

D4-225 I
R4 225 hp (165 kW)

21954792**01****General**

4-stroke direct injected, turbocharged and aftercooled diesel engine

Number of cylinders		4
No of valves		16
Displacement, total	litres in ³	3,67 223,7
Firing order		1-3-4-2
Rotational direction, viewed from the front		Clockwise
Bore	mm in	103 4,06
Stroke	mm in	110 4,33
Compression ratio		17.5:1
Max. static forward inclination:	°	0
Max. static backward inclination:	°	10
Max. intermittent forward inclination while running:	°	10
Max. intermittent backward inclination while running:	°	20
Max. intermittent side inclination while running:	°	30 for max 30 sec
Idling speed	rpm	700 - 750
Rated speed R5	rpm	3500
	rpm	3500
	rpm	3500
Propeller selection range R5	rpm	3400-3600
	rpm	3400-3600
	rpm	3400-3600
Dry weight engine BT	kg lb	482 1063
Dry weight with reverse gear HS45AE	kg lb	546 1204

Performance	Rating	rpm	1000	1500	2000	2500	3000	3500				
Crankshaft power 1), 5)	5	kW	31	62	105	141	161	165				
		hp	42	84	143	191	218	225				
Propeller shaft power 1) (At full load) With reverse gear HS45AE	5	kW	30	60	102	136	156	160				
		hp	41	82	139	185	212	218				
Propellershaft power at prop. load x ^{2,5} With reverse gear HS45AE	5	kW	7	19	40	69	109	160				
		hp	10	26	54	94	148	218				
Propellershaft power at prop. load x ³ With reverse gear HS45AE	5	kW	4	13	30	58	101	160				
		hp	5	17	41	80	137	218				
Torque at crankshaft 2)	5	Nm	296	394,7	501,3	536,7	510,9	451,3				
		lbf ft	218	291	370	396	377	333				
Mean piston speed		m/s	3,7	5,5	7,3	9,2	11,0	12,8				
		ft/s	12,0	18,0	24,1	30,1	36,1	42,1				
Effective mean pressure 2)	5	MPa	1,01	1,35	1,72	1,84	1,75	1,55				
		psi	147,2	196,2	249,2	266,8	254,0	224,3				
Max combustion pressure 2)	5	MPa	13	16	18	19	18	18				
		psi	1885	2321	2611	2756	2611	2611				

Lubricating system

Specific lubricating oil consumption.	g/kWh	< 0,2
Max. oil volume including filters for all allowed installation inclinations:	litres	12
	US gal	3,17
Min. oil volume excluding filters for all allowed installation inclinations:	litres	10,5
	US gal	2,77

Fuel system

	Rating	rpm	1000	1500	2000	2500	3000	3500				
Specific fuel consumption 2)	5	g/kWh	240	235	217	203	214	232				
		lb/hph	0,389	0,381	0,352	0,329	0,347	0,376				
Fuel consumption, Test cycle E5	5	g/kWh	239									
		lb/hph	0,39									
Fuel consumption at prop. load x ^{2,5}	5	l/h	2,2	5,6	11,1	18,7	30,7	45,9				
		US gal/h	0,6	1,5	2,9	4,9	8,1	12,1				
Fuel consumption at prop. load x ³	5	l/h	1,4	4,1	8,9	16,2	29,3	45,9				
		US gal/h	0,4	1,1	2,3	4,3	7,7	12,1				
Fuel consumption at full load	5	l/h	8,9	17,4	27,3	34,1	41,1	45,9				
		US gal/h	2,4	4,6	7,2	9,0	10,9	12,1				

Intake and exhaust system

	Rating	rpm	1000	1500	2000	2500	3000	3500					
Specific exhaust heating effect in percent of crankshaft power	5							66					
		%						66					
									66				
Exhaust temperature at the exhaust pipe connecting flange after the turbo charger.	5	°C	170	260	345	385	430	510					
		°F	338	500	653	725	806	950					
Permitted back pressure in the exhaust line at rated speed. (Installed back pressure)		kPa							Max	30			
		psi								4,4			
		kPa							Min	10			
		psi								1,5			
Engine air consumption at 25°C / 77°F atmospheric pressure 100kPA and relative humidity 30%.	5	m ³ /min						15,3					
		cu.ft./min						540,3					
Charge air pressure Inlet manifold	5	kPa						205					
		psi						29,7					
Exhaust gas flow	5	m ³ /min						27,7					
		cu.ft./min						978,2					

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Cooling system	Rating	rpm	1000	1500	2000	2500	3000	3500				
Radiated heat in percent of crankshaft power.	5	%						3				
Heat rejection to charge air cooler in percent of crankshaft power.	5	%						27				
Coolant heat rejection to HE, incl. engine oil cooler and excl. charge air cooler, in percent of crankshaft power.	5	%						57				
Coolant flow with fully open thermostat and std cooling system		l/min cu.ft./min						360 12,7				
Extra water pump flow through charge air cooler		l/min cu.ft./min						172 6,1				
Max. permissible temperature on coolant in engine outlet		°C °F						55 131				
Coolant volume engine, including heat exchanger and charge air cooler		litres US gal.						13 3,43				
Max. additional coolant for cabin heater etc. with std. Expansion tank		litres US gal.						5 1,32				
Maximum coolant flow to cabin heater etc.		l/min cu.ft./min						30 1,06				
Thermostat, start open at		°C °F						82 180				
Thermostat, fully open at		°C °F						92 198				

Raw water circuit	rpm	1000	1500	2000	2500	3000	3500				
Nominal raw water design flow	l/min cu.ft./min						172 6,1				
Maximum raw water temperature entering heat exchanger	°C °F						30 86				

Emissions	Rating	rpm	1000	1500	2000	2500	3000	3500				
Smoke at prop. load $x^{2.5}$	5	*BSU	0,4	0,4	0,2	0,1	0,2	0,4				
Smoke at prop. load x^3	5	*BSU	0,5	0,3	0,2	0,2	0,3	0,4				

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