

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 | 3000 |
| Propeller selection range R5 | rpm | 2900-3130 |
| Dry weight engine BT | kg lb | 260 573 |

| Performance | Rating | rpm | 700 | 1200 | 1600 | 2000 | 2200 | 2400 | 2600 | 2800 | 3000 | 3130 |
|--|---------------|------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Crankshaft power 1), 5) | 5 | kW | 11 | 25 | 46 | 63 | 70 | 77 | 79 | 81 | 81 | 81 |
| | | hp | 15 | 34 | 63 | 86 | 95 | 105 | 107 | 110 | 110 | 110 |
| Propeller shaft power 1) (At full load) With reverse gear | 5 | kW | 11 | 24 | 44 | 60 | 67 | 74 | 76 | 78 | 78 | 78 |
| | | hp | 14 | 33 | 60 | 82 | 91 | 101 | 103 | 106 | 106 | 106 |
| Propellershaft power at prop. load x ^{2,5} | 5 | kW | 1 | 2 | 8 | 16 | 28 | 35 | 44 | 54 | 65 | 77 |
| | | hp | 2 | 3 | 11 | 22 | 38 | 48 | 60 | 73 | 88 | 105 |
| Torque at crankshaft 2) | 5 | Nm | 150,1 | 198,9 | 274,5 | 300,8 | 303,8 | 306,4 | 290,2 | 276,2 | 257,8 | 247,1 |
| | | lbf ft | 111 | 147 | 202 | 222 | 224 | 226 | 214 | 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 | 1,44 | 1,57 | 1,59 | 1,60 | 1,52 | 1,45 | 1,35 | 1,29 |
| | | psi | 113,9 | 151,0 | 208,4 | 228,3 | 230,6 | 232,5 | 220,2 | 209,7 | 195,7 | 187,6 |
| Max combustion pressure 2) | 5 | MPa | 9,4 | 11,2 | 12,2 | 11,4 | 11,5 | 11,6 | 11,4 | 11,1 | 11 | 10,8 |
| | | psi | 1363 | 1624 | 1769 | 1653 | 1668 | 1682 | 1653 | 1610 | 1595 | 1566 |

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 |

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 | rpm | 700 | 1200 | 1600 | 2000 | 2200 | 2400 | 2600 | 2800 | 3000 | 3130 |
|---|---------------|-----------------|--------------|-------------|--------------|--------------|--------------|--------------|--------------|-------------|--------------|-------------|
| Specific fuel consumption 2) | 5 | g/kWh lb/hph | 280 0,454 | 253 0,41 | 230 0,373 | 214 0,347 | 213 0,345 | 213 0,345 | 215 0,348 | 216 0,35 | 219 0,355 | 222 0,36 |
| Fuel consumption, Test cycle E5 | 5 | g/kWh lb/hph | 236 0,38 | | | | | | | | | |
| Fuel consumption at prop. load x ^{2,5} | 5 | l/h US gal/h | | 0,9 0,2 | 2,5 0,7 | 4,8 1,3 | 8,1 2,1 | 10,1 2,7 | 12,5 3,3 | 14,9 3,9 | 18,0 4,8 | 21,2 5,6 |
| Fuel consumption at full load | 5 | l/h US gal/h | 3,7 1,0 | 7,6 2,0 | 12,7 3,3 | 16,1 4,3 | 17,8 4,7 | 19,6 5,2 | 20,3 5,4 | 20,9 5,5 | 21,2 5,6 | 21,5 5,7 |

| 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 | % | 53 | 62 | 65 | 65 | 67 | 69 | 71 | 72 | 74 | 76 | |
| Exhaust temperature at the exhaust pipe connecting flange after the turbo charger. | 5 | °C °F | 354 669 | 448 838 | 486 907 | 453 847 | 466 871 | 483 901 | 478 892 | 462 864 | 443 829 | 436 817 | |
| Permitted back pressure in the exhaust line at rated speed. (Installed back pressure) | | kPa psi kPa psi | | | | | | | | Max Min | 10 1,5 5 0,7 | | |
| Engine air consumption at 25°C / 77°F atmospheric pressure 100kPA and relative humidity 30%. | 5 | m³/min cu.ft./min | 0,7 24,72 | 1,6 56,5 | 2,8 98,88 | 4,2 148,3 | 4,7 166 | 5,1 180,1 | 5,5 194,2 | 6 211,9 | 6,4 226 | 6,7 236,6 | |
| Charge air pressure Inlet manifold | 5 | kPa psi | 105 15,2 | 128 18,6 | 168 24,4 | 199 28,9 | 199 28,9 | 200 29,0 | 199 28,9 | 198 28,7 | 200 29,0 | 199 28,9 | |
| Exhaust gas flow | 5 | m³/min cu.ft./min | 1,7 60,03 | 4,3 151,9 | 7,8 275,5 | 10,8 381,4 | 12 423,8 | 13,3 469,7 | 14,2 501,5 | 14,7 519,1 | 15,3 540,3 | 15,6 550,9 | |

| Cooling system | Rating | rpm | 700 | 1200 | 1600 | 2000 | 2200 | 2400 | 2600 | 2800 | 3000 | 3130 |
|--|---------------|---------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Radiated heat in percent of crankshaft power. | 5 | % | | | | 6 | 7 | 6 | 6 | 7 | 9 | 10 |
| Heat rejection to charge air cooler in percent of crankshaft power. | 5 | % | 2 | 5 | 9 | 13 | 12 | 12 | 13 | 13 | 14 | 15 |
| Coolant heat rejection to HE in percent of crankshaft power. | 5 | % | 0 | 102 | 84 | 71 | 68 | 67 | 66 | 64 | 64 | 64 |
| Coolant flow with fully open thermostat and std cooling system | | l/min cu.ft./min | 45 1,6 | 80 2,8 | 109 3,8 | 138 4,9 | 152 5,4 | 166 5,9 | 180 6,4 | 195 6,9 | 208 7,3 | 217 7,7 |
| 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 | | | | | | | | | |

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

| Raw water circuit | | rpm | 700 | 1200 | 1600 | 2000 | 2200 | 2400 | 2600 | 2800 | 3000 | 3130 |
|--|-----------|------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Nominal raw water design flow | l/min | | 27 | 46 | 61 | 76 | 83 | 89 | 96 | 102 | 108 | 112 |
| | cu.ft/min | | 1,0 | 1,6 | 2,2 | 2,7 | 2,9 | 3,1 | 3,4 | 3,6 | 3,8 | 4,0 |
| Nominal raw water pump pressure head at design flow. (measured before and after pump) | kPa | | 19 | 26 | 36 | 48 | 55 | 62 | 69 | 77 | 85 | 90 |
| | psi | | 2,8 | 3,8 | 5,2 | 7,0 | 8,0 | 9,0 | 10,0 | 11,2 | 12,3 | 13,1 |
| 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 | 7 | 8 | 10 | 12 | 14 | 16 |
| | psi | | | 0,1 | 0,4 | 0,7 | 1,0 | 1,2 | 1,5 | 1,7 | 2,0 | 2,3 |
| Pressure drop over reverse gear oil cooler (optional equipment) | kPa | | 2 | 3 | 4 | 5 | 5 | 6 | 6 | 7 | 7 | 7 |
| | psi | | 0,2 | 0,4 | 0,6 | 0,7 | 0,8 | 0,8 | 0,9 | 1,0 | 1,0 | 1,0 |
| Maximum raw water temperature entering charge air cooler | °C | | 30 | | | | | | | | | |
| | °F | | 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 | 0,3 | 0,2 | 0,3 | 0,1 | 0,2 | 0,1 | |
| Noise at prop. load x ^{2,5} . 4) | 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

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