General

4-stroke direct injected, turbocharged and aftercooled diesel engine

Number of cylinders		5
No of valves		20
Displacement, total	litres in³	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:	°	5
Max. intermittent forward inclination while running:	°	10
Max. intermittent backward inclination while running:	°	20
Max. intermittent side inclination while running:	°	20
Idling speed	rpm	700 + 50
Rated speed R5	rpm	3000
Rated speed R5	rpm	3000
	rpm	
Propeller selection range R5	rpm	2900-3130
Dry weight engine BT	kg lb	260 573

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5) At installed back pressure

Performance	Rating	rpm	700	1200	1600	2000	2200	2400	2600	2800	3000	3130
Crankshaft power 1), 5)	5	kW	11	25	43	62	69	80	80	81	81	81
		hp	15	34	58	84	94	109	109	110	110	110
	5	kW	11	25	43	62	69	80	80	81	81	81
		hp	15	34	58	84	94	109	109	110	110	110
Propeller shaft power 1) (At full load) With drive	5	kW	10	24	41	59	66	76	76	77	77	77
		hp	14	32	56	80	89	103	103	105	105	105
With reverse gear	5	kW	11	24	41	60	66	77	77	78	78	78
		hp	14	33	56	81	90	104	104	106	106	106
Propellershaft power at prop. load $x^{2,5}$	5	kW	2	8	16	28	35	44	54	65	77	
		hp	3	11	22	38	48	60	73	88	105	
	5	kW	2	8	16	28	36	45	54	65	78	
		hp	3	11	22	38	49	61	74	89	106	
Torque at crankshaft 2)	5	Nm	150,1	198,9	256,6	296	299,5	318,3	293,8	276,2	257,8	247,1
		lbf ft	111	147	189	218	221	235	217	204	190	182
	5	Nm	150,1	198,9	256,6	296	299,5	318,3	293,8	276,2	257,8	247,1
		lbf ft	111	147	189	218	221	235	217	204	190	182
Mean piston speed		m/s	2,2	3,7	5,0	6,2	6,8	7,5	8,1	8,7	9,3	9,7
		ft/s	7,1	12,2	16,3	20,4	22,4	24,5	26,5	28,5	30,6	31,9
Effective mean pressure 2)	5	MPa	0,79	1,04	1,34	1,55	1,57	1,67	1,54	1,45	1,35	1,29
		psi	113,9	151,0	194,8	224,7	227,3	241,6	223,0	209,7	195,7	187,6
	5	MPa	0,79	1,04	1,34	1,55	1,57	1,67	1,54	1,45	1,35	1,29
		psi	113,9	151,0	194,8	224,7	227,3	241,6	223,0	209,7	195,7	187,6
Max combustion pressure 2)	5	MPa	10,2	10,7	11	10,8	11,4	11,7	11,3	10,9	10,7	10,4
		psi	1479	1552	1595	1566	1653	1697	1639	1581	1552	1508
	5	MPa	10,2	10,7	11	10,8	11,4	11,7	11,3	10,9	10,7	10,4
		psi	1479	1552	1595	1566	1653	1697	1639	1581	1552	1508

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

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Fuel system	Rating	rpm	700	1200	1600	2000	2200	2400	2600	2800	3000	3130
Specific fuel consumption 2)	5	g/kWh	350	251	243	214	211	213	214	214	218	220
		lb/hph	0,567	0,407	0,394	0,347	0,342	0,345	0,347	0,347	0,353	0,356
	5	g/kWh	350	251	243	214	211	213	214	214	218	220
		lb/hph	0,567	0,407	0,394	0,347	0,342	0,345	0,347	0,347	0,353	0,356
Fuel consumption, Test cycle E5	5	g/kWh	232									
		lb/hph	0,38									
	5	g/kWh	232									
		lb/hph	0,38									
Fuel consumption at prop. load x [2,5]	5	l/h	0,8	2,4	4,7	7,9	9,9	12,4	14,8	17,8	21,0	
		US gal/h	0,2	0,6	1,2	2,1	2,6	3,3	3,9	4,7	5,6	
	5	l/h	0,8	2,4	4,7	7,9	9,9	12,4	14,8	17,8	21,0	
		US gal/h	0,2	0,6	1,2	2,1	2,6	3,3	3,9	4,7	5,6	

Fuel system	Rating	rpm	700	1200	1600	2000	2200	2400	2600	2800	3000	3130
Fuel consumption at full load	5	l/h	4,6	7,5	12,5	15,9	17,4	20,4	20,5	20,7	21,1	21,3
		US gal/h	1,2	2,0	3,3	4,2	4,6	5,4	5,4	5,5	5,6	5,6
	5	l/h	4,6	7,5	12,5	15,9	17,4	20,4	20,5	20,7	21,1	21,3
		US gal/h	1,2	2,0	3,3	4,2	4,6	5,4	5,4	5,5	5,6	5,6

Intake and exhaust system	Rating	rpm	700	1200	1600	2000	2200	2400	2600	2800	3000	3130
Specific exhaust heating effect in percent of crankshaft power	5	%									70	
	5										70	
Exhaust temperature at the exhaust pipe connecting flange after the turbo charger.	5	°C									422	
		°F									792	
	5	°C									422	
		°F									792	
Permitted back pressure in the exhaust line at rated speed. (Installed back pressure)		kPa							Max		10	
		psi									1,5	
		kPa							Min		5	
		psi									0,7	

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Intake and exhaust system	Rating	rpm	700	1200	1600	2000	2200	2400	2600	2800	3000	3130
Engine air consumption at 25°C / 77°F atmospheric pressure 100kPA and relative humidity 30%.	5	m³/min cu.ft./min									6,5 229,5	
	5	m³/min cu.ft./min									6,5 229,5	
Charge air pressure Inlet manifold	5	kPa psi									198 28,7	
	5	kPa psi									198 28,7	
Exhaust gas flow	5	m³/min cu.ft./min									14,5 512,1	
	5	m³/min cu.ft./min									14,5 512,1	

Cooling system	Rating	rpm	700	1200	1600	2000	2200	2400	2600	2800	3000	3130
Radiated heat in percent of crankshaft power.	5	%									6	
	5										6	
Heat rejection to charge air cooler in percent of crankshaft power.	5	%									15	
	5										15	
Coolant heat rejection to HE in percent of crankshaft power.	5	%									57	
	5										57	
Coolant flow with fully open thermostat and std cooling system		l/min cu.ft./min									208 7,3	
Max. permissible temperature on coolant in engine outlet		°C °F	98 208									
Coolant volume engine, including heat exchanger		litres US gal.	8,7 2,30									
Max. additional coolant for cabin heater etc. with std. Expansion tank		litres US gal.	8 2,11									
Maximum coolant flow to cabin heater etc.		l/min cu.ft./min	20 0,71									
Thermostat, start open at		°C °F	80 176									
Thermostat, fully open at		°C °F	94 201									

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Raw water circuit	rpm	700	1200	1600	2000	2200	2400	2600	2800	3000	3130
Nominal raw water design flow	l/min cu.ft/min									105 3,7	
Nominal raw water pump pressure head at design flow. (measured before and after pump)	kPa psi									85 12,3	
Maximum raw water pump suction head	kPa psi	30 4,4									
Maximum additional pressure drop excl. reverse gear oil cooler and riser	kPa psi									14 2,0	
Pressure drop over reverse gear oil cooler (optional equipment)	kPa psi									7 1,0	
Maximum raw water temperature entering charge air cooler	°C °F	30 86									

Emissions	Rating	rpm	700	1200	1600	2000	2200	2400	2600	2800	3000	3130
Smoke at prop. load $x^{2,5}$	5	*BSU	0,0	0,0	0,1	0,2	0,1	0,2	0,1	0,1	0,1	
	5	*BSU	0,0	0,0	0,1	0,2	0,1	0,2	0,1	0,1	0,1	
Noise at prop. load $x^{2,5}$. 4)	5	dBA	92	94	99	107	109	111	110	109	110	
	5	dBA	92	94	99	107	109	111	110	109	110	

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

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