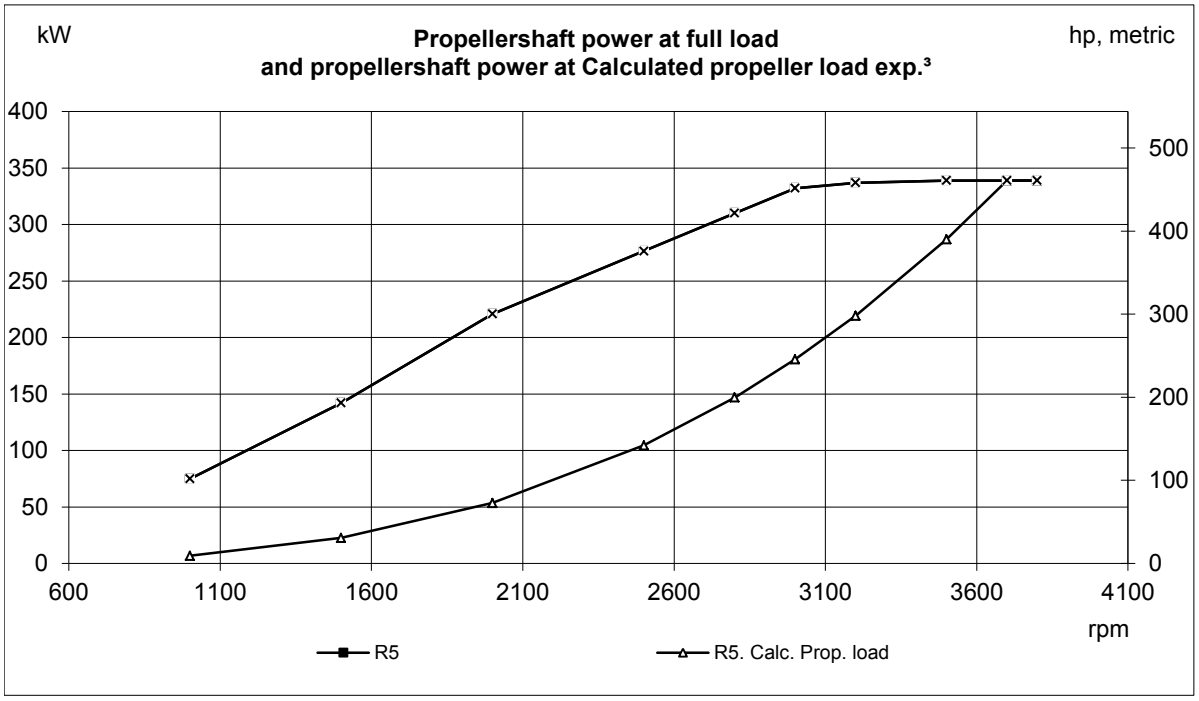

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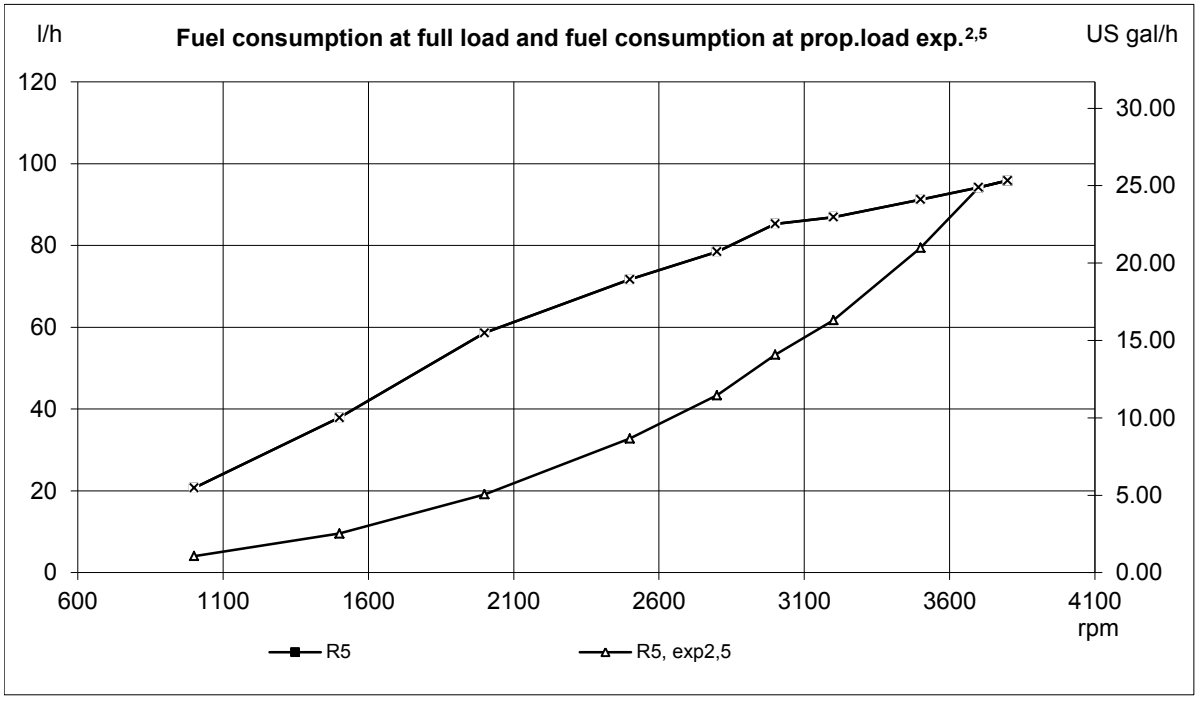

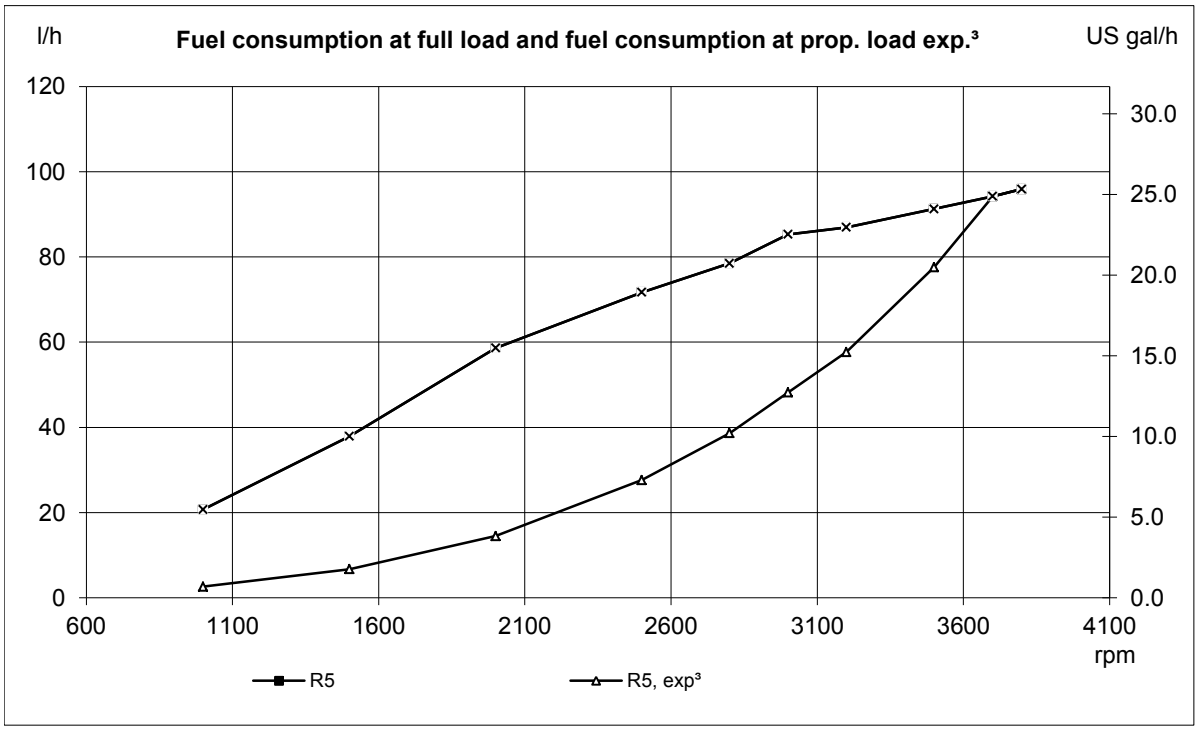

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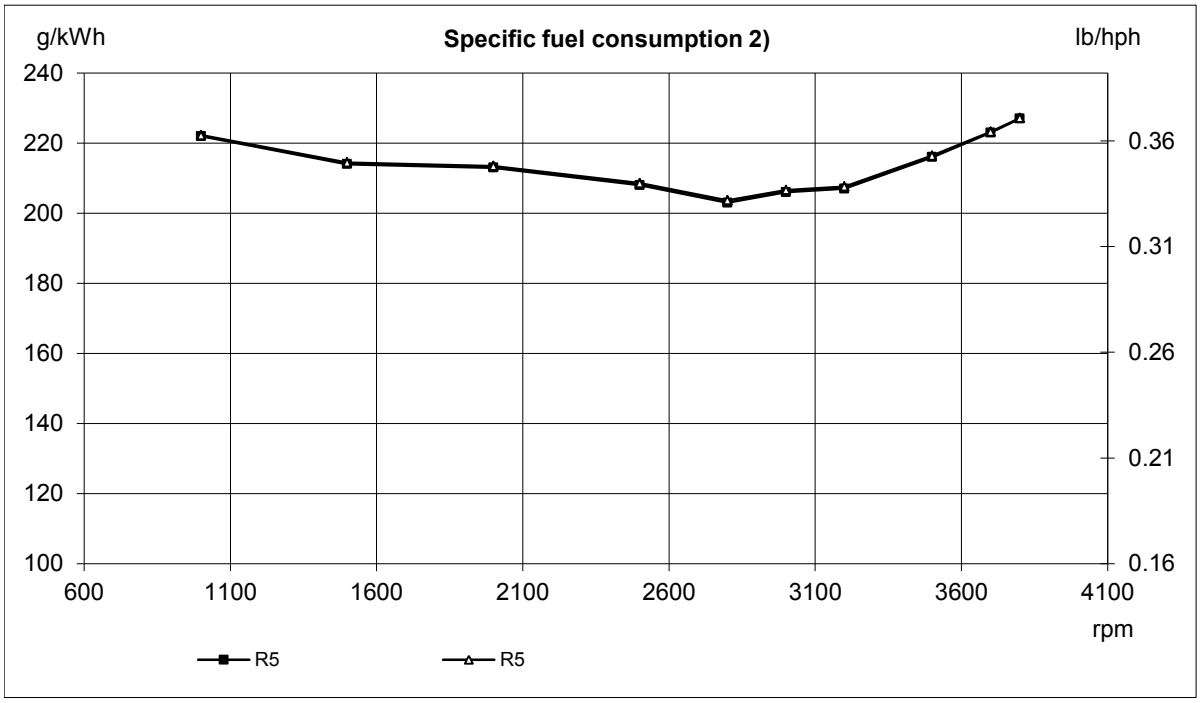

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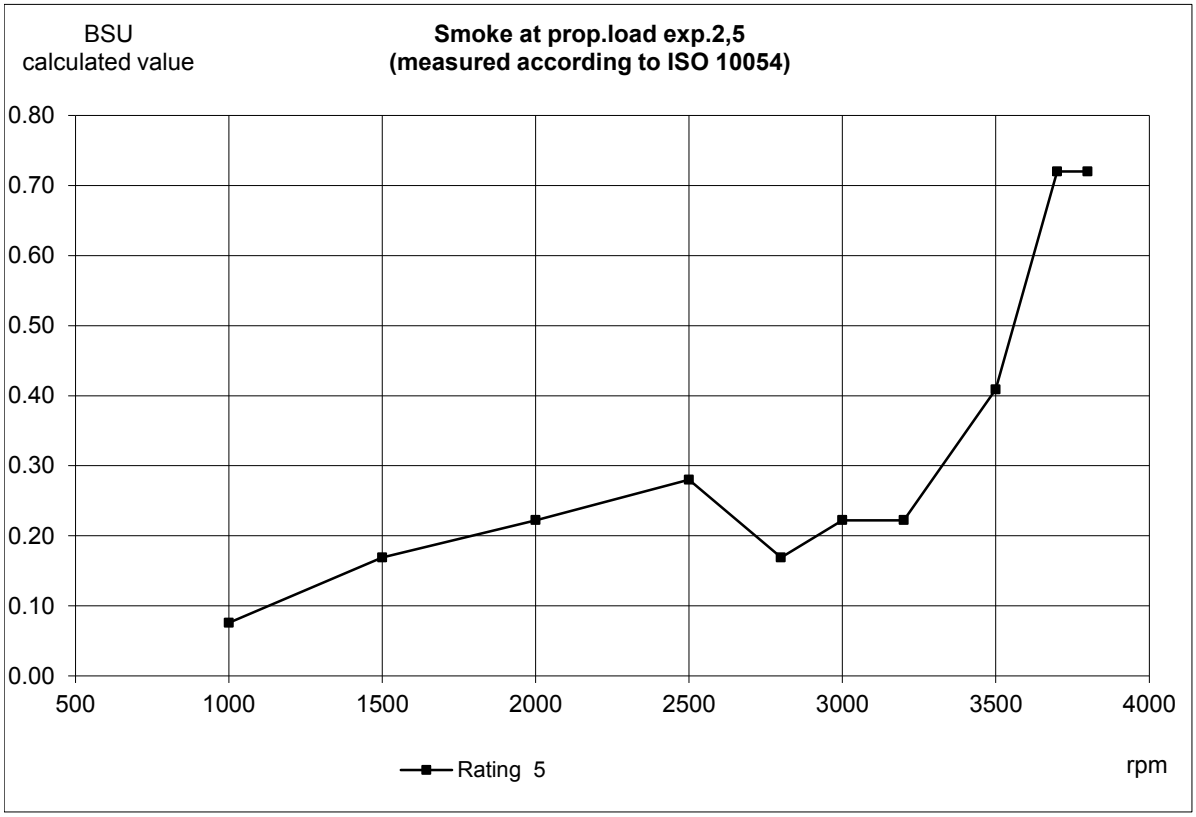

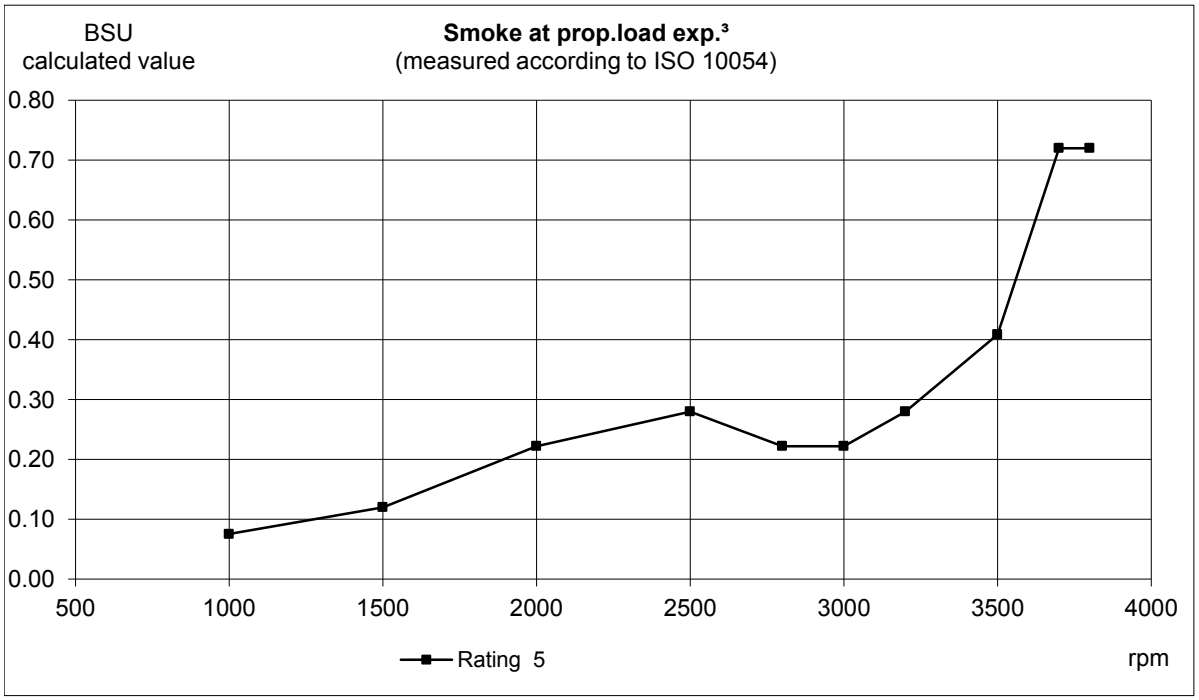

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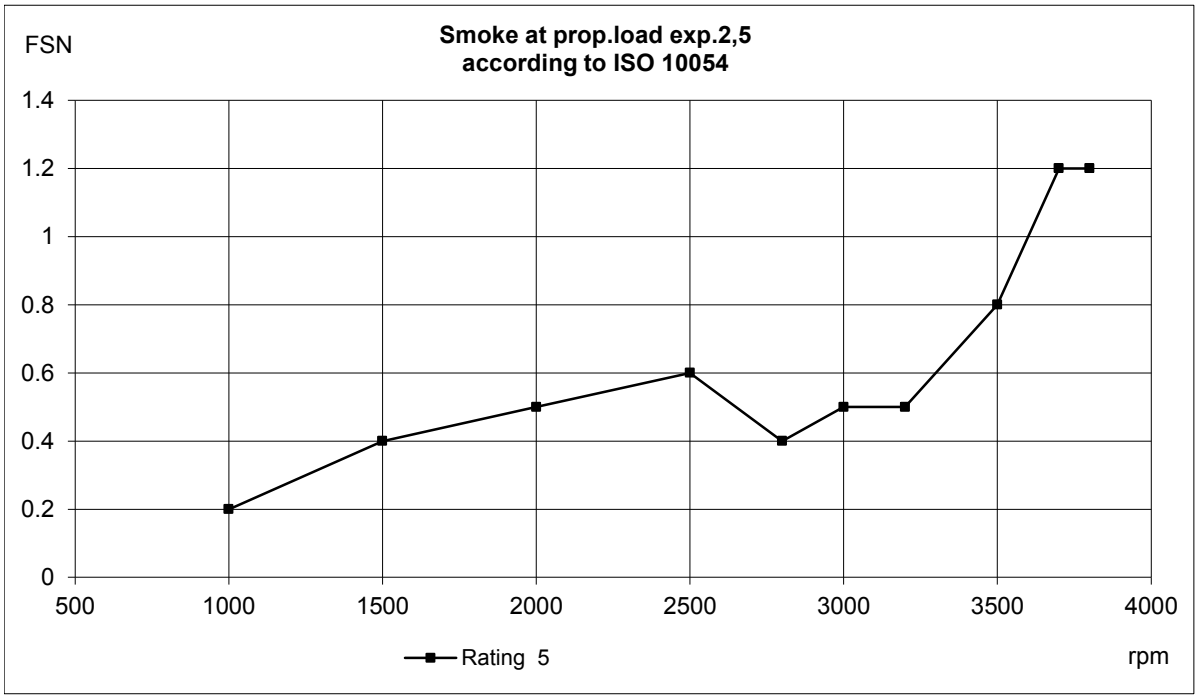

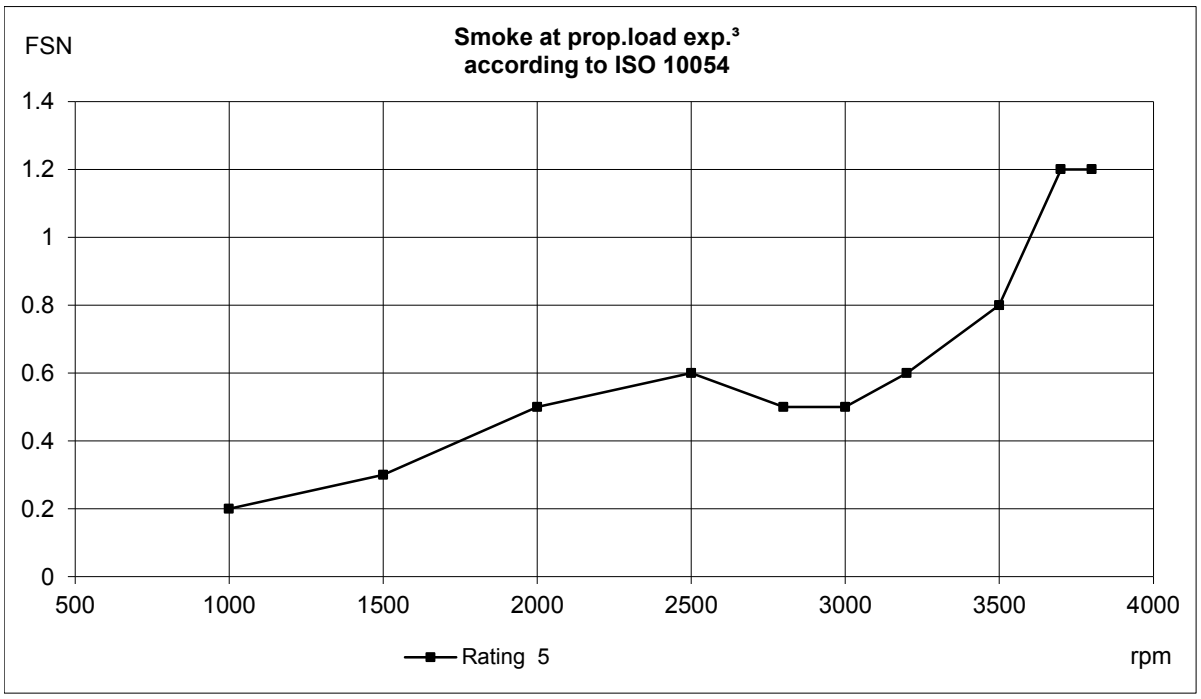

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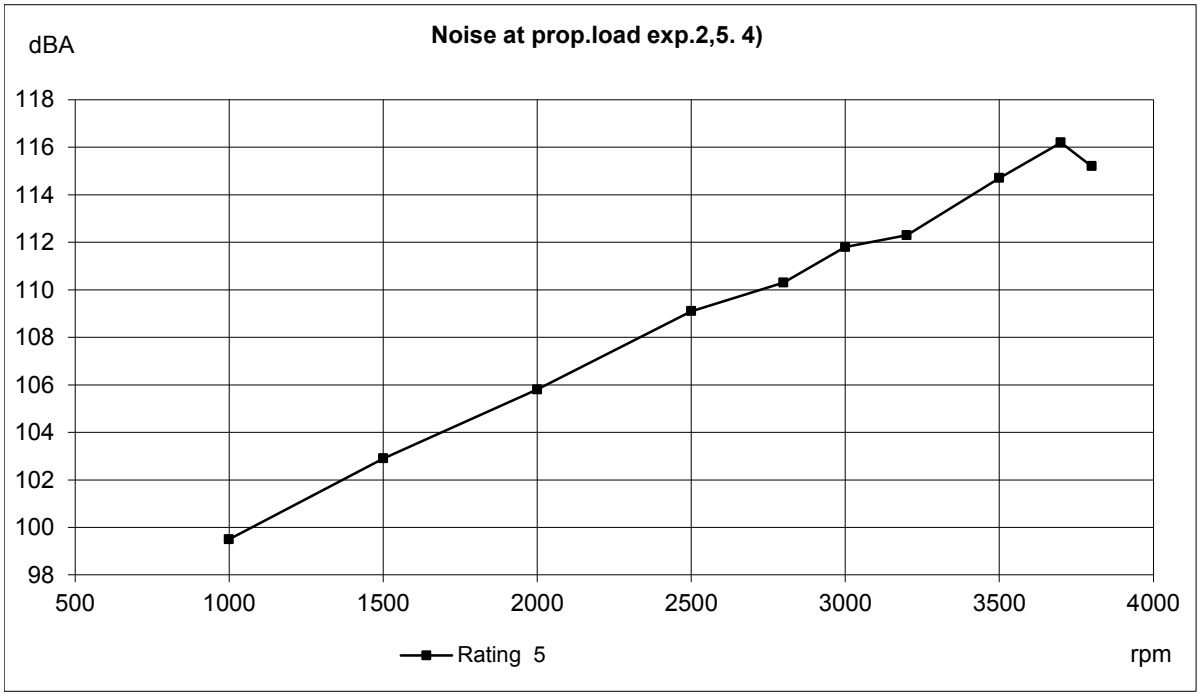

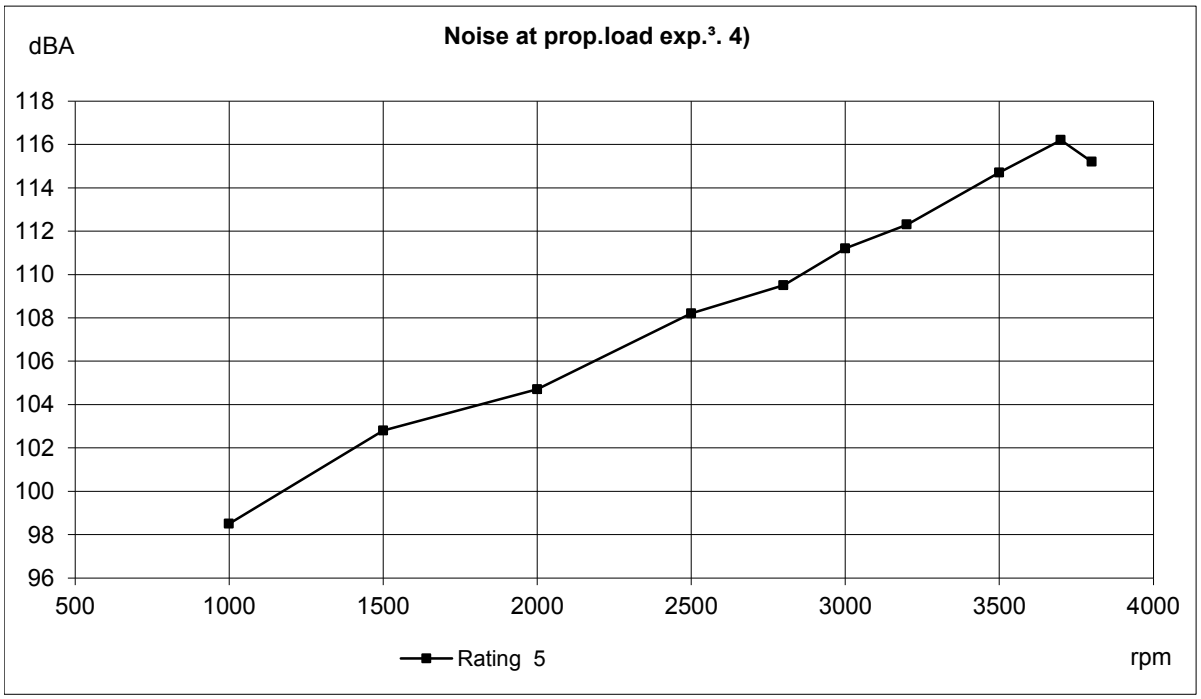

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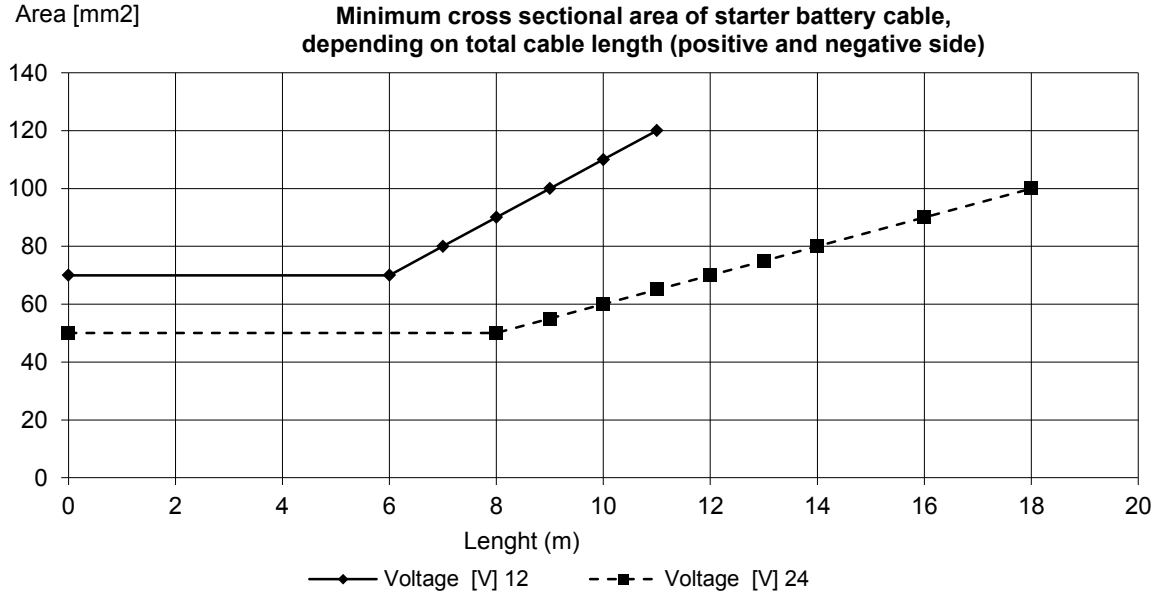
Battery capacity 12V

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) [mm²]
5	95	850 (EN)	2	1.8	70
-5	120	1150 (EN)	2	1.8	70

Battery capacity 24V

5	75	750(EN)	2	1.8	50
-5	95	850 (EN)	2	1.8	50

Minimum cable cross sectional area



Fuses size:

	[A]
Engine:	10
Control system:	10

Max current consumption during normal operation:

	[A]
Engine :	2 - 4

VOLVO PENTA	Document No	Issue Index
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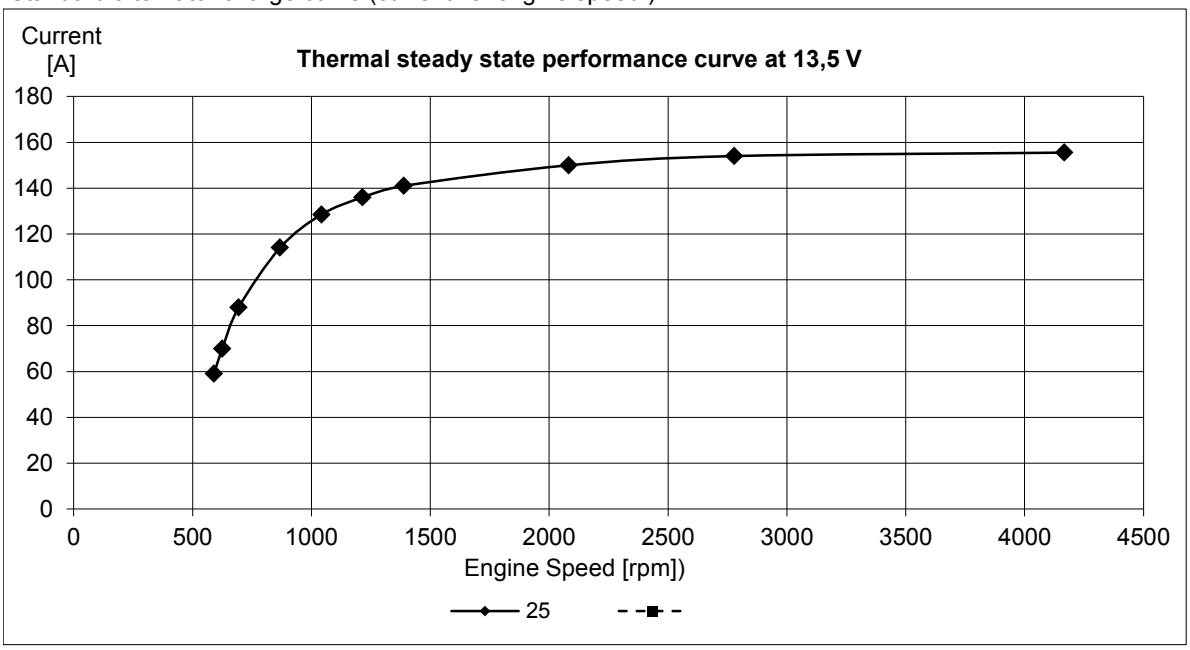
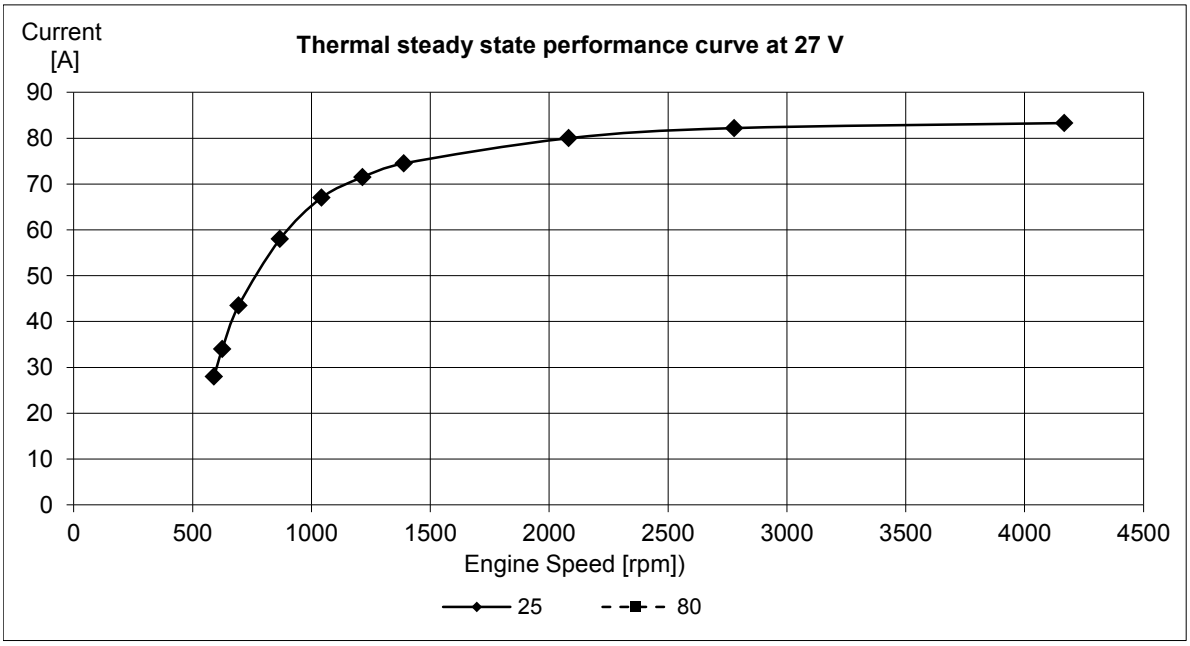
Alternator data:

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



Constant charge voltage: [V]	14.3	+/- 0,3



Constant charge voltage: [V]	28.3	+/- 0,3

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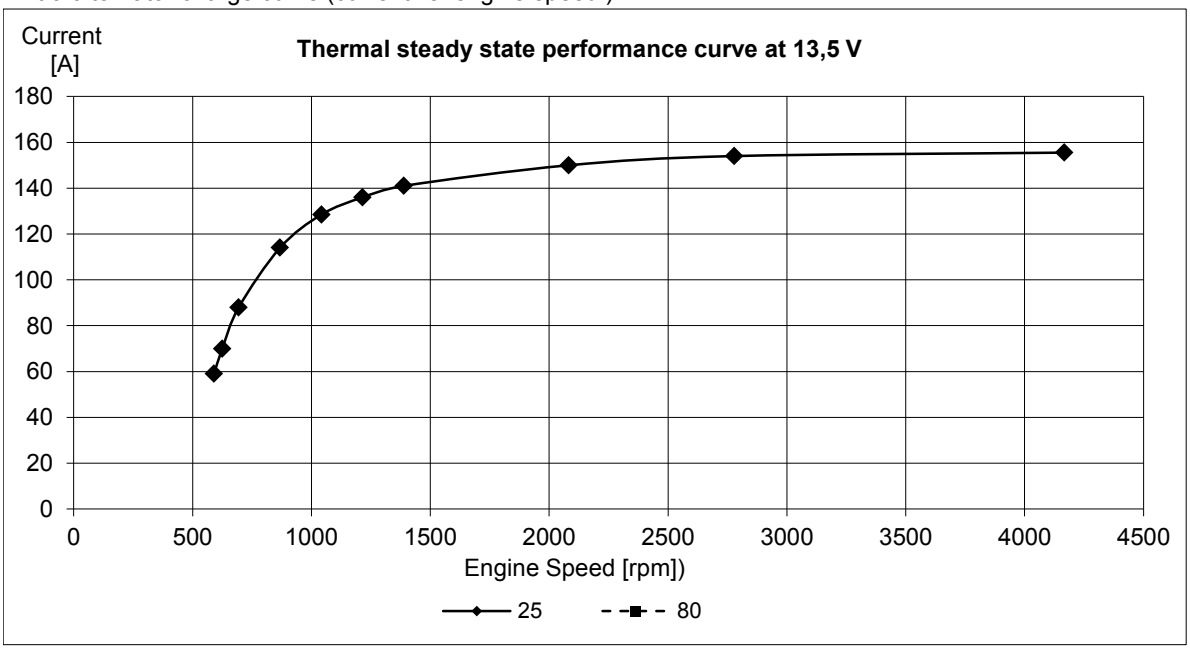
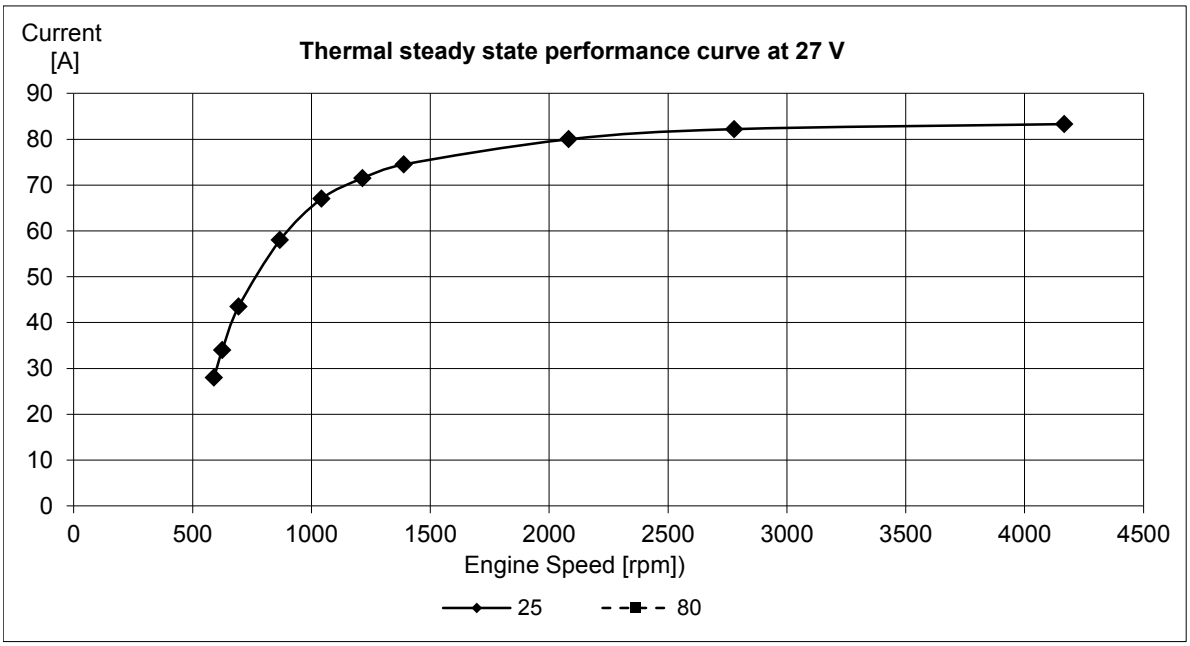
Alternator data:

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



Constant charge voltage: [V]	14.3	+/- 0,3



Constant charge voltage: [V]	28.3	+/- 0,3