

<b>VOLVO PENTA</b>	Document No	Issue Index
	<b>23609290</b>	<b>03</b>

**D4-300 AQ****General**

4-stroke direct injected, turbocharged and aftercooled diesel engine

Engine Rating		5
Number of cylinders		4
No of valves		16
Displacement, total	litres in <sup>3</sup>	3.67 223.7
Firing order		1-3-4-2
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	700-750
Rated speed R5	rpm	3500
Governed speed R5	rpm	3630
Propeller selection range R5		3450-3630
Dry weight engine BT	kg lb	525 1157
Dry weight with drive DPI	kg lb	670 1477
Dry weight with drive DPH	kg lb	660 1455
	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).
- 4) Acc. to ISO 3744
- 5) At installed back pressure

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**D4-300 AQ**

<b>Performance</b>	<b>rpm</b>	<b>1000</b>	<b>1500</b>	<b>2000</b>	<b>2500</b>	<b>2800</b>	<b>3000</b>	<b>3200</b>	<b>3400</b>	<b>3500</b>	<b>3600</b>
Crankshaft power 1), 5)	kW	52	100	147	183	205	218	220	221	221	221
	hp	71	136	200	249	279	296	299	300	300	300
Propeller shaft power 1) (At full load)	kW	50	96	141	176	197	209	211	212	212	212
	hp	68	131	192	239	268	285	287	288	288	288
Propellershaft power at prop. load x <sup>2.5</sup>	kW	9	25	52	91	121	144	169	197	212	212
	hp	13	35	71	124	165	196	230	268	288	289
Propellershaft power at prop. load x <sup>3</sup>	kW	5	17	40	77	108	133	162	194	212	212
	hp	7	23	54	105	147	181	220	264	288	289
Torque at crankshaft 2)	Nm	497	637	702	699	699	694	657	620	602	585
	lbf ft	366	470	518	516	516	512	484	457	444	432
Mean piston speed	m/s	3.7	5.5	7.3	9.2	10.3	11.0	11.7	12.5	12.8	13.2
	ft/s	12.0	18.0	24.1	30.1	33.7	36.1	38.5	40.9	42.1	43.3
Effective mean pressure 2)	MPa	1.70	2.18	2.41	2.40	2.40	2.38	2.25	2.12	2.06	2.01
	psi	246.9	316.5	348.9	347.5	347.6	345.0	326.4	308.0	299.2	290.9
Max combustion pressure 2)	MPa	18.2	19.5	20.0	19.6	19.8	19.8	19.3	18.8	18.9	19.1
	psi	2635	2833	2901	2839	2874	2875	2797	2727	2736	2766

**Lubricating system**

Specific lubricating oil consumption.	g/kWh	< 0.2
Max. oil volume including filters for all allowed installation inclinations:	litres	12
	US gal	3.17
Max. oil volume excluding filters for all allowed installation inclinations:	litres	10.5
	US gal	2.77
Min. oil volume excluding filters for all allowed installation inclinations:	litres	9.3
	US gal	2.46

<b>Fuel system</b>	<b>rpm</b>	<b>1000</b>	<b>1500</b>	<b>2000</b>	<b>2500</b>	<b>2800</b>	<b>3000</b>	<b>3200</b>	<b>3400</b>	<b>3500</b>	<b>3600</b>
Specific fuel consumption 2)	g/kWh	239.0	230.0	217.0	207.0	204.0	207.0	211.0	217.0	219.0	222.0
	lb/hph	0.387	0.373	0.352	0.335	0.33	0.335	0.342	0.352	0.355	0.36
Fuel consumption, Test cycle E5 EU	g/kWh	222									
	lb/hph	0.36									
Fuel consumption at prop. load x <sup>2.5</sup>	l/h	2.9	6.9	13.8	24.1	31.7	37.9	45.2	53.5	57.8	58.7
	US gal/h	0.8	1.8	3.6	6.4	8.4	10.0	11.9	14.1	15.3	15.5

<b>Fuel system</b>	<b>rpm</b>	<b>1000</b>	<b>1500</b>	<b>2000</b>	<b>2500</b>	<b>2800</b>	<b>3000</b>	<b>3200</b>	<b>3400</b>	<b>3500</b>	<b>3600</b>
Fuel consumption at prop. load x <sup>3</sup>	l/h	2.0	4.9	10.7	20.8	28.8	35.6	43.6	52.8	57.8	58.7
	US gal/h	0.5	1.3	2.8	5.5	7.6	9.4	11.5	13.9	15.3	15.5
Fuel consumption at full load	l/h	14.9	27.5	38.2	45.3	50.0	54.0	55.6	57.3	57.8	58.6
	US gal/h	3.9	7.3	10.1	12.0	13.2	14.3	14.7	15.1	15.3	15.5

**Full load performance at rated speed**

Fuel inlet temperature	°C	40
	°F	104
Fuel return temperature from engine	°C	65
	°F	149
Fuel consumption	l/h	57.9
	US gal/h	15.30
Fuel inlet flow to engine	l/h	84.9
	US gal/h	22.43
Fuel return flow from engine	l/h	27
	US gal/h	7.13

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**D4-300 AQ**

<b>Intake and exhaust system</b>	<b>rpm</b>	<b>1000</b>	<b>1500</b>	<b>2000</b>	<b>2500</b>	<b>2800</b>	<b>3000</b>	<b>3200</b>	<b>3400</b>	<b>3500</b>	<b>3600</b>
Specific exhaust heating effect in percent of crankshaft power	%	27	34	39	56	57	58	61	64	65	67
Exhaust temperature at the exhaust pipe connecting flange after the turbo charger.	°C	373	451	456	464	417	407	400	394	391	392
	°F	703	844	853	867	783	765	752	741	736	738
Permitted exhaust back pressure after turbocharger at rated speed. (Installed back pressure)	kPa							Max	30		
	psi								4.4		
	kPa							Min	10		
	psi								1.5		

<b>Intake and exhaust system</b>	<b>rpm</b>	<b>1000</b>	<b>1500</b>	<b>2000</b>	<b>2500</b>	<b>2800</b>	<b>3000</b>	<b>3200</b>	<b>3400</b>	<b>3500</b>	<b>3600</b>
Engine air consumption at 25°C / 77°F atmospheric pressure 100kPa	m³/min	3.5	5.9	8.3	10.3	13.5	15	16.2	17.1	17.6	18.1
	cu.ft./min	123.6	208.4	293.1	363.7	476.7	529.7	572.1	603.9	621.5	639.2
Charge air pressure Inlet manifold	kPa	118	148	165	168	206	221	227	228	230	231
	psi	17.1	21.5	23.9	24.4	29.9	32.1	32.9	33.1	33.4	33.5
Exhaust gas flow	m³/min	8.1	15.3	21.1	25.6	30	32	33.3	34.2	34.7	35.3
	cu.ft./min	286	540.3	745.1	904.1	1059	1130	1176	1208	1225	1247

<b>Cooling system</b>	<b>rpm</b>	<b>1000</b>	<b>1500</b>	<b>2000</b>	<b>2500</b>	<b>2800</b>	<b>3000</b>	<b>3200</b>	<b>3400</b>	<b>3500</b>	<b>3600</b>
Radiated heat of crankshaft power at full load.	kW	2.4	4.4	5.8	5.7	6.3	6.7	6.7	6.7	6.7	6.7
Heat rejection to charge air cooler of crankshaft power at full load.	kW	7.3	16.0	24.2	26.3	39.0	45.9	51.0	55.0	56.8	59.4
Coolant heat rejection to HE, incl. engine oil cooler and excl. charge air cooler, of crankshaft power at full load.	kW	50	81	115	129	131	136	142	149	142	145
Coolant flow with fully open thermostat and std cooling system	l/min	58	91	122	154	175	188	201	214	221	227
	cu.ft./min	2.0	3.2	4.3	5.4	6.2	6.6	7.1	7.6	7.8	8.0
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	13									
	US gal.	3.43									
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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**D4-300 AQ**

<b>Raw water circuit</b>	<b>rpm</b>	<b>1000</b>	<b>1500</b>	<b>2000</b>	<b>2500</b>	<b>2800</b>	<b>3000</b>	<b>3200</b>	<b>3400</b>	<b>3500</b>	<b>3600</b>
Nominal raw water design flow	l/min	50	72	92	108	116	121	126	132	134	137
	cu.ft./min	1.8	2.5	3.2	3.8	4.1	4.3	4.4	4.7	4.7	4.8
Nominal raw water pump pressure head at design flow.	kPa	19	39	63	91	106	116	127	139	145	151
	psi	2.8	5.7	9.1	13.2	15.4	16.8	18.4	20.2	21.0	21.9
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									

<b>1 circuit keel cooling system</b>	<b>rpm</b>	<b>1000</b>	<b>1500</b>	<b>2000</b>	<b>2500</b>	<b>2800</b>	<b>3000</b>	<b>3200</b>	<b>3400</b>	<b>3500</b>	<b>3600</b>
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.										

<b>1 1/2 circuit keel cooling system (Two circuit</b>	<b>rpm</b>	<b>1000</b>	<b>1500</b>	<b>2000</b>	<b>2500</b>	<b>2800</b>	<b>3000</b>	<b>3200</b>	<b>3400</b>	<b>3500</b>	<b>3600</b>
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.										

<b>2 circuit keel cooling system, LT</b>	<b>rpm</b>	<b>1000</b>	<b>1500</b>	<b>2000</b>	<b>2500</b>	<b>2800</b>	<b>3000</b>	<b>3200</b>	<b>3400</b>	<b>3500</b>	<b>3600</b>
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										137
	cu.ft./min										4.8
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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<b>2 circuit keel cooling system, HT</b>		<b>rpm</b>	<b>1000</b>	<b>1500</b>	<b>2000</b>	<b>2500</b>	<b>2800</b>	<b>3000</b>	<b>3200</b>	<b>3400</b>	<b>3500</b>	<b>3600</b>
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											100
	cu.ft./min											3.5
Maximum coolant flow through keel cooler, HT-cooling system circuit	l/min											227
	cu.ft./min											8.0
Pressure drop in external HT-cooling system circuit, including piping	kPa	70										
	psi	10.2										
Coolant volume engine	litres	13										
	US gal.	3.43										

<b>Emissions</b>	<b>rpm</b>	<b>1000</b>	<b>1500</b>	<b>2000</b>	<b>2500</b>	<b>2800</b>	<b>3000</b>	<b>3200</b>	<b>3400</b>	<b>3500</b>	<b>3600</b>
Smoke at prop. load $x^{2.5}$	*BSU	0.1	0.1	0.2	0.3	0.2	0.2	0.2	0.4	0.6	0.5
Smoke at prop. load $x^3$	*BSU	0.1	0.1	0.1	0.3	0.2	0.2	0.2	0.4	0.6	0.5
Noise at prop. load $x^{2.5}$ . 4)	dBA	98.5	101.7	104.2	106.8	108.3	109.4	110.2	111.9	111.9	112.1
Noise at prop. load $x^3$ . 4)	dBA	98.2	101.7	103.2	106	107.9	109.2	110.2	112.2	112	112.2

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

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Sensors : Control and Monitoring System							Engine protection action
Sensors	Signal	Range	Unit	Warning Initial Delay / Warning Delay	Warning Level	Derating Level	
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
					0 rpm	1200 rpm	2000 rpm	2500 rpm	3600 rpm	
<b>Charge air temperature</b>	50-0 kΩ	-40 - 130	°C		<b>0 rpm</b>	<b>1200 rpm</b>	<b>2000 rpm</b>	<b>2500 rpm</b>	<b>3600 rpm</b>	
Warning Level			°C	30 sec from start / 5 sec	100	100	70	70	70	
Derating Level			°C							See derating map
<b>Fuel pressure</b>	0,5-4,5 V	0-200	kPa		<b>0 rpm</b>	<b>600 rpm</b>	<b>1600 rpm</b>	<b>2600 rpm</b>	<b>3600 rpm</b>	
Warning Level			kPa	30 sec from start / 5 sec	50	50	50	50	50	
Derating Level			kPa	NA	NA	NA	NA	NA	NA	
<b>Oil pressure</b>	0,5-4,5 V	0-700	kPa		<b>0 rpm</b>	<b>600 rpm</b>	<b>1200 rpm</b>	<b>2000 rpm</b>	<b>3600 rpm</b>	
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

## Derating map

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

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

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

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

<b>Wet exhaust temp [°C]</b>	<b>rpm</b>	<b>95°C</b>	<b>105°C</b>	<b>115°C</b>	<b>125°C</b>
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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**Technical data - Drive unit**

Drive line		DPI with D4/D6
Transmission type		DPI-A
Gear ratio (total)		1,69:1 and 1,85:1
Steering angle, max.		+/- 24°
Total weight of drive unit (1)	kg	154
Oil capacity, approx.	litres	5.7
Oil volume difference MIN-MAX	litres	0.3
Oil type drive		Volvo Penta API GL5 75W/90
Propeller range		H2-H10

(1) Drive, Transom shield kit, including oil and various installation components. Propellers are not included in total weight

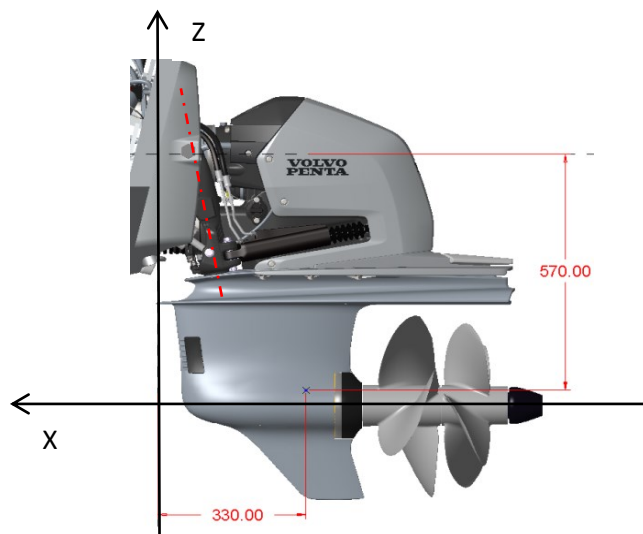
**"Generalized maximum load document"for DPI**

Valid products	Drive Unit	Gear Ratio
DPI-A with D6	DPI	1,69:1
DPI-A with D4	DPI	1,85:1

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
25-50 kn	Fx	18 kN
	Fy (+/-)	11 kN
	MCL rudder (+/-)	1.6 kNm

Fy load coordinate	570 mm
Fy load coordinate	330 mm



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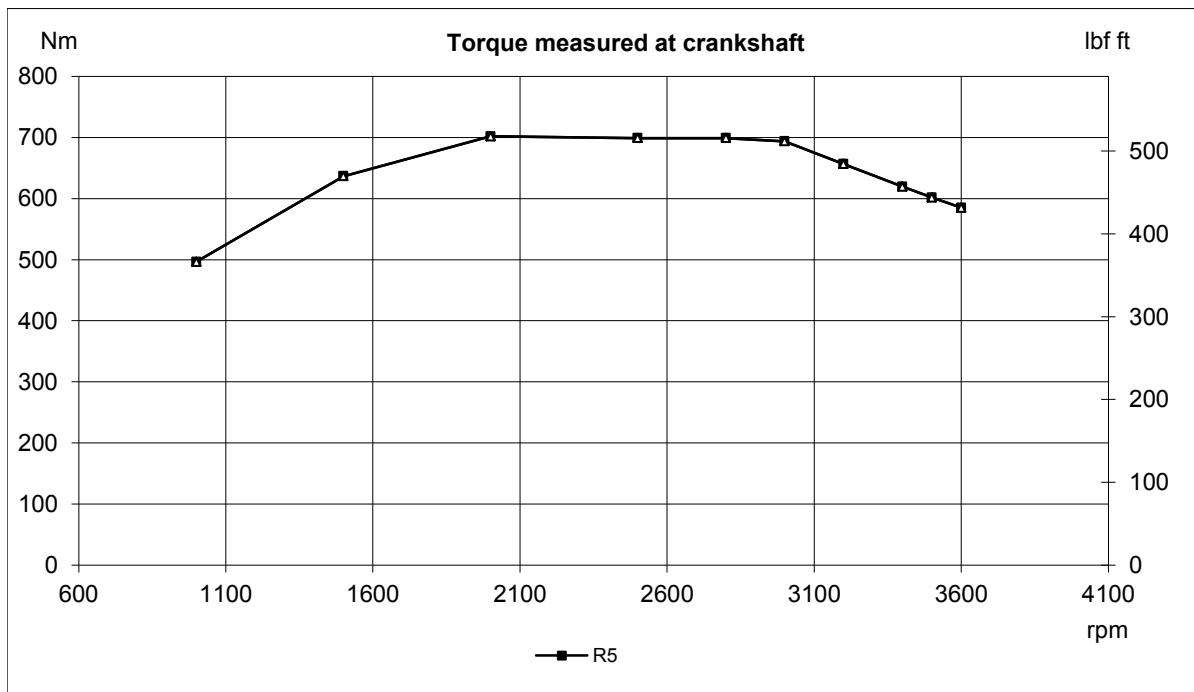
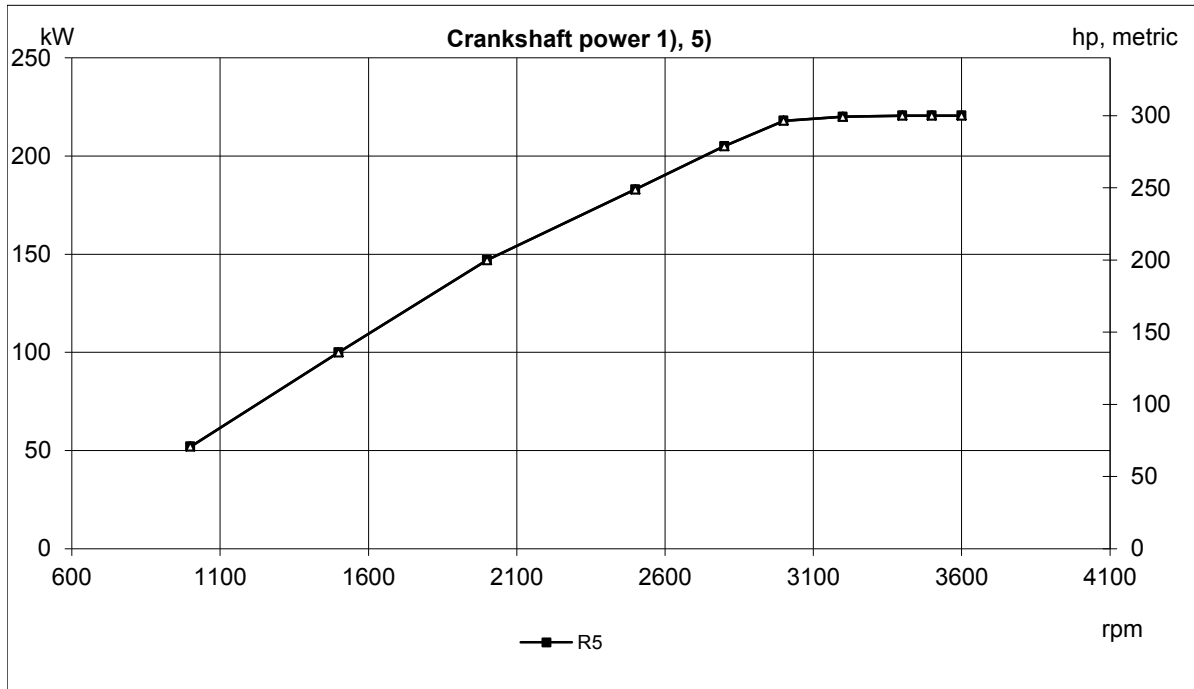
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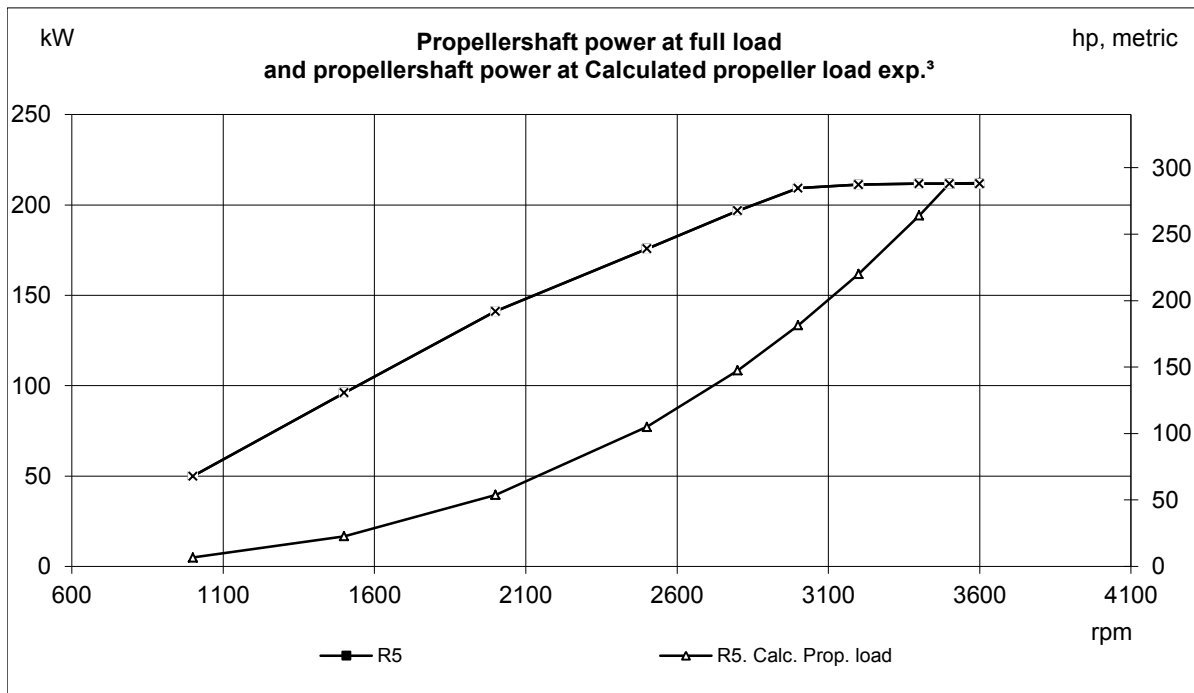
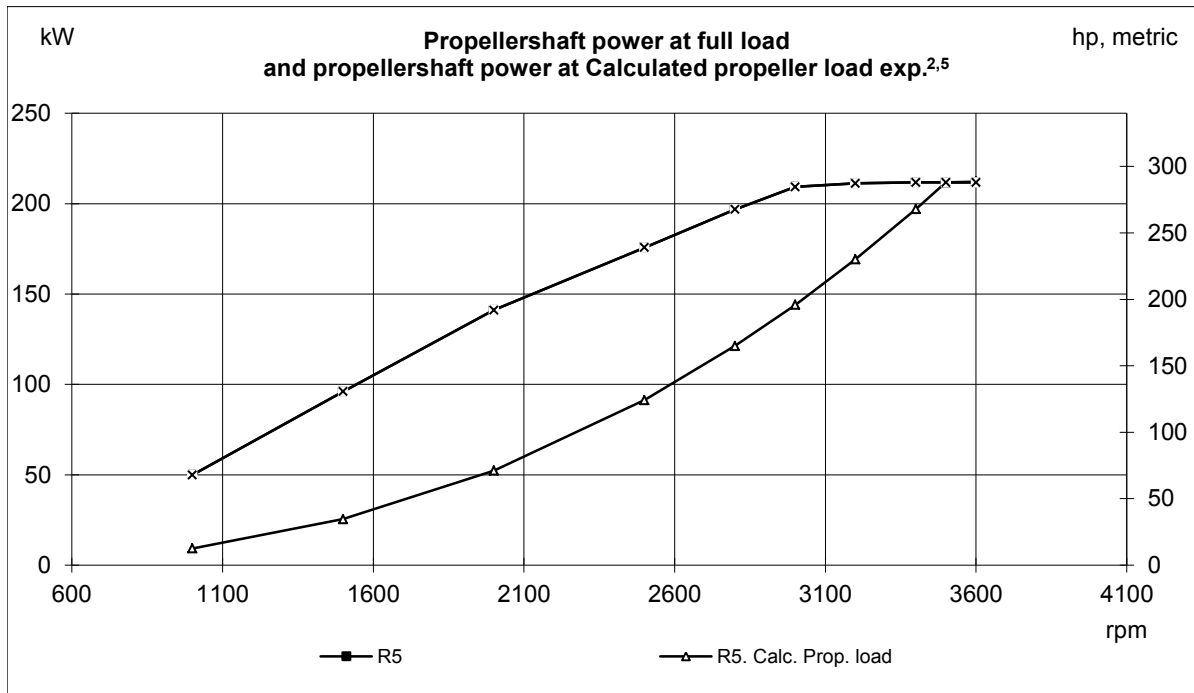
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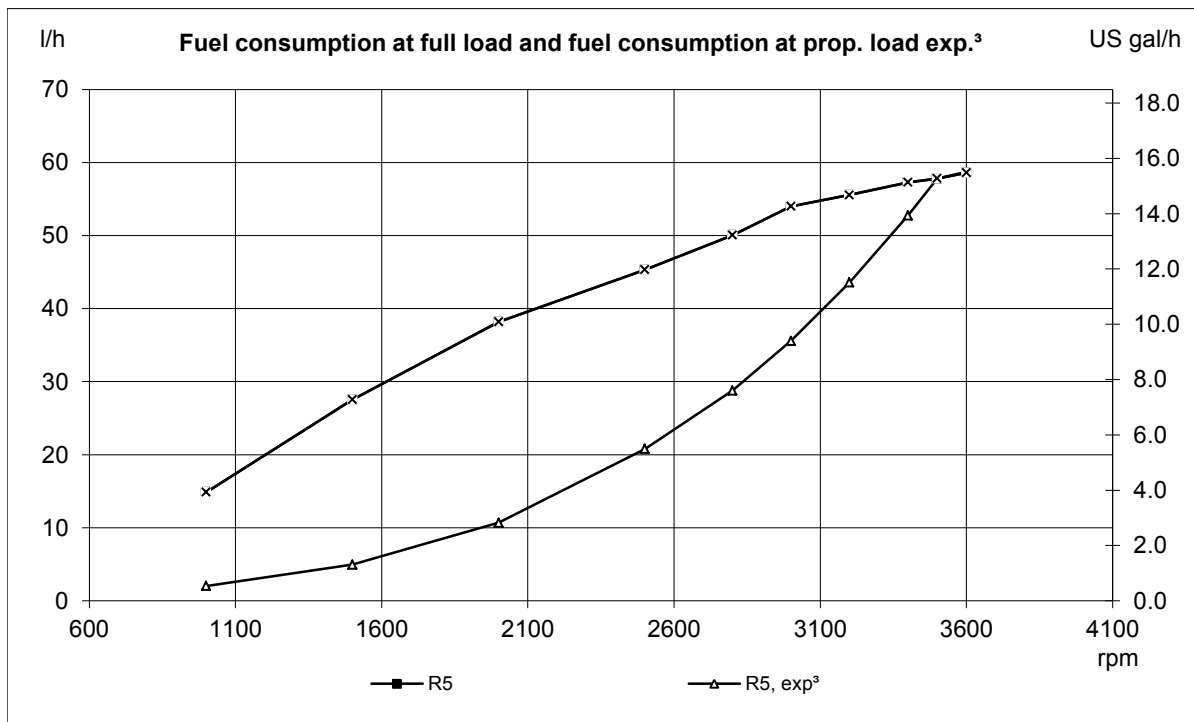
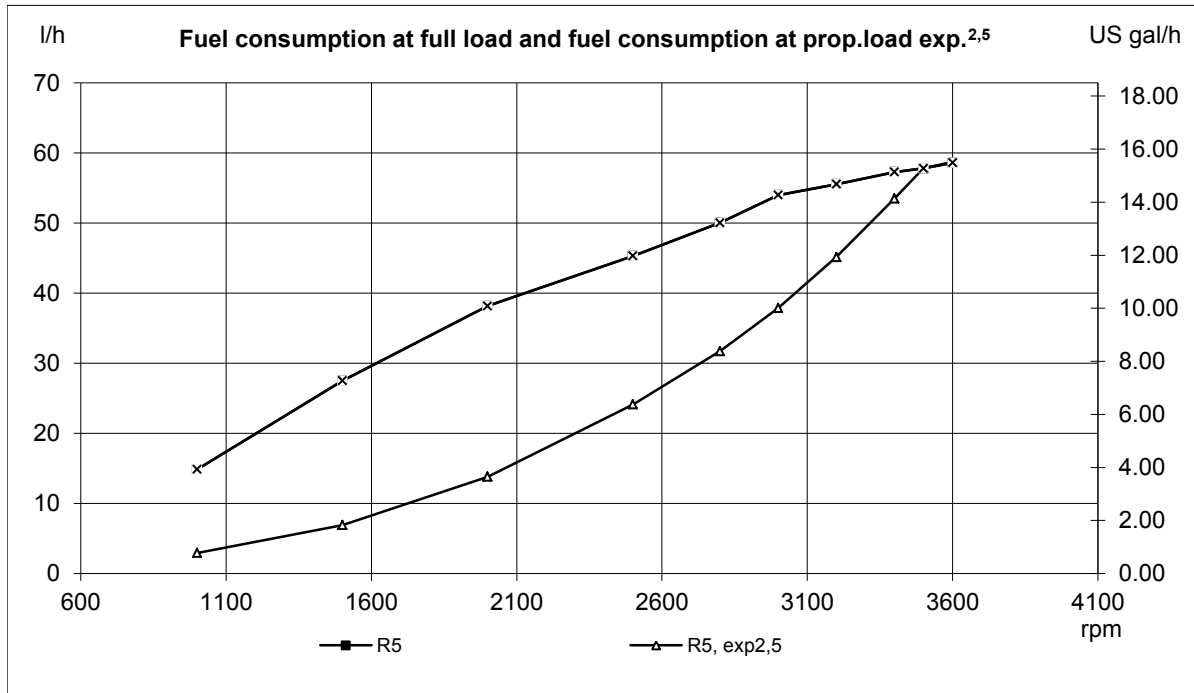
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**VOLVO PENTA**

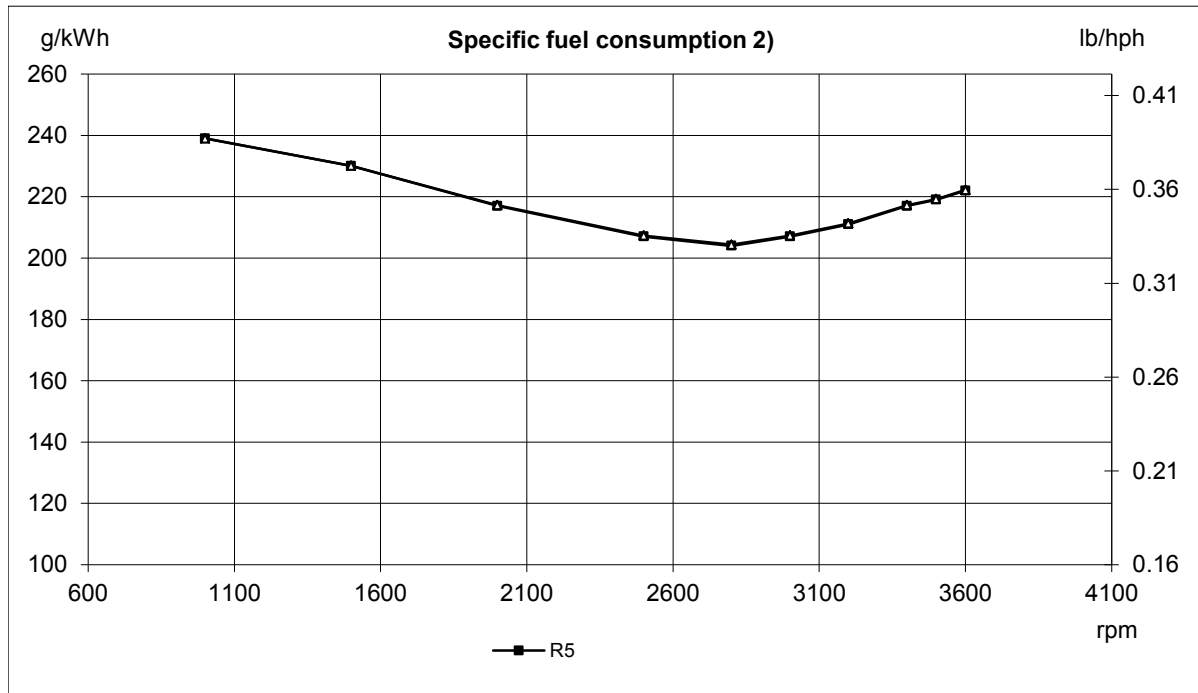
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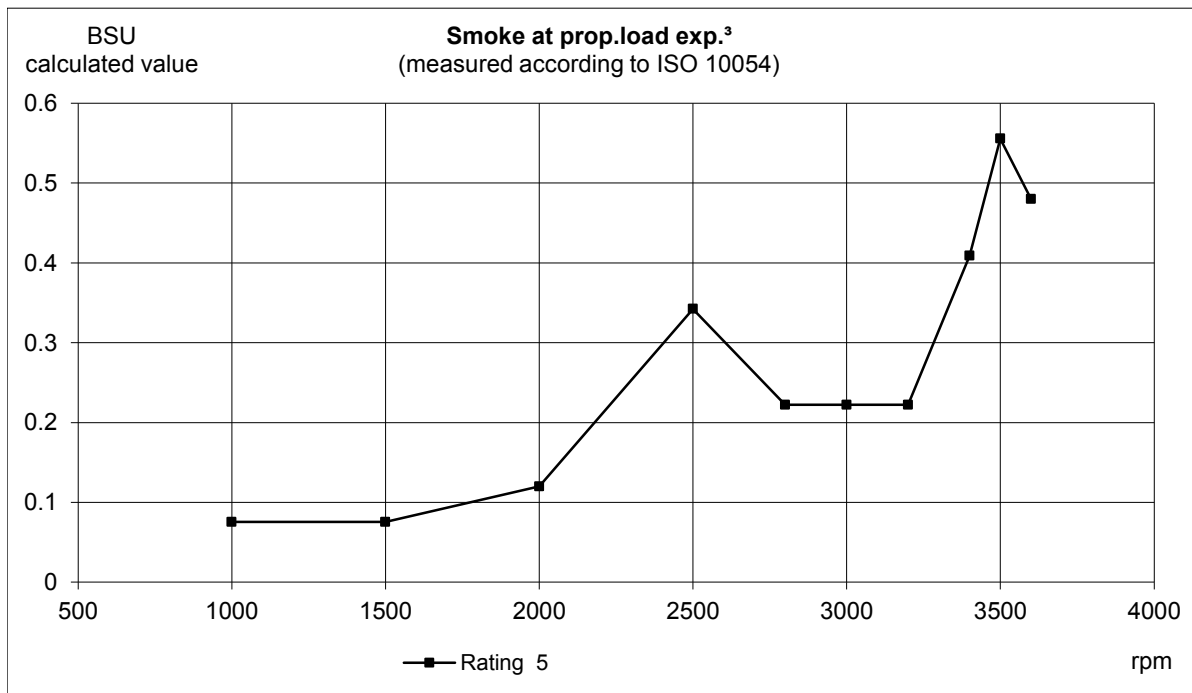
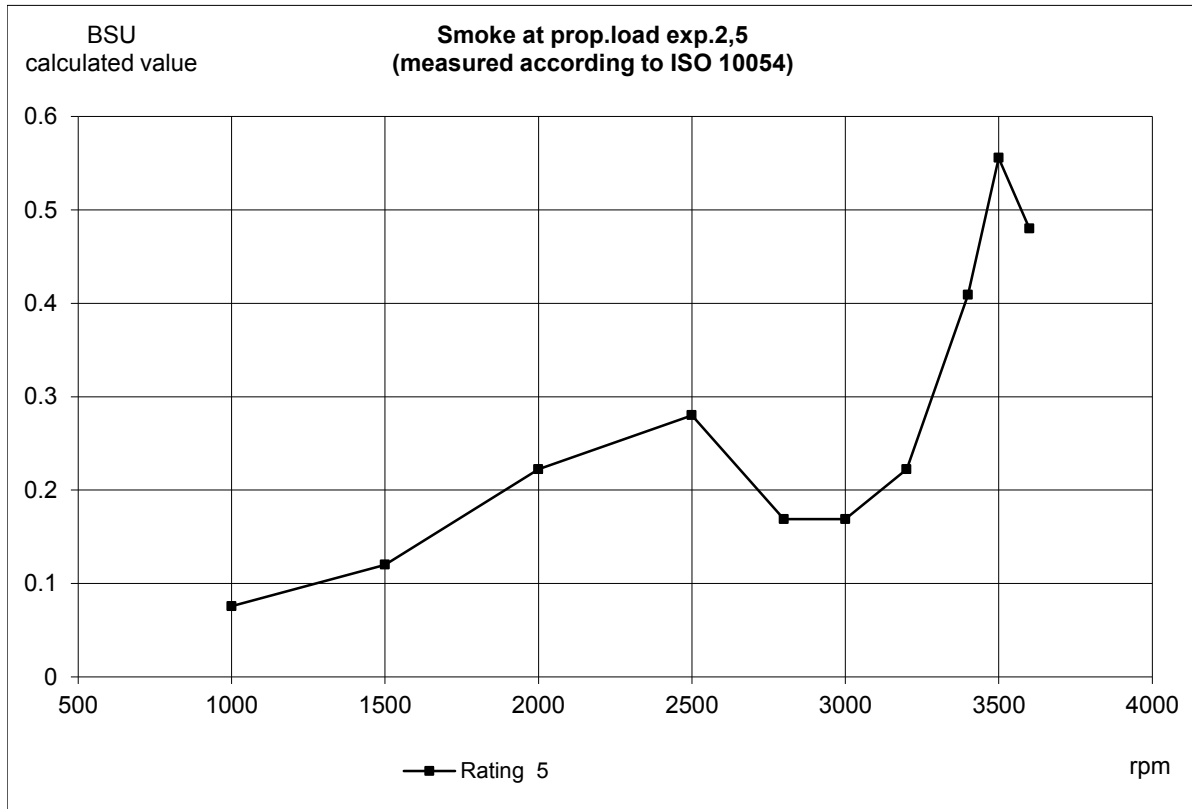
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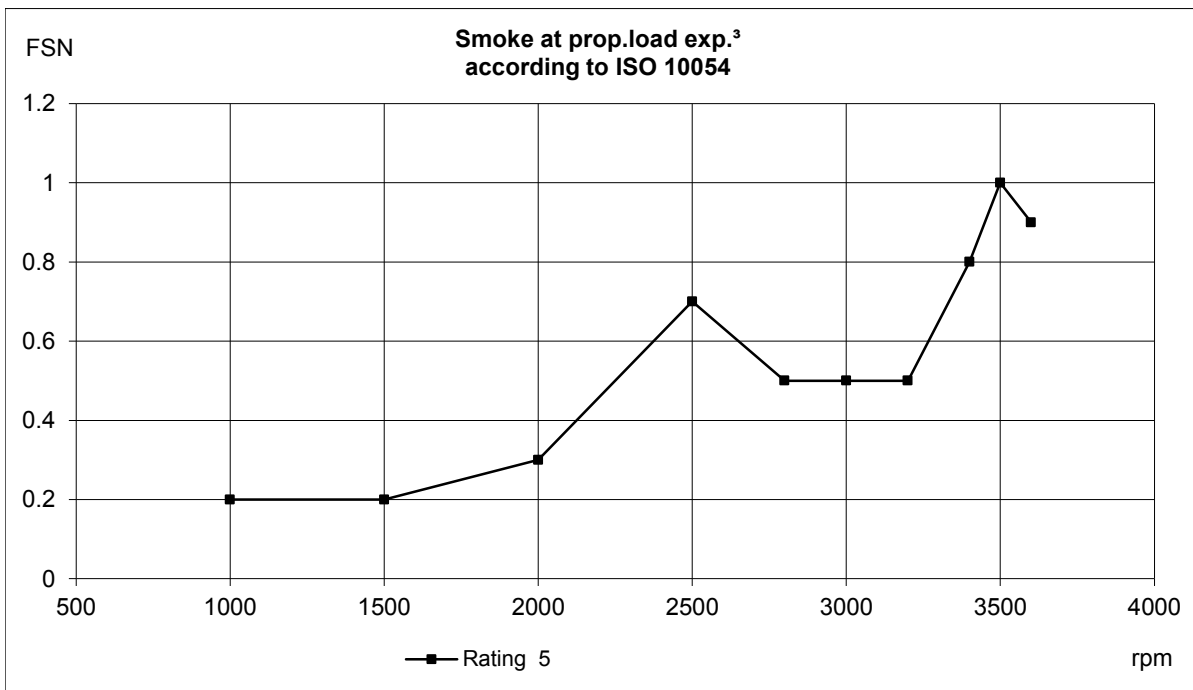
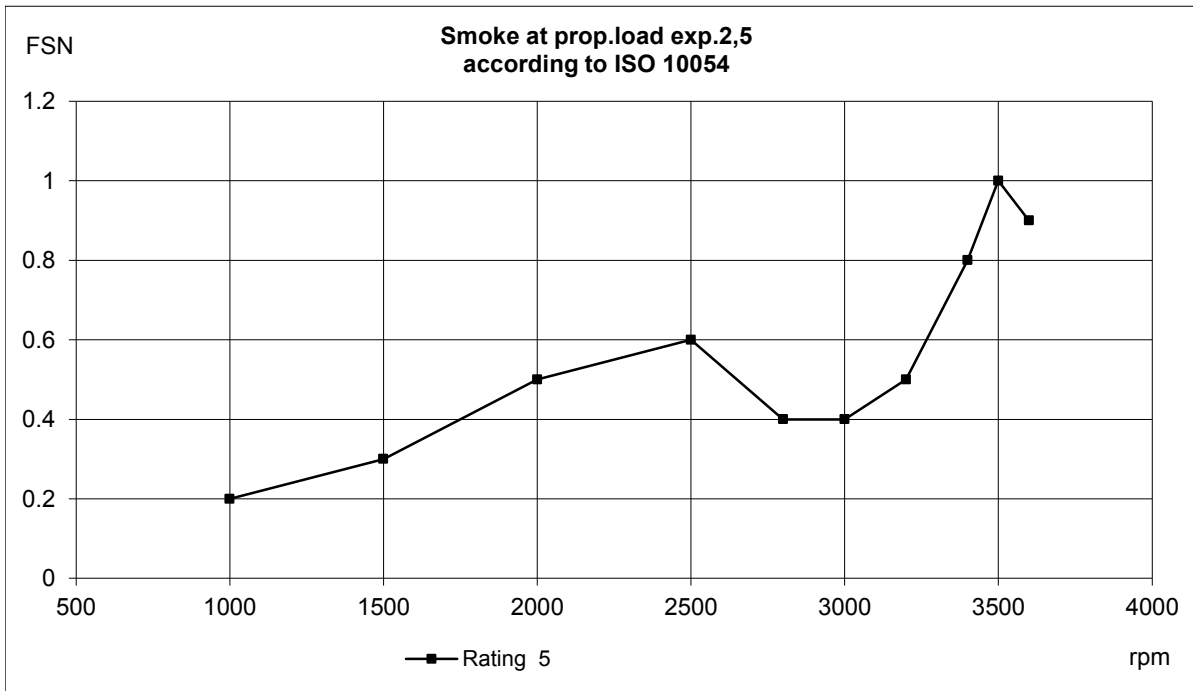
**D4-300 AQ**

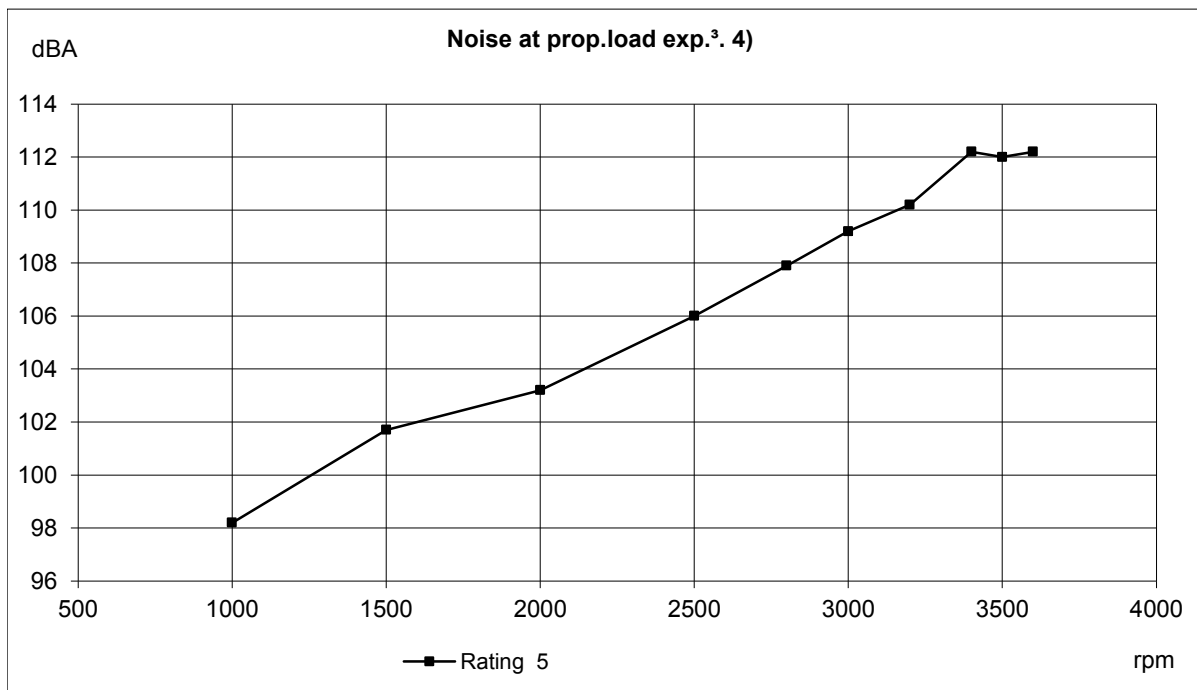
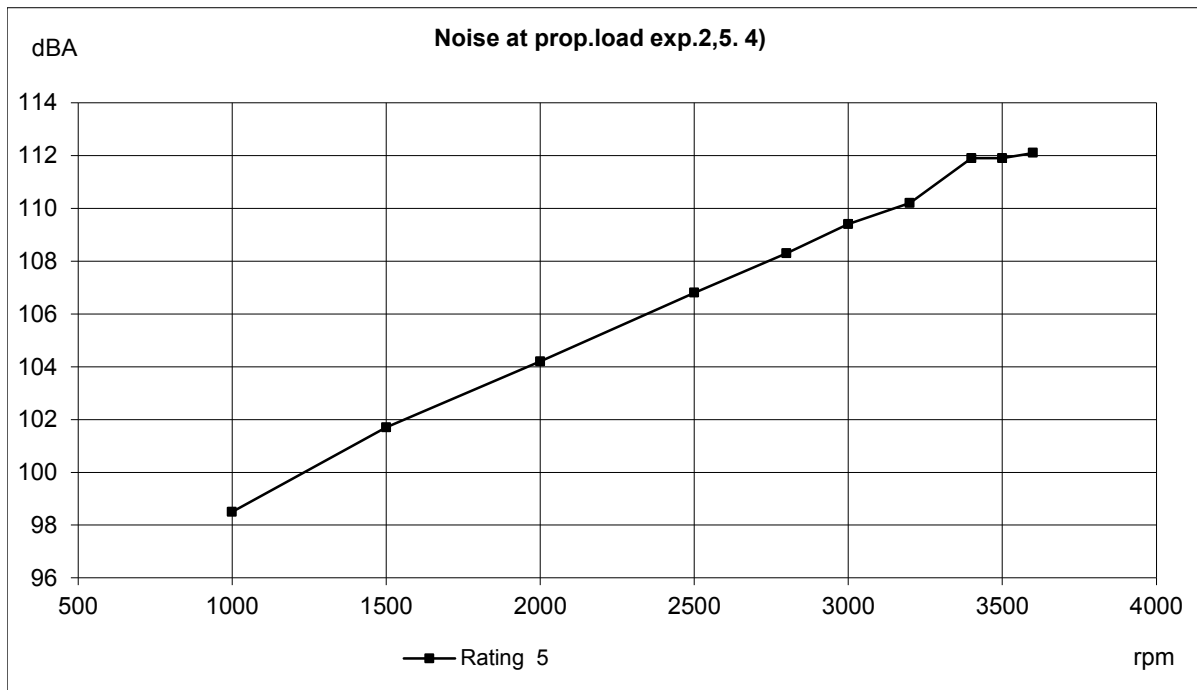
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# VOLVO PENTA

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## D4-300 AQ

### Battery capacity 12V DPI

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 DPI

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

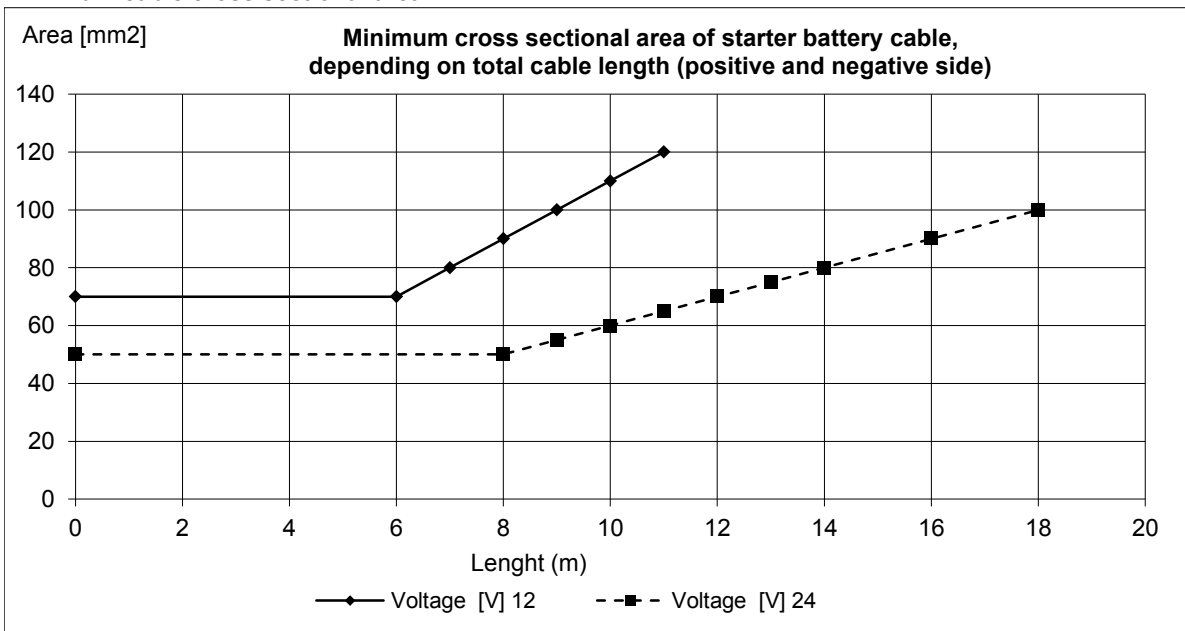
### Battery capacity 12V DPH

5	95	750 (EN)	2	1.8	70
-5	110	850 (EN)	2	1.8	70

### Battery capacity 24V DPH

5	70	600(EN)	2	1.8	50
-5	75	750 (EN)	2	1.8	50

### Minimum cable cross sectional area



### Fuses size:

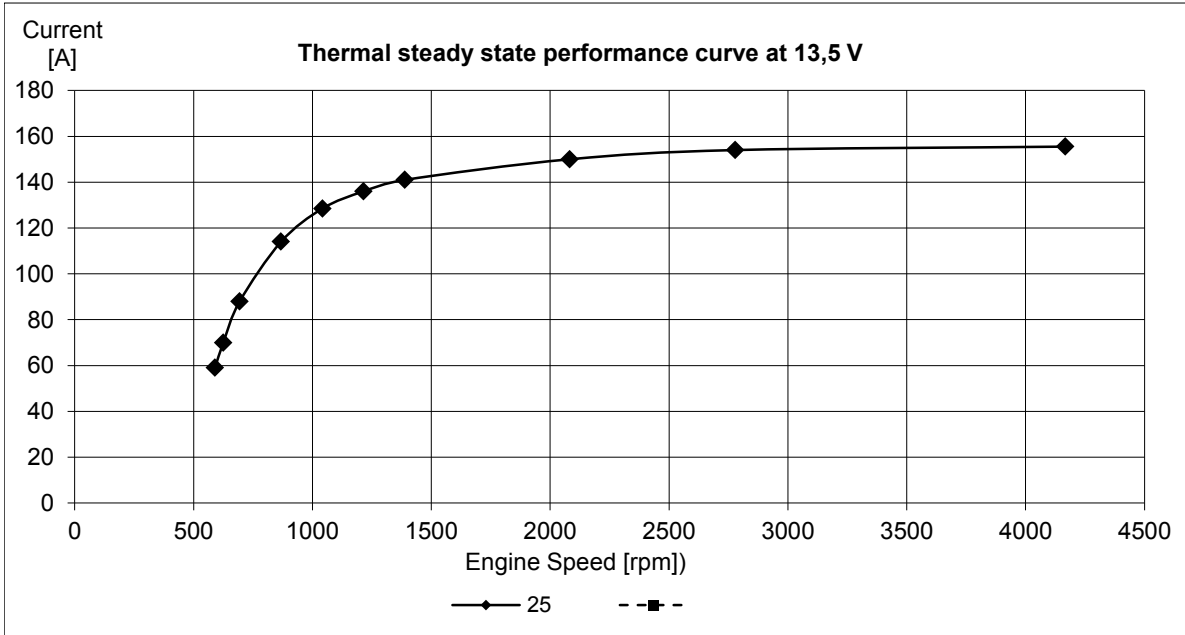
	[A]
Engine:	10
Control system:	10

### Max current consumption during normal operation:

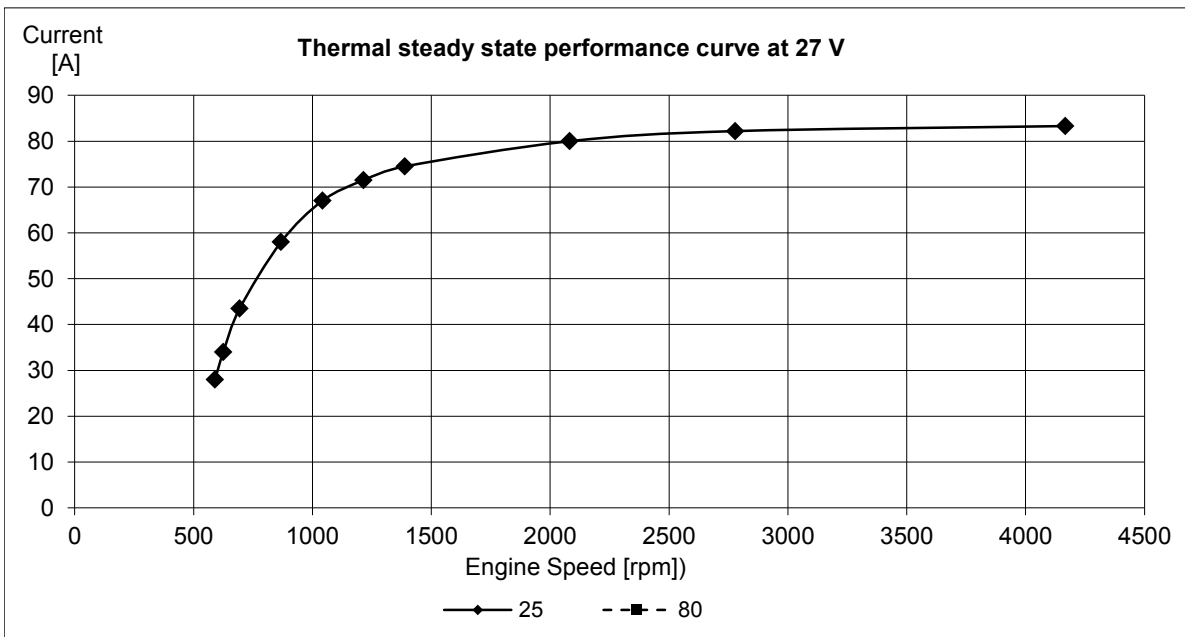
	[A]
Engine :	2 - 4

**Alternator data:**

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



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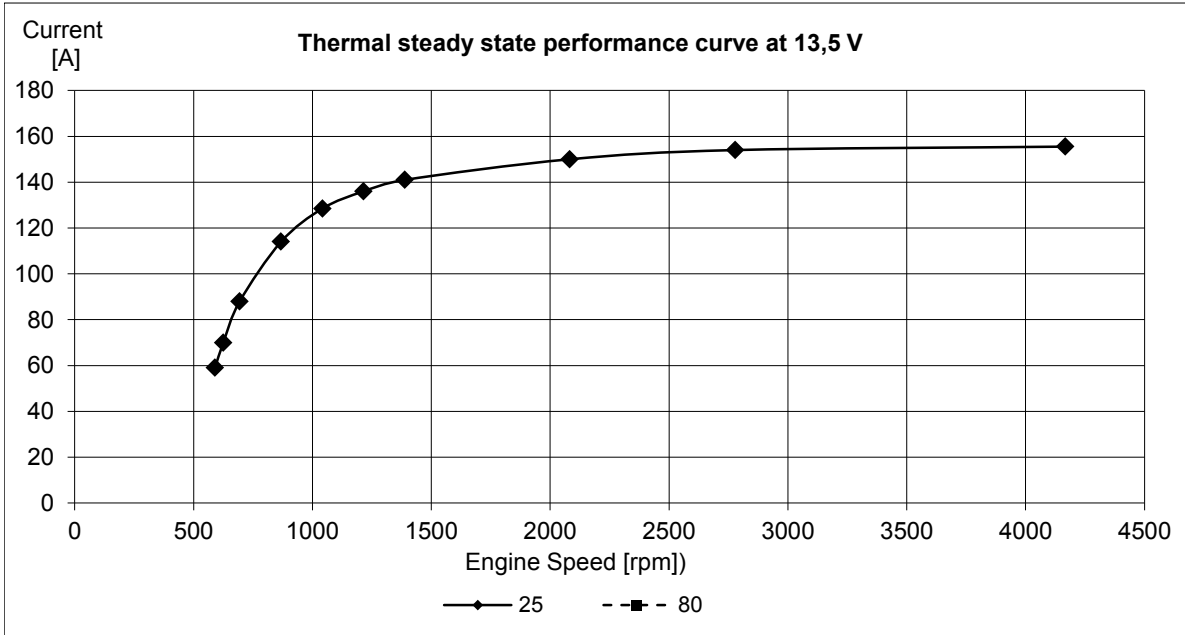


Constant charge voltage: [V]	28.3	+/- 0,3
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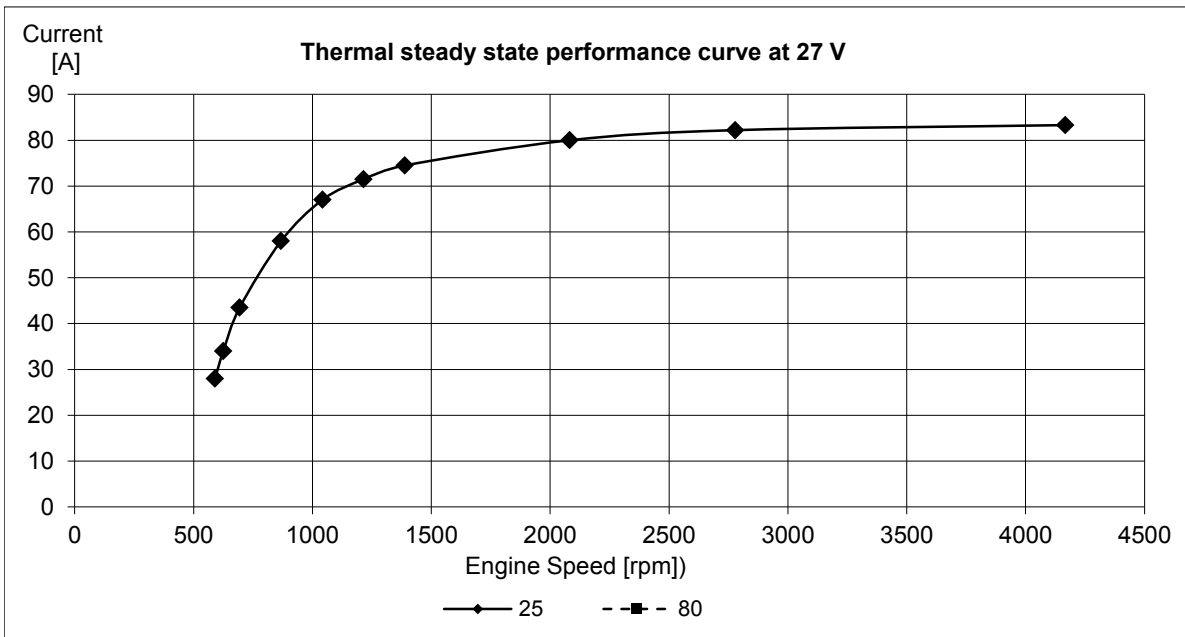
**D4-300 AQ**

**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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