

General

4-stroke direct injected, turbocharged and aftercooled diesel engine

Number of cylinders		5
No of valves		20
Displacement, total	litres	2,40
	in ³	146,5
Firing order		1-2-4-5-3
Rotational direction, viewed from the front		Clockwise
Bore	mm	81
	in	3,19
Stroke	mm	93,2
	in	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	4000
Rated speed R5	rpm	4000
Propeller selection range R5	rpm	3900-4130
Propeller selection range R5	rpm	3900-4130
	rpm	
Dry weight engine BT	kg	260
	lb	573

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

Performance	Rating	rpm	700	1200	1600	2000	2400	2800	3200	3600	4000	4130
Crankshaft power 1), 5)	5	kW	12	26	49	82	106	125	144	147	147	147
		hp	16	36	67	112	144	170	196	200	200	200
	5	kW	12	26	49	82	106	125	144	147	147	147
		hp	16	36	67	112	144	170	196	200	200	200
Propeller shaft power 1) (At full load) With drive	5	kW	11	25	47	78	101	119	137	140	140	140
		hp	15	34	64	106	137	162	186	190	190	190
With reverse gear	5	kW	11	25	47	79	102	120	138	141	141	141
		hp	15	34	64	108	139	163	188	192	192	192
Propellershaft power at prop. load x ^{2,5}	5	kW	2	7	14	25	39	57	80	107	140	
		hp	2	9	19	34	53	78	109	146	190	
	5	kW	2	7	14	25	39	58	81	108	141	
		hp	2	9	19	34	54	79	110	147	192	
Torque at crankshaft 2)	5	Nm	158,2	210,1	294,8	393,4	422,2	426,6	429,4	389,9	350,9	339,9
		lbf ft	117	155	217	290	311	315	317	288	259	251
	5	Nm	158,2	210,1	294,8	393,4	422,2	426,6	429,4	389,9	350,9	339,9
		lbf ft	117	155	217	290	311	315	317	288	259	251
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	0,83	1,10	1,54	2,06	2,21	2,23	2,25	2,04	1,84	1,78
		psi	120,1	159,5	223,8	298,6	320,4	323,8	325,9	296,0	266,4	258,0
	5	MPa	0,83	1,10	1,54	2,06	2,21	2,23	2,25	2,04	1,84	1,78
		psi	120,1	159,5	223,8	298,6	320,4	323,8	325,9	296,0	266,4	258,0
Max combustion pressure 2)	5	MPa	10,3	11,8	16	15,2	15,7	15,8	16,5	16,3	16	15,8
		psi	1494	1711	2321	2205	2277	2292	2393	2364	2321	2292
	5	MPa	10,3	11,8	16	15,2	15,7	15,8	16,5	16,3	16	15,8
		psi	1494	1711	2321	2205	2277	2292	2393	2364	2321	2292

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	2400	2800	3200	3600	4000	4130
Specific fuel consumption 2)	5	g/kWh	320,4	246,4	221,8	209,1	204,6	206,9	215,1	221,5	229,7	233,6
		lb/hph	0,519	0,399	0,359	0,339	0,331	0,335	0,348	0,359	0,372	0,378
	5	g/kWh	320,4	246,4	221,8	209,1	204,6	206,9	215,1	221,5	229,7	233,6
		lb/hph	0,519	0,399	0,359	0,339	0,331	0,335	0,348	0,359	0,372	0,378
Fuel consumption, Test cycle E5	5	g/kWh	224,3									
		lb/hph	0,36									
	5	g/kWh	224,3									
		lb/hph	0,36									
Fuel consumption at prop. load x ^{2,5}	5	l/h	0,8	2,3	4,2	7,2	10,6	15,5	21,5	29,7	40,4	
		US gal/h	0,2	0,6	1,1	1,9	2,8	4,1	5,7	7,8	10,7	
	5	l/h	0,8	2,3	4,2	7,2	10,6	15,5	21,5	29,7	40,4	
		US gal/h	0,2	0,6	1,1	1,9	2,8	4,1	5,7	7,8	10,7	

Fuel system	Rating	rpm	700	1200	1600	2000	2400	2800	3200	3600	4000	4130
Fuel consumption at full load	5	l/h	4,4	7,8	13,1	20,6	26,0	31,0	37,0	39,0	40,4	41,1
		US gal/h	1,2	2,1	3,5	5,4	6,9	8,2	9,8	10,3	10,7	10,9
	5	l/h	4,4	7,8	13,1	20,6	26,0	31,0	37,0	39,0	40,4	41,1
		US gal/h	1,2	2,1	3,5	5,4	6,9	8,2	9,8	10,3	10,7	10,9

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	%									82	
	5										82	
Exhaust temperature at the exhaust pipe connecting flange after the turbo charger.	5	°C									508	
		°F									946	
	5	°C									508	
		°F									946	
Permitted back pressure in the exhaust line at rated speed. (Installed back pressure)		kPa								Max	27	
		psi									3,9	
		kPa								Min	5	
		psi									0,7	

Intake and exhaust system	Rating	rpm	700	1200	1600	2000	2400	2800	3200	3600	4000	4130
Engine air consumption at 25°C / 77°F atmospheric pressure 100kPa and relative humidity 30%.	5	m ³ /min									10,8	
		cu.ft./min									381,4	
	5	m ³ /min									10,8	
		cu.ft./min									381,4	
Charge air pressure Inlet manifold	5	kPa									264	
		psi									38,3	
	5	kPa									264	
		psi									38,3	
Exhaust gas flow	5	m ³ /min									24,4	
		cu.ft./min									861,7	
	5	m ³ /min									24,4	
		cu.ft./min									861,7	

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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	%									7	
	5										7	
Heat rejection to charge air cooler in percent of crankshaft power.	5	%									20	
	5										20	
Coolant heat rejection to HE in percent of crankshaft power.	5	%									52	
	5										52	
Coolant flow with fully open thermostat and std cooling system		l/min cu.ft./min									270 9,5	
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 cu.ft./min									132 4,7	
Nominal raw water pump pressure head at design flow. (measured before and after pump)	kPa psi									125 18,1	
Maximum raw water pump suction head	kPa psi	30 4,4									
Maximum additional pressure drop excl. reverse gear oil cooler and riser	kPa psi									28 4,1	
Pressure drop over reverse gear oil cooler (optional equipment)	kPa psi									9 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	0,0	0,1	0,1	0,1	0,2	0,3	
	5	*BSU	0,0	0,0	0,0	0,0	0,1	0,1	0,1	0,2	0,3	
		*BSU										
Smoke at prop. load x ³	5	*BSU	0,0	0,0	0,1	0,0	0,0	0,1	0,1	0,2	0,3	
	5	*BSU	0,0	0,0	0,1	0,0	0,0	0,1	0,1	0,2	0,3	
		*BSU										
Noise at prop. load x ^{2.5} . 4)	5	dBA	92	94	99	105	110	110	110	110	112	
	5	dBA	92	94	99	105	110	110	110	110	112	
		dBA										
Noise at prop. load x ³ . 4)	5	dBA										
	5	dBA										
		dBA										

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

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