

VOLVO PENTA D16MH-600, D16MH-550, D16MH-500 Rating R1	Document No	Issue Index
	3847333	01

General

4-stroke direct injected, turbocharged and aftercooled diesel engine

Number of cylinders		6
No of valves		24
Displacement, total	litres	16,12
	in ³	983,9
Firing order		1-5-3-6-2-4
Rotational direction, viewed from the front		Clockwise
Bore	mm	144
	in	5,67
Stroke	mm	165
	in	6,50
Compression ratio		17,5:1
Compression pressure at 240 rpm	MPa psi	N/A
Max. static forward inclination:	°	5
Max. static backward inclination:	°	11
Max. intermittent forward inclination while running:	°	10
Max. intermittent backward inclination while running:	°	21
Max. intermittent side inclination while running:	°	30
Idling speed	rpm	550 - 800
Rated speed D16MH 600 R1	rpm	1800
Rated speed D15MH 550 R1	rpm	1800
Rated speed D16MH 500 R1	rpm	1800
Propeller selection range D16MH 600 R1	rpm	1780 - 1850
Propeller selection range D15MH 550 R1	rpm	
Propeller selection range D16MH 500 R1	rpm	
Dry weight engine BT	kg	1750
	lb	3858

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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Performance	Rating	r/min	600	800	1000	1200	1400	1500	1600	1800		
Crankshaft power 1), 5) D16MH 600 D15MH 550 D16MH 500	1	kW	85	167	302	389	429	439	441	442		
		hp	116	227	410	528	584	597	600	601		
	1	kW	83	166	287	365	401	404	405	405		
		hp	113	226	390	497	545	550	551	551		
	1	kW	84	166	271	348	369	367	369	368		
		hp	114	226	369	473	501	500	501	501		
Propeller shaft power 1) (At full load) With reverse gear TD MG 5170 With reverse gear TD MG 5170 With reverse gear TD MG 5170	1	kW	83	162	292	377	416	426	428	428		
		hp	113	220	398	513	566	579	582	583		
	1	kW	81	161	278	354	388	392	393	393		
		hp	110	219	379	482	528	533	534	534		
	1	kW	81	161	263	337	357	356	358	357		
		hp	110	219	358	459	486	485	486	486		
Propellershaft power at prop. load x ^{2,5} With reverse gear TD MG 5170 With reverse gear TD MG 5170 With reverse gear TD MG 5170	1	kW	27	56	99	155	229	272	319	428		
		hp	37	77	134	211	311	369	434	583		
	1	kW	25	52	90	143	210	249	293	393		
		hp	34	70	123	194	285	339	398	534		
	1	kW	23	47	82	130	191	227	266	358		
		hp	31	64	112	176	259	308	362	486		
Propellershaft power at prop. load x ³ With reverse gear TD MG 5170 With reverse gear TD MG 5170 With reverse gear TD MG 5170	1	kW	16	38	73	127	202	248	301	428		
		hp	22	51	100	173	274	337	409	583		
	1	kW	15	34	67	116	185	227	276	393		
		hp	20	47	92	158	251	309	375	534		
	1	kW	13	31	61	106	168	207	251	358		
		hp	18	43	83	144	229	281	342	486		
Torque at crankshaft 2)	1	Nm	1359	1989	2879	3092	2928	2793	2634	2343		
		lbf ft	1002	1467	2124	2280	2160	2060	1943	1728		
	1	Nm	1327	1983	2741	2907	2732	2574	2417	2148		
		lbf ft	979	1462	2021	2144	2015	1898	1783	1584		
	1	Nm	1329	1983	2591	2766	2514	2338	2200	1954		
		lbf ft	980	1462	1911	2040	1854	1725	1623	1442		
Mean piston speed		m/s	3,3	4,4	5,5	6,6	7,7	8,3	8,8	9,9		
		ft/s	10,8	14,4	18,0	21,7	25,3	27,1	28,9	32,5		
Effective mean pressure 2)	1	MPa	1,06	1,55	2,24	2,41	2,28	2,18	2,05	1,83		
		psi	153,6	224,8	325,5	349,5	331,0	315,8	297,8	264,8		
	1	MPa	1,03	1,55	2,14	2,27	2,13	2,01	1,88	1,67		
		psi	150,0	224,1	309,8	328,6	308,8	291,0	273,2	242,8		
	1	MPa	1,04	1,55	2,02	2,16	1,96	1,82	1,71	1,52		
		psi	150,2	224,1	292,9	312,7	284,1	264,3	248,7	220,9		
Max combustion pressure 2)	1	MPa	11,1	14	17,2	16,8	16,9	16,6	16,3	15		
		psi	1610	2031	2495	2437	2451	2408	2364	2176		
	1	MPa	10,9	13,9	16,6	15,5	15,8	15,3	14,8	14		
		psi	1581	2016	2408	2248	2292	2219	2147	2031		
	1	MPa	10,9	13,9	16	14,7	14,6	13,9	13,4	13		
		psi	1581	2016	2321	2132	2118	2016	1944	1885		

Lubricating system

Specific lubricating oil consumption.	g/kWh	0,08
Max. oil volume including filters for all allowed installation inclinations:	litres	55
	US gal	14,53
Max. oil volume excluding filters for all allowed installation inclinations:	litres	49
	US gal	12,94
Min. oil volume excluding filters for all allowed installation inclinations:	litres	39
	US gal	10,30

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

Fuel system	Rating	r/min	600	800	1000	1200	1400	1500	1600	1800		
Specific fuel consumption 2)	1	g/kWh lb/hph	240,4 0,389	235,7 0,382	212,2 0,344	199,8 0,324	195,2 0,316	194,8 0,316	197,3 0,32	209,3 0,339		
	1	g/kWh lb/hph	233,1 0,378	233,2 0,378	219 0,355	201,6 0,327	195,6 0,317	195,5 0,317	199,2 0,323	208,5 0,338		
	1	g/kWh lb/hph	235,2 0,381	234,9 0,381	219 0,355	203,4 0,33	197,3 0,32	199,8 0,324	202,2 0,328	209,4 0,339		
Fuel consumption, Test cycle E3	1	g/kWh lb/hph	206,4 0,33									
	1	g/kWh lb/hph	206,6 0,33									
	1	g/kWh lb/hph	207,7 0,34									
Fuel consumption at prop. load x ^{2,5}	1	l/h US gal/h	8,2 2,2	15,0 4,0	25,7 6,8	39,0 10,3	57,8 15,3	68,0 18,0	80,1 21,2	110,2 29,1		
	1	l/h US gal/h	7,5 2,0	14,0 3,7	23,7 6,3	36,1 9,5	53,3 14,1	63,2 16,7	73,7 19,5	101,2 26,7		
	1	l/h US gal/h	6,9 1,8	12,8 3,4	21,9 5,8	33,4 8,8	48,6 12,8	57,5 15,2	67,3 17,8	92,1 24,3		
Fuel consumption at prop. load x ³	1	l/h US gal/h	5,4 1,4	10,6 2,8	19,7 5,2	32,5 8,6	50,9 13,4	62,0 16,4	75,1 19,8	109,6 29,0		
	1	l/h US gal/h	5,1 1,3	10,0 2,7	18,5 4,9	29,8 7,9	47,0 12,4	57,5 15,2	69,5 18,4	101,1 26,7		
	1	l/h US gal/h	4,8 1,3	9,3 2,5	17,0 4,5	27,8 7,3	42,9 11,3	52,9 14,0	63,6 16,8	92,4 24,4		
Fuel consumption at full load	1	l/h US gal/h	24,6 6,5	47,0 12,4	76,6 20,2	92,9 24,5	100,3 26,5	102,3 27,0	104,2 27,5	110,6 29,2		
	1	l/h US gal/h	23,3 6,1	46,3 12,2	75,2 19,9	88,1 23,3	93,7 24,8	94,6 25,0	96,5 25,5	101,0 26,7		
	1	l/h US gal/h	23,5 6,2	46,7 12,3	71,1 18,8	84,6 22,3	87,0 23,0	87,8 23,2	89,2 23,6	92,3 24,4		

Intake and exhaust system	Rating	r/min	600	800	1000	1200	1400	1500	1600	1800		
Specific exhaust heating effect in percent of crankshaft power	1	%	75	88	82	70	66	65	66	73		
	1		72	86	82	71	67	66	68	73		
	1		72	87	82	73	68	69	71	74		
Exhaust temperature at the exhaust pipe connecting flange after the turbo charger.	1	°C °F	551 1024	681 1258	653 1207	532 990	456 853	439 822	423 793	411 772		
	1	°C °F	527 981	671 1240	651 1204	531 988	457 855	434 813	418 784	400 752		
	1	°C °F	527 981	678 1252	647 1197	538 1000	460 860	437 819	420 788	398 748		
Permitted back pressure in the exhaust line at rated speed. (Installed back pressure)		kPa psi								Max	15 2,2	
		kPa psi								Min	0 0,0	

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Intake and exhaust system	Rating	r/min	600	800	1000	1200	1400	1500	1600	1800		
Engine air consumption at 25°C / 77°F atmospheric pressure 100kPa and relative humidity 30%.	1	m³/min cu.ft./min	5,133 181,3	9,183 324,3	16,32 576,3	23,13 816,8	28,92 1021	30,95 1093	32,72 1155	37,55 1326		
	1	m³/min cu.ft./min	5,067 178,9	9,083 320,8	15,57 549,8	22,17 782,9	27,2 960,6	29,3 1035	31,28 1105	35,48 1253		
	1	m³/min cu.ft./min	5,05 178,3	9,033 319	14,82 523,4	21,32 752,9	25,47 899,5	27,52 971,9	29,6 1045	32,97 1164		
Charge air pressure Inlet manifold	1	kPa psi	20 2,9	60 8,7	132 19,1	174 25,2	194 28,1	194 28,1	193 28,0	200 29,0		
	1	kPa psi	18 2,6	59 8,6	121 17,5	163 23,6	177 25,7	178 25,8	179 26,0	181 26,3		
	1	kPa psi	18 2,6	59 8,6	111 16,1	151 21,9	158 22,9	160 23,2	163 23,6	161 23,4		
Exhaust gas flow	1	m³/min cu.ft./min	15,38 543,1	31,53 1113	52,63 1859	61,93 2187	67,77 2393	69,9 2468	71,72 2533	79,27 2799		
	1	m³/min cu.ft./min	14,73 520,2	31,02 1095	50,3 1776	59,57 2104	64,47 2277	66,13 2335	68,63 2424	74,62 2635		
	1	m³/min cu.ft./min	14,63 516,7	30,75 1086	47,55 1679	56,98 2012	60,08 2122	62,12 2194	64,62 2282	68,6 2423		

Cooling system	Rating	r/min	600	800	1000	1200	1400	1500	1600	1800		
Radiated heat in percent of crankshaft power.	1	%	17	12	5	3	3	3	4	4		
	1		13	12	7	4	3	4	4	3		
	1		16	12	7	3	3	3	2	3		
Heat rejection to charge air cooler in percent of crankshaft power.	1	%	2	5	10	13	16	17	18	22		
	1		2	5	9	13	15	16	18	21		
	1		2	5	9	12	14	15	17	19		
Coolant heat rejection to HE, incl. engine oil cooler and excl. charge air cooler, in percent of crankshaft power.	1	%	11	71	60	51	48	49	49	54		
	1		14	70	61	53	50	50	50	55		
	1		75	70	59	54	50	51	52	55		
Coolant flow with fully open thermostat and std cooling system		l/min	168,7	263,3	318,2	406,8	479,7	513,5	546,5	617		
		cu.ft./min	6,0	9,3	11,2	14,4	16,9	18,1	19,3	21,8		
Max. permissible temperature on coolant in engine outlet		°C	96									
		°F	205									
Coolant volume engine, including heat exchanger and charge air cooler		litres	56									
		US gal.	14,79									
Max. additional coolant for cabin heater etc. with std. Expansion tank		litres	20									
		US gal.	5,28									
Thermostat, start open at		°C	86									
		°F	187									
Thermostat, fully open at		°C	96									
		°F	205									

Raw water circuit	r/min	600	800	1000	1200	1400	1500	1600	1800		
Nominal raw water design flow	l/min	153	205	258	306	351	371	394	432		
	cu.ft./min	5,4	7,2	9,1	10,8	12,4	13,1	13,9	15,3		
Maximum raw water pump suction head	kPa	30									
	psi	4,4									
Maximum additional pressure drop excl. reverse gear oil cooler	kPa	7	10	13	17	21	26	31	33		
	psi	1,0	1,5	1,9	2,5	3,0	3,8	4,5	4,8		
Pressure drop over reverse gear oil cooler (optional equipment)	kPa	4	6	10	14	18	21	23	28		
	psi	0,6	0,9	1,5	2,0	2,6	3,0	3,3	4,1		
Maximum raw water temperature entering heat exchanger	°C	32									
	°F	90									

- 1) ISO 3046, fuel temp 40°C.
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- 2) At power according to 1).
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- 5) At installed back pressure

2 circuit keel cooling system, LT		Rating	r/min	600	800	1000	1200	1400	1500	1600	1800		
Maximum temperature to charge air cooler from external LT-cooling system circuit	1	°C	20	22	28	34	37	38	40	44			
		°F	68	72	82	93	99	100	104	111			
	1	°C	20	23	29	34	38	40	41	44			
		°F	68	73	84	93	100	104	106	111			
	1	°C	21	24	28	34	36	38	39	41			
		°F	70	75	82	93	97	100	102	106			
Coolant flow through keel cooler, LT-cooling system circuit	1	l/min	38	47	53	63	72	75	78	85			
		cu.ft./min	1,3	1,7	1,9	2,2	2,5	2,6	2,8	3,0			
	1	l/min	40	48	53	63	72	75	78	83			
		cu.ft./min	1,4	1,7	1,9	2,2	2,5	2,6	2,8	2,9			
	1	l/min	38	47	52	62	68	72	75	80			
		cu.ft./min	1,3	1,7	1,8	2,2	2,4	2,5	2,6	2,8			
Pressure drop in external LT-cooling system circuit, including piping		kPa	50										
		psi	7,3										
Coolant volume charge air cooler		litres	5										
		US gal.	1,32										

2 circuit keel cooling system, HT		Rating	r/min	600	800	1000	1200	1400	1500	1600	1800		
Design point for keel cooler, engine outlet temperature	1	°C									90		
		°F									194		
	1	°C									89		
		°F									192		
	1	°C									89		
		°F									192		
Maximum temperature to engine from external HT-cooling system circuit	1	°C									63		
		°F									145		
	1	°C									63		
		°F									145		
	1	°C									64		
		°F									147		
Coolant flow through keel cooler, HT-cooling system circuit at design point	1	l/min									144		
		cu.ft./min									5,1		
	1	l/min									137		
		cu.ft./min									4,8		
	1	l/min									132		
		cu.ft./min									4,7		
Maximum coolant flow through keel cooler, HT-cooling system circuit	1	l/min									445		
		cu.ft./min									15,7		
	1	l/min									441		
		cu.ft./min									15,6		
	1	l/min									439		
		cu.ft./min									15,5		
Pressure drop in external HT-cooling system circuit, including piping		kPa	50										
		psi	7,3										
Coolant volume engine, excl. heat exchangers		litres	38										
		US gal.	10,04										

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5) At installed back pressure

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Emissions	Rating	r/min	600	800	1000	1200	1400	1500	1600	1800		
Smoke at prop. load x ^{2,5}	1	*BSU	0,0	0,1	0,3	0,7	0,5	0,3	0,2	0,2		
	1	*BSU	0,0	0,1	0,3	0,6	0,6	0,4	0,3	0,2		
	1	*BSU	0,0	0,1	0,3	0,6	0,7	0,4	0,3	0,2		
Smoke at prop. load x ³	1	*BSU	0,0	0,0	0,2	0,6	0,6	0,3	0,2	0,2		
	1	*BSU	0,0	0,0	0,2	0,5	0,7	0,4	0,3	0,2		
	1	*BSU	0,0	0,1	0,1	0,4	0,7	0,5	0,3	0,2		
Noise at prop. load x ^{2,5} . 4)	1	dBA	103,4	105,7	108,6	110,5	113,7	114,1	115,8	121		
	1	dBA	103,3	105,4	108,3	110,2	113,6	114	114,7	120,1		
	1	dBA	103,3	105,4	108,3	110,2	113,6	114	114,7	120,1		
Noise at prop. load x ³ . 4)	1	dBA	103,8	105,9	108,4	110,4	113,6	114,5	115,2	121,3		
	1	dBA	103,5	106	108,4	110,2	113,3	114	114,5	120,5		
	1	dBA	103,5	106	108,4	110,2	113,3	114	114,5	120,5		

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

1) ISO 3046, fuel temp 40°C.

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5) At installed back pressure