

General

4-stroke direct injected, turbocharged and aftercooled diesel engine

Number of cylinders		5
No of valves		20
Displacement, total	litres in ³	2,40 146,5
Firing order		1-2-4-5-3
Rotational direction, viewed from the front		Clockwise
Bore	mm in	81 3,19
Stroke	mm in	93,2 3,67
Compression ratio		16,5
Max. static forward inclination:	°	0
Max. static backward inclination:	°	10
Max. intermittent forward inclination while running:	°	20
Max. intermittent backward inclination while running:	°	10
Max. intermittent side inclination while running:	°	20
Idling speed	rpm	700 + 50
Rated speed R5	rpm	4000
Rated speed R5	rpm	4000
Propeller selection range R5	rpm	3900-4130
Dry weight engine BT	kg lb	260 573

Performance	Rating	rpm	700	1200	1600	2000	2400	2800	3200	3600	4000	4130
Crankshaft power 1), 5)	5	kW	11	25	47	88	116	136	156	162	162	162
		hp	15	34	64	120	158	185	212	220	220	220
Propeller shaft power 1) (At full load) With reverse gear	5	kW	11	24	45	84	111	131	150	156	156	156
		hp	14	33	61	115	151	178	204	212	212	212
Propellershaft power at prop. load $x^{2,5}$ With reverse gear	5	kW	1	2	8	16	27	43	64	89	120	156
		hp	2	3	10	21	37	59	87	121	163	212
Torque at crankshaft 2)	5	Nm	150,1	198,9	280,5	420,2	461,5	463,8	465,5	429,7	386,7	374,6
		lbf ft	111	147	207	310	340	342	343	317	285	276
Mean piston speed		m/s	2,2	3,7	5,0	6,2	7,5	8,7	9,9	11,2	12,4	12,8
		ft/s	7,1	12,2	16,3	20,4	24,5	28,5	32,6	36,7	40,8	42,1
Effective mean pressure 2)	5	MPa	0,79	1,04	1,47	2,20	2,42	2,43	2,44	2,25	2,02	1,96
		psi	113,9	151,0	212,9	318,9	350,3	352,0	353,3	326,2	293,5	284,3
Max combustion pressure 2)	5	MPa	9,3	11,6	15	15,5	16,7	17,2	17,2	17,6	18	18
		psi	1349	1682	2176	2248	2422	2495	2495	2553	2611	2611

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

Lubricating system

Specific lubricating oil consumption.	g/kWh	0,29
Max. oil volume including filters for all allowed installation inclinations:	litres	6,3
	US gal	1,66
Max. oil volume excluding filters for all allowed installation inclinations:	litres	5,8
	US gal	1,53
Min. oil volume excluding filters for all allowed installation inclinations:	litres	4,3
	US gal	1,14

Fuel system

	Rating	rpm	700	1200	1600	2000	2400	2800	3200	3600	4000	4130
Specific fuel consumption 2)	5	g/kWh	288	264	241	225	217	216	223	232	239	243
		lb/hph	0,467	0,428	0,39	0,365	0,352	0,35	0,361	0,376	0,387	0,394
Fuel consumption, Test cycle E5	5	g/kWh	229									
		lb/hph	0,37									
Fuel consumption at prop. load x ^{2,5}	5	l/h		0,9	2,5	4,6	7,8	12,1	17,6	23,9	32,9	46,3
		US gal/h		0,2	0,7	1,2	2,1	3,2	4,6	6,3	8,7	12,2
Fuel consumption at full load	5	l/h	3,8	7,9	13,6	23,7	30,1	35,2	41,6	45,0	46,3	47,1
		US gal/h	1,0	2,1	3,6	6,3	8,0	9,3	11,0	11,9	12,2	12,4

Intake and exhaust system

	Rating	rpm	700	1200	1600	2000	2400	2800	3200	3600	4000	4130	
Specific exhaust heating effect in percent of crankshaft power	5	%	54	65	67	69	70	71	79	87	92	94	
	5		54	65	67	69	70	71	79	87	92	94	
Exhaust temperature at the exhaust pipe connecting flange after the turbo charger.	5	°C	357	462	499	567	570	556	592	616	607	596	
		°F	675	864	930	1053	1058	1033	1098	1141	1125	1105	
Permitted back pressure in the exhaust line at rated speed. (Installed back pressure)		kPa								Max	30		
		psi									4,4		
		kPa								Min	5		
		psi									0,7		
Engine air consumption at 25°C / 77°F atmospheric pressure 100kPa and relative humidity 30%.	5	m³/min	0,7	1,6	2,8	4,8	6,3	7,9	9,3	10,3	11,1	11,5	
		cu.ft./min	24,72	56,5	98,88	169,5	222,5	279	328,4	363,7	392	406,1	
Charge air pressure Inlet manifold	5	kPa	105	127	169	230	254	270	280	276	274	279	
		psi	15,2	18,4	24,5	33,4	36,8	39,2	40,6	40,0	39,7	40,5	
Exhaust gas flow	5	m³/min	1,8	4,3	8	14,2	18,3	21,2	24,9	27,1	28	28,4	
		cu.ft./min	63,57	151,9	282,5	501,5	646,3	748,7	879,3	957	988,8	1003	

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Cooling system	Rating	rpm	700	1200	1600	2000	2400	2800	3200	3600	4000	4130
Radiated heat in percent of crankshaft power.	5	%				9	7	5	4	3	2	2
Heat rejection to charge air cooler in percent of crankshaft power.	5	%	2	5	9	13	14	16	17	17	19	20
Coolant heat rejection to HE in percent of crankshaft power.	5	%	0	90	81	72	66	65	66	70	72	74
Coolant flow with fully open thermostat and std cooling system		l/min	45	80	109	138	165,9	195	221	250	275	283
		cu.ft./min	1,6	2,8	3,8	4,9	5,9	6,9	7,8	8,8	9,7	10,0
Max. permissible temperature on coolant in engine outlet		°C	98									
		°F	208									
Coolant volume engine, including heat exchanger		litres	8,7									
		US gal.	2,30									
Max. additional coolant for cabin heater etc. with std. Expansion tank		litres	8									
		US gal.	2,11									
Maximum coolant flow to cabin heater etc.		l/min	20									
		cu.ft./min	0,71									
Thermostat, start open at		°C	80									
		°F	176									
Thermostat, fully open at		°C	94									
		°F	201									

Raw water circuit	rpm	700	1200	1600	2000	2400	2800	3200	3600	4000	4130
Nominal raw water design flow	l/min	27	46	61	76	90	103	115	126	136	138
	cu.ft./min	1,0	1,6	2,2	2,7	3,2	3,6	4,1	4,4	4,8	4,9
Nominal raw water pump pressure head at design flow. (measured before and after pump)	kPa	19	26	36	48	62	77	93	109	125	130
	psi	2,8	3,8	5,2	7,0	9,0	11,2	13,5	15,8	18,1	18,9
Maximum raw water pump suction head	kPa	30									
	psi	4,4									
Maximum additional pressure drop excl. reverse gear oil cooler and riser	kPa	0	1	3	5	8	12	17	22	28	30
	psi		0,1	0,4	0,7	1,2	1,7	2,5	3,2	4,1	4,4
Pressure drop over reverse gear oil cooler (optional equipment)	kPa	2	3	4	5	6	7	7	8	9	9
	psi	0,2	0,4	0,6	0,7	0,9	1,0	1,0	1,2	1,3	1,3
Maximum raw water temperature entering charge air cooler	°C	30									
	°F	86									

Emissions	Rating	rpm	700	1200	1600	2000	2400	2800	3200	3600	4000	4130
Smoke at prop. load x ^{2,5}	5	*BSU	0,0	0,0	0,0	0,3	0,2	0,2	0,1	0,2	0,8	
Noise at prop. load x ^{2,5} . 4)	5	dBA	92	95	100	106	111	110	111	111	112	

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

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