

VOLVO PENTA D8 R5 IPS	Document No	Issue Index
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General

4-stroke direct injected, turbocharged and aftercooled diesel engine

Number of cylinders		6
No of valves		24
Displacement, total	litres in ³	7,70 469,9
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	3000
Rated speed R5	rpm	2900
Propeller selection range R5	rpm	2950-3050
Propeller selection range R5	rpm	2850-2950
	rpm	
Dry weight engine BT	kg lb	880 1940

Performance	Rating	rpm	600	800	1200	1700	2000	2400	2700	2800	2900	3000
Crankshaft power 1), 5)	5	kW	57	90	178	312	368	441	441	441	441	441
		hp	78	122	242	424	500	600	600	600	600	600
	5	kW	50	82	166	296	349	405	405	405	405	
		hp	68	111	225	403	474	550	550	550	550	
Propeller shaft power 1) (At full load) With drive	5	kW	54	86	169	296	350	419	419	419	419	419
		hp	74	116	230	403	475	570	570	570	570	570
	With drive	5	kW	48	77	157	282	331	384	384	384	384
		hp	65	105	214	383	451	523	523	523	523	
Propellershaft power at prop. load x ^{2,5}	5	kW	7	15	42	101	152	240	322	353	385	419
		hp	10	21	58	138	207	326	438	480	523	570
	5	kW	7	15	42	101	152	239	321	352	384	
		hp	10	21	58	138	206	326	437	479	523	
Propellershaft power at prop. load x ³	5	kW	3	8	27	76	124	215	305	341	378	419
		hp	5	11	36	104	169	292	415	463	515	570
	5	kW	3	8	27	77	126	218	310	346	384	
		hp	5	11	37	105	171	296	422	470	523	
Torque at crankshaft 2)	5	Nm	907,2	1074	1416	1753	1757	1755	1560	1504	1452	1404
		lbf ft	669	792	1045	1293	1296	1294	1150	1109	1071	1035
	5	Nm	800,1	973	1319	1665	1665	1609	1431	1380	1332	
		lbf ft	590	718	973	1228	1228	1187	1055	1018	982	
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

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

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Effective mean pressure 2)	5	MPa psi	1,48 214,7	1,75 254,3	2,31 335,3	2,86 414,8	2,87 415,9	2,86 415,3	2,55 369,2	2,45 356,0	2,37 343,7	2,29 332,3
	5	MPa psi	1,31 189,4	1,59 230,3	2,15 312,2	2,72 394,1	2,72 394,1	2,63 381,0	2,33 338,6	2,25 326,5	2,17 315,3	
Max combustion pressure 2)	5	MPa psi	17,3 2509	18,5 2683	18,6 2698	19,2 2785	18,9 2741	18,4 2669	17 2466	16,9 2451	16,7 2422	16,8 2437
	5	MPa psi	16,7 2422	17,9 2596	18,3 2654	18,3 2654	18,4 2669	17,8 2582	15,8 2292	16,1 2335	15,5 2248	

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	7,77
Max. oil volume excluding filters for all allowed installation inclinations:	litres	28
	US gal	7,40
Min. oil volume excluding filters for all allowed installation inclinations:	litres	22
	US gal	5,81

Fuel system		Rating	rpm	600	800	1200	1700	2000	2400	2700	2800	2900	3000
Specific fuel consumption 2)	5	g/kWh lb/hph	221,8 0,359	212,1 0,344	204,9 0,332	199,8 0,324	197,3 0,32	207,8 0,337	218 0,353	221,3 0,359	224,6 0,364	226,2 0,366	
			g/kWh lb/hph	222,3 0,36	212 0,343	204,2 0,331	200,2 0,324	196,8 0,319	206,4 0,334	220,4 0,357	220,2 0,357	225,3 0,365	
Fuel consumption at prop. load x ^{2,5}	5	l/h US gal/h	2,7 0,7	4,8 1,3	11,5 3,0	26,9 7,1	40,4 10,7	64,9 17,1	87,8 23,2	98,6 26,0	108,4 28,6	119,4 31,5	
			l/h US gal/h	2,6 0,7	4,6 1,2	11,2 3,0	26,4 7,0	39,5 10,4	63,7 16,8	87,9 23,2	97,4 25,7	109,5 28,9	
Fuel consumption at prop. load x ³	5	l/h US gal/h	1,6 0,4	3,0 0,8	7,7 2,0	20,4 5,4	33,3 8,8	58,5 15,5	83,8 22,1	95,3 25,2	106,4 28,1	119,4 31,5	
			l/h US gal/h	1,6 0,4	3,0 0,8	7,8 2,1	20,5 5,4	33,3 8,8	58,9 15,6	85,4 22,6	96,0 25,4	109,5 28,9	
Fuel consumption at full load	5	l/h US gal/h	15,1 4,0	22,8 6,0	43,6 11,5	74,6 19,7	86,9 23,0	109,7 29,0	115,0 30,4	116,8 30,9	118,5 31,3	119,4 31,5	
			l/h US gal/h	13,4 3,5	20,7 5,5	40,5 10,7	71,0 18,8	82,1 21,7	99,9 26,4	106,7 28,2	106,6 28,2	109,5 28,9	
Intake and exhaust system		Rating	rpm	600	800	1200	1700	2000	2400	2700	2800	2900	3000
Specific exhaust heating effect in percent of crankshaft power	5	%	35	40	52	64	63	72	80	83	85	85	
	5		20	21	30	64	63	68	80	80	84		
Exhaust temperature at the exhaust pipe connecting flange after the turbo charger.	5	°C °F	338 640	380 716	478 892	543 1009	469 876	501 934	538 1000	540 1004	541 1006	536 997	
			°C °F	309 588	350 662	446 835	545 1013	470 878	448 838	503 937	489 912	517 963	
Permitted back pressure in the exhaust line at rated speed. (Installed back pressure)		kPa psi								Max	30		
										Min	10		
Engine air consumption at 25°C / 77°F atmospheric pressure 100kPa and relative humidity 30%.	5	m³/min cu.ft./min	4,43 156,4	6,65 234,8	10,75 379,6	17,12 604,6	23,38 825,7	29,45 1040	30,48 1076	31,38 1108	32,13 1135	32,98 1165	
			m³/min cu.ft./min	4,48 158,2	6,68 235,9	10,72 378,6	16,55 584,5	22,42 791,8	29,83 1053	30,62 1081	31,4 1109	31,22 1103	
Charge air pressure Inlet manifold	5	kPa psi	206 29,9	231 33,5	257 37,3	291 42,2	336 48,7	359 52,1	336 48,7	336 48,7	336 48,7	336 48,7	336 48,7
			kPa psi	206 29,9	231 33,5	256 37,1	278 40,3	322 46,7	363 52,6	334 48,4	332 48,2	322 46,7	
Exhaust gas flow	5	m³/min cu.ft./min	9,72 343,3	15,52 548,1	28,73 1015	48,6 1716	57,53 2032	71,58 2528	76,4 2698	78,13 2759	79,73 2816	80,53 2844	
			m³/min cu.ft./min	9,21 325,2	14,8 522,7	27,2 960,6	46,67 1648	54,95 1941	66,32 2342	72,03 2544	72,27 2552	74,2 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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Cooling system	Rating	rpm	600	800	1200	1700	2000	2400	2700	2800	2900	3000
Radiated heat in percent of crankshaft power.	5	%	1,9	1,8	1,7	1,6	1,5	1,5	1,5	1,5	1,5	1,5
	5		1,9	1,8	1,7	1,6	1,5	1,5	1,5	1,5	1,5	1,5
Heat rejection to charge air cooler in percent of crankshaft power.	5	%	17	18	18	16	20	23	22	23	24	25
	5		18	21	18	15	20	25	24	25	24	
Coolant heat rejection to HE, incl. engine oil cooler and excl. charge air cooler, in percent of crankshaft power.	5	%	72	62	57	53	45	23	48	52	53	53
	5		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	273
		cu.ft./min	2,3	3,1	4,6	6,4	7,5	8,6	9,4	9,5	9,6	9,6
Extra water pump flow through charge air cooler		l/min	NA									
		cu.ft./min										
Max. pump pressure at extra pump pressure side (pressure set system)		kPa	NA									
		psi										
Max. permissible temperature on coolant in engine outlet		°C	NA									
		°F										
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	260
	cu.ft./min	2,3	3,1	4,6	5,8	7,1	8,5	8,8	9,0	9,1	9,2
Nominal raw water pump pressure head at design flow. (measured before and after pump)	kPa	5	11	27	50	67	87	101	105	107	107
	psi	0,7	1,6	3,9	7,3	9,7	12,6	14,6	15,2	15,5	15,6
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	13
	psi	14,1	13,5	12,0	9,1	7,3	4,5	2,9	2,3	2,0	1,9
Pressure drop over reverse gear oil cooler (optional equipment)	kPa	1	1	2	4	5	7	8	9	9	9
	psi	0,2	0,2	0,3	0,6	0,8	1,0	1,2	1,3	1,3	1,3
Maximum sea water temperature	°C	32									
	°F	90									

Emissions	Rating	rpm	600	800	1200	1700	2000	2400	2700	2800	2900	3000
Smoke at prop. load x ^{2.5}	5	*BSU	0,2	0,2	0,3	0,9	0,8	0,5	0,4	0,5	0,6	0,8
	5	*BSU	0,2	0,2	0,3	0,9	0,7	0,5	0,4	0,4	0,6	
Smoke at prop. load x ³	5	*BSU	0,2	0,2	0,2	0,7	1,0	0,7	0,4	0,5	0,5	0,8
	5	*BSU	0,3	0,2	0,2	0,6	0,7	0,7	0,4	0,4	0,6	
Noise at prop. load x ^{2.5} . 4)	5	dBA	97,2	99,1	100,6	103,7	107,1	108,9	111,9	112,1	112,2	112,5
	5	dBA	96,5	99,8	100,6	103,5	107,1	109,0	111,9	112,1	112,3	
Noise at prop. load x ³ . 4)	5	dBA	95,6	98,5	101,3	102,9	107,0	109,0	111,9	112,1	112,3	112,5
	5	dBA	95,8	98,5	101,0	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

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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

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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

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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

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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

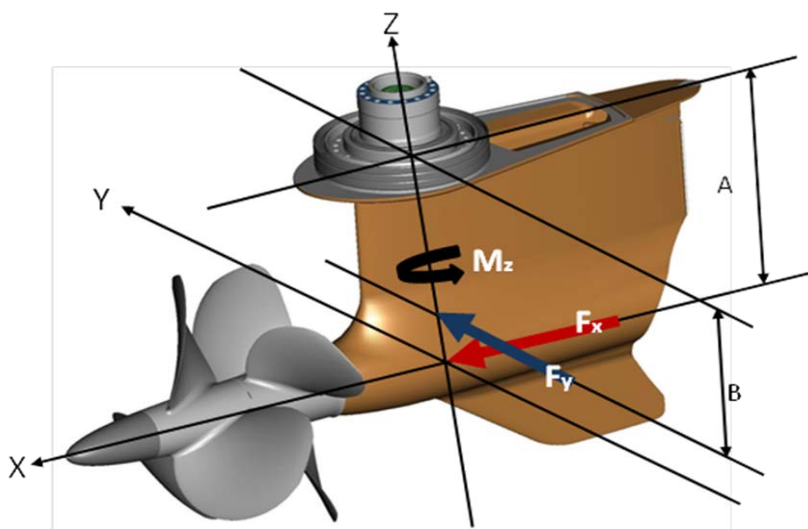
Generalized maximum load document for IPS 15

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.

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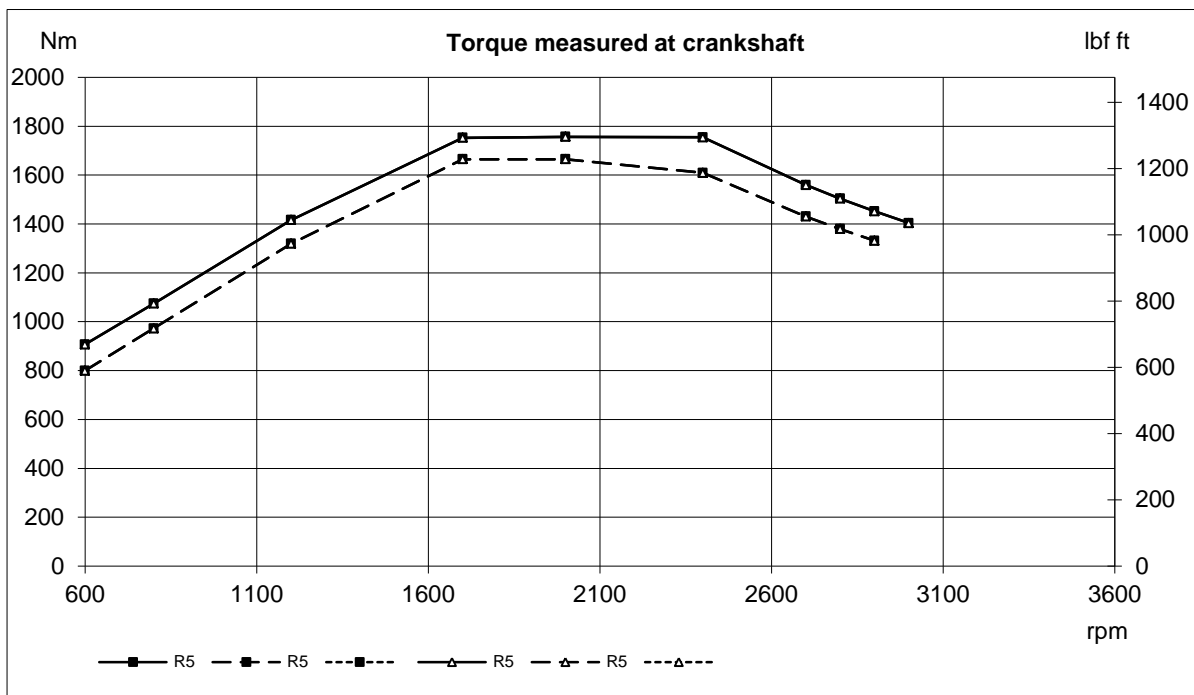
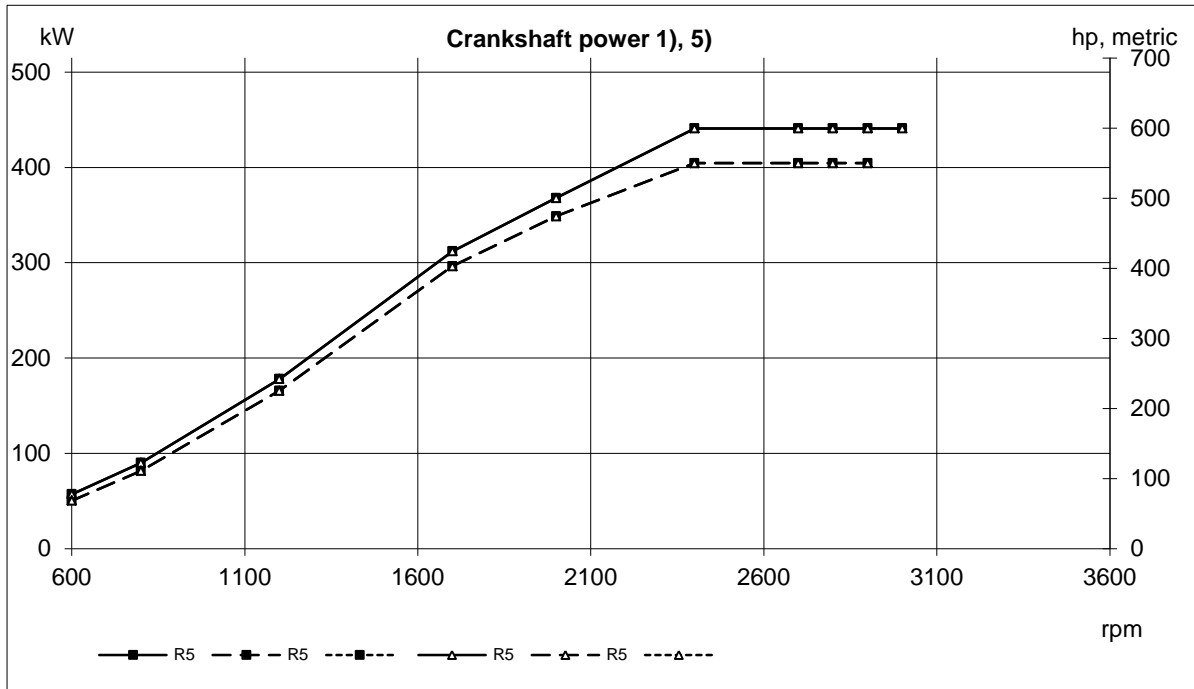
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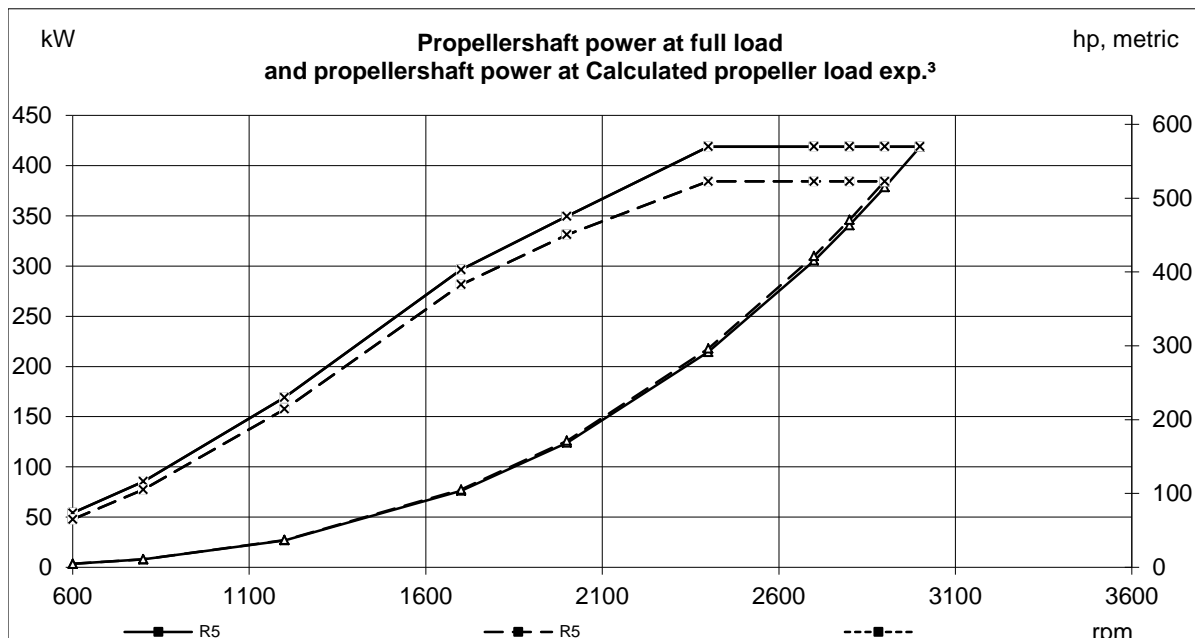
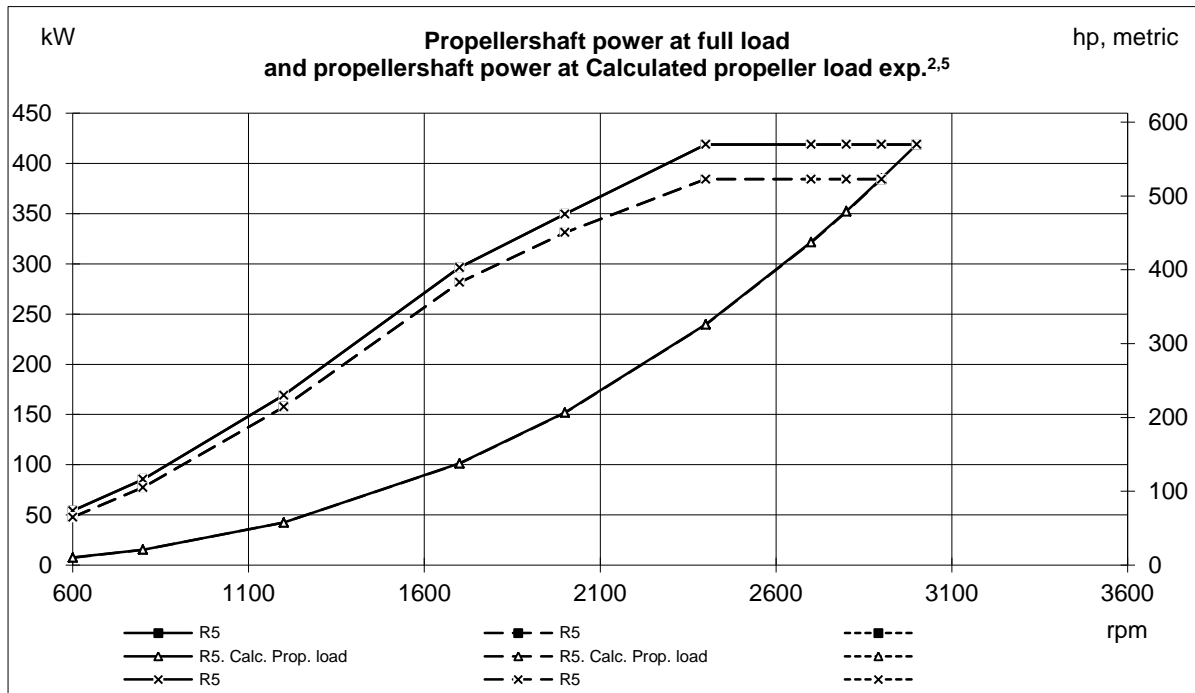
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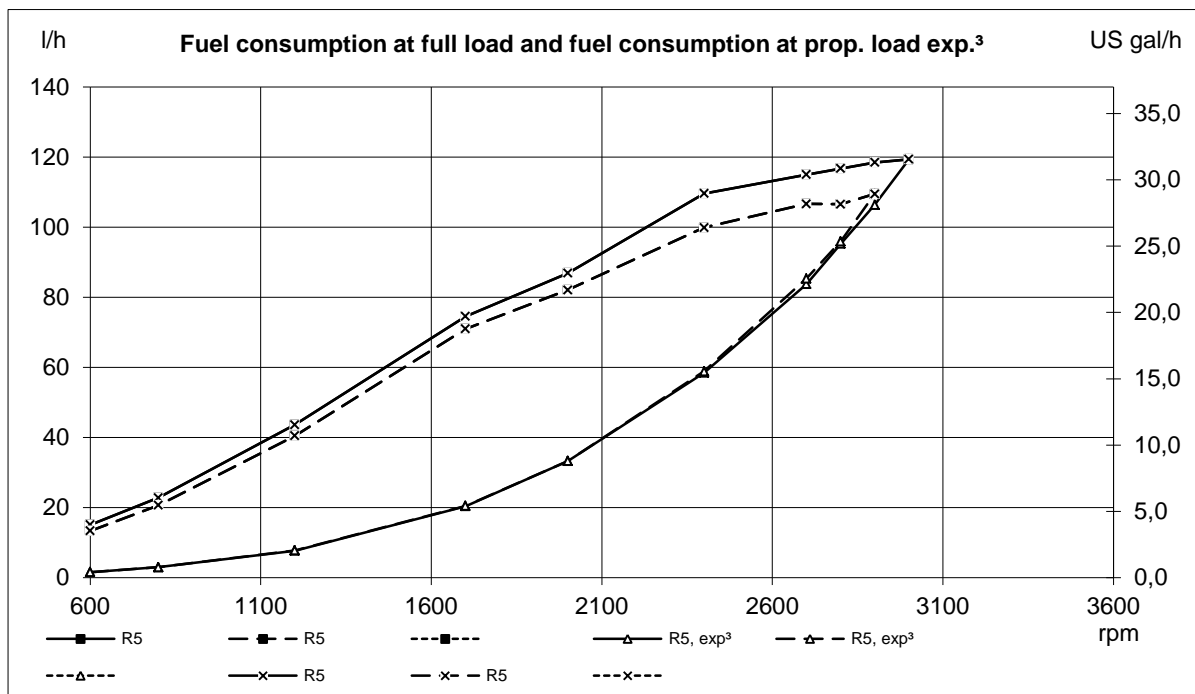
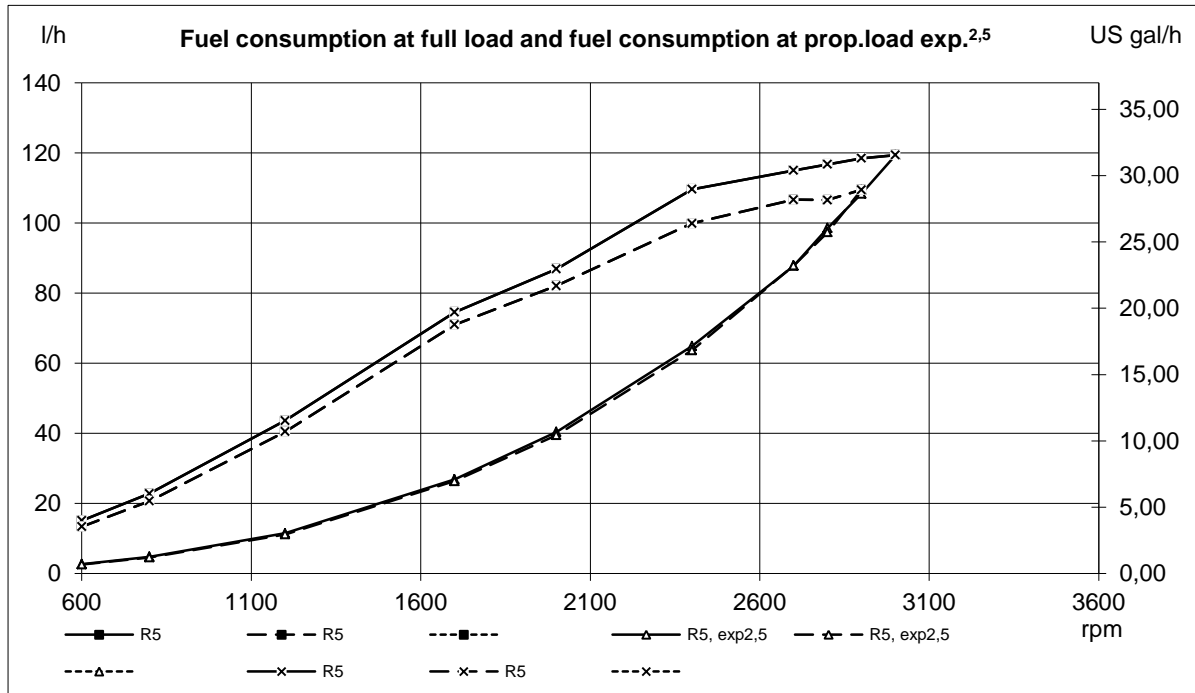
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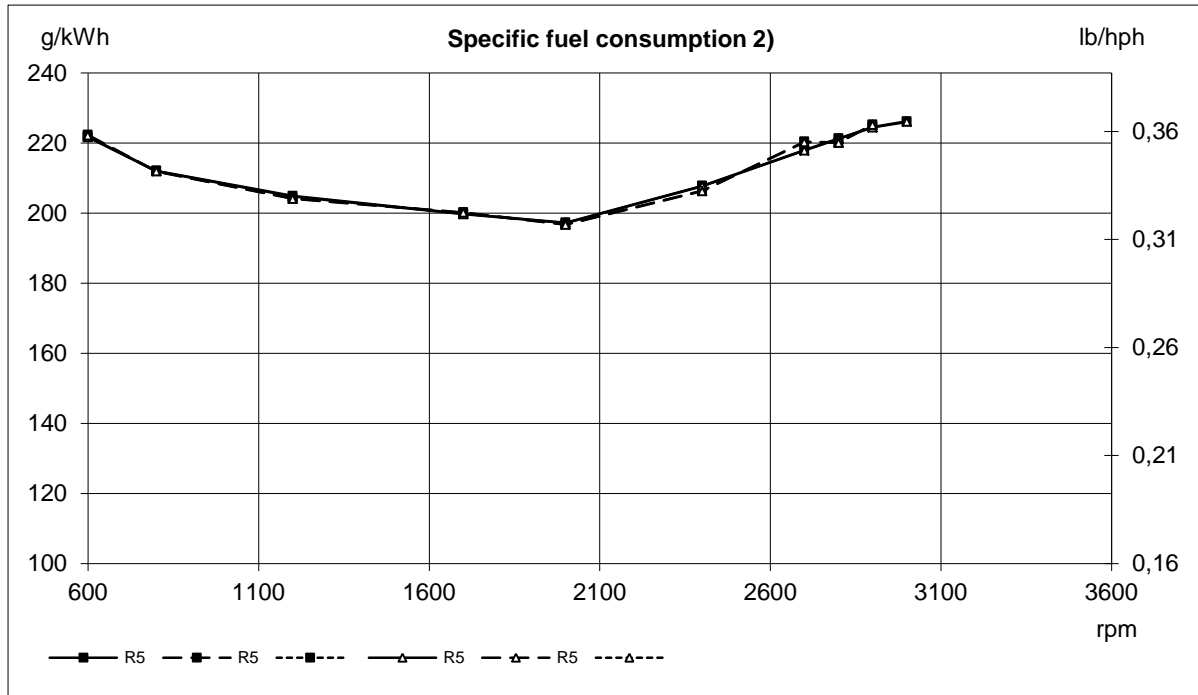
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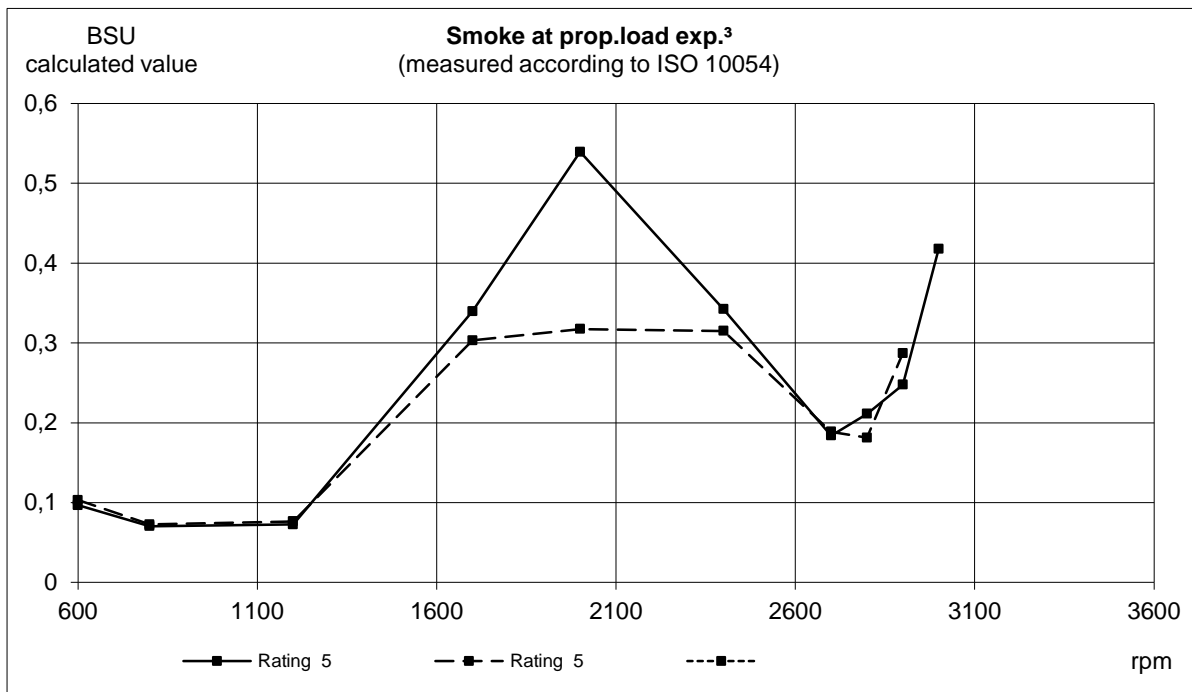
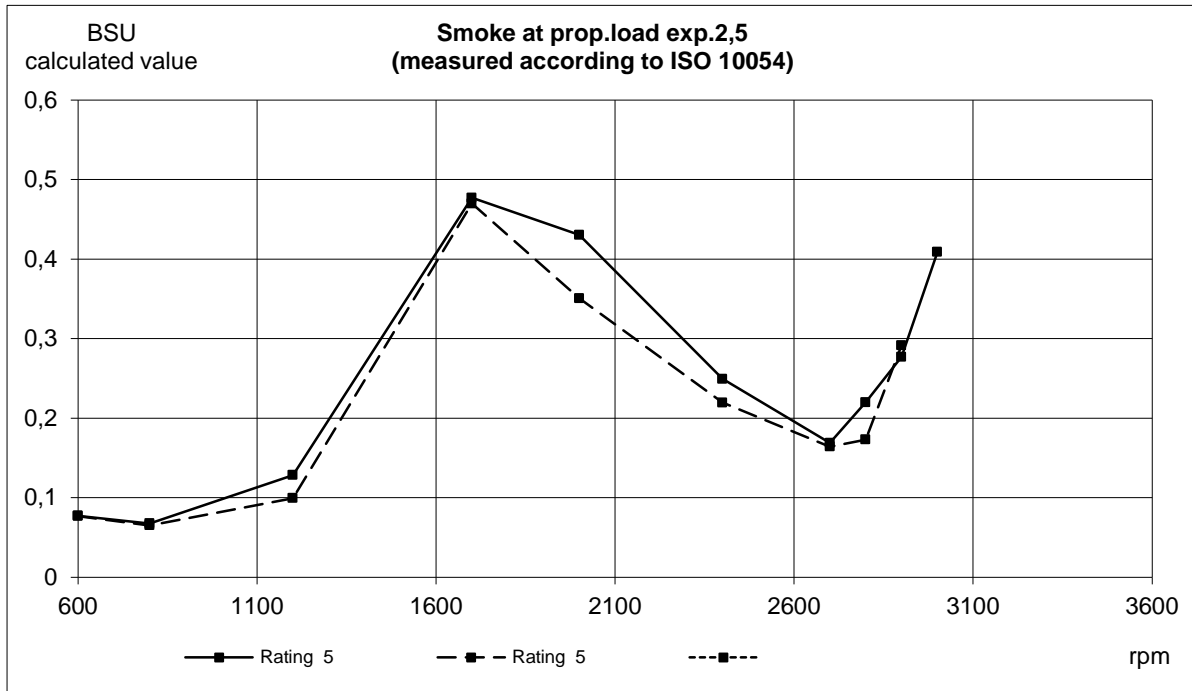
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