

**General**

4-stroke direct injected, turbocharged and aftercooled diesel engine

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

| <b>Performance</b>                                    | <b>Rating</b> | <b>rpm</b> | <b>700</b> | <b>1200</b> | <b>1600</b> | <b>2000</b> | <b>2400</b> | <b>2800</b> | <b>3200</b> | <b>3600</b> | <b>4000</b> | <b>4130</b> |
|---|---------------|------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Crankshaft power 1), 5)                               | 5             | kW         | 11         | 25          | 43          | 75          | 89          | 104         | 120         | 125         | 125         | 125         |
|   |               | hp         | 15         | 34          | 58          | 102         | 121         | 141         | 163         | 170         | 170         | 170         |
| Propeller shaft power 1) (At full load)<br>With drive | 5             | kW         | 10         | 24          | 41          | 71          | 85          | 99          | 114         | 119         | 119         | 119         |
|   |               | hp         | 14         | 32          | 56          | 97          | 115         | 134         | 155         | 162         | 162         | 162         |
|   | 5             | kW         | 11         | 24          | 41          | 72          | 85          | 100         | 115         | 120         | 120         | 120         |
|   |               | hp         | 14         | 33          | 56          | 98          | 116         | 136         | 157         | 163         | 163         | 163         |
| Propellershaft power at prop. load x <sup>2,5</sup>   | 5             | kW         | 2          | 6           | 12          | 21          | 33          | 49          | 68          | 91          | 119         |             |
|   |               | hp         | 2          | 8           | 16          | 29          | 45          | 66          | 92          | 124         | 162         |             |
|   | 5             | kW         | 2          | 6           | 12          | 21          | 33          | 49          | 69          | 92          | 120         |             |
|   |               | hp         | 2          | 8           | 17          | 29          | 46          | 67          | 93          | 125         | 163         |             |
| Torque at crankshaft 2)                               | 5             | Nm         | 150        | 199         | 257         | 358         | 354         | 355         | 358         | 332         | 298         | 289         |
|   |               | lbf ft     | 111        | 147         | 189         | 264         | 261         | 262         | 264         | 245         | 220         | 213         |
| 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        | 1,34        | 1,87        | 1,85        | 1,86        | 1,87        | 1,74        | 1,56        | 1,51        |
|   |               | psi        | 113,9      | 151,0       | 194,8       | 271,8       | 268,8       | 269,2       | 271,8       | 251,7       | 226,5       | 219,4       |
| Max combustion pressure 2)                            | 5             | MPa        | 10         | 11,7        | 13,8        | 14,9        | 12,7        | 13,5        | 14,1        | 13,6        | 14,3        | 14,3        |
|   |               | psi        | 1450       | 1697        | 2002        | 2161        | 1842        | 1958        | 2045        | 1973        | 2074        | 2074        |

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    | 363  | 266  | 245  | 208  | 211  | 211  | 216  | 224  | 235  | 239   |
|   |        | lb/hph   | 0,59 | 0,43 | 0,4  | 0,34 | 0,34 | 0,34 | 0,35 | 0,36 | 0,38 | 0,387 |
| Fuel consumption, Test cycle E5                 | 5      | g/kWh    | 238  |      |      |      |      |      |      |      |      |       |
|   |        | lb/hph   | 0,39 |      |      |      |      |      |      |      |      |       |
| Fuel consumption at prop. load x <sup>2,5</sup> | 5      | l/h      | 0,7  | 2,0  | 3,6  | 6,3  | 9,6  | 14,4 | 18,9 | 25,6 | 34,9 |       |
|   |        | US gal/h | 0,2  | 0,5  | 1,0  | 1,7  | 2,5  | 3,8  | 5,0  | 6,8  | 9,2  |       |
| Fuel consumption at full load                   | 5      | l/h      | 4,8  | 8,0  | 12,6 | 18,7 | 22,5 | 26,3 | 31,0 | 33,5 | 35,2 | 35,8  |
|   |        | US gal/h | 1,3  | 2,1  | 3,3  | 4,9  | 5,9  | 6,9  | 8,2  | 8,9  | 9,3  | 9,4   |

**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      | %          |     |      |      |      |      |      |      |      | 81   |      |
|  |        |            |     |      |      |      |      |      |      |      |      |      |
| Exhaust temperature at the exhaust pipe connecting flange after the turbo charger.           | 5      | °C         |     |      |      |      |      |      |      |      | 439  |      |
|  |        | °F         |     |      |      |      |      |      |      |      | 822  |      |
| Permitted back pressure in the exhaust line at rated speed.<br>(Installed back pressure)     |        | kPa        |     |      |      |      |      |      |      |      | Max  | 25   |
|  |        | psi        |     |      |      |      |      |      |      |      |      | 3,6  |
|  |        | kPa        |     |      |      |      |      |      |      |      | Min  | 5    |
|  |        | psi        |     |      |      |      |      |      |      |      |      | 0,7  |
| Engine air consumption at 25°C / 77°F atmospheric pressure 100kPA and relative humidity 30%. | 5      | m³/min     |     |      |      |      |      |      |      |      | 10,9 |      |
|  |        | cu.ft./min |     |      |      |      |      |      |      |      | 385  |      |
| Charge air pressure Inlet manifold   | 5      | kPa        |     |      |      |      |      |      |      |      | 264  |      |
|  |        | psi        |     |      |      |      |      |      |      |      | 38,3 |      |
| Exhaust gas flow   | 5      | m³/min     |     |      |      |      |      |      |      |      | 22,4 |      |
|  |        | cu.ft./min |     |      |      |      |      |      |      |      | 791  |      |

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5) At installed back pressure

| Cooling system   | Rating | rpm                 | 700 | 1200 | 1600 | 2000 | 2400 | 2800        | 3200 | 3600 | 4000       | 4130 |
|--|--------|---------------------|-----|------|------|------|------|-------------|------|------|------------|------|
| Radiated heat in percent of crankshaft power.                          | 5      | %                   |     |      |      |      |      |             |      |      | 6          |      |
| Heat rejection to charge air cooler in percent of crankshaft power.    | 5      | %                   |     |      |      |      |      |             |      |      | 24         |      |
| Coolant heat rejection to HE in percent of crankshaft power.           | 5      | %                   |     |      |      |      |      |             |      |      | 51         |      |
| Coolant flow with fully open thermostat and std cooling system         |        | l/min<br>cu.ft./min |     |      |      |      |      |             |      |      | 270<br>9,5 |      |
| Max. permissible temperature on coolant in engine outlet               |        | °C<br>°F            |     |      |      |      |      | 98<br>208   |      |      |            |      |
| Coolant volume engine, including heat exchanger                        |        | litres<br>US gal.   |     |      |      |      |      | 8,7<br>2,30 |      |      |            |      |
| Max. additional coolant for cabin heater etc. with std. Expansion tank |        | litres<br>US gal.   |     |      |      |      |      | 8<br>2,11   |      |      |            |      |
| Maximum coolant flow to cabin heater etc.                              |        | l/min<br>cu.ft./min |     |      |      |      |      | 20<br>0,71  |      |      |            |      |
| Thermostat, start open at  |        | °C<br>°F            |     |      |      |      |      | 80<br>176   |      |      |            |      |
| Thermostat, fully open at  |        | °C<br>°F            |     |      |      |      |      | 94<br>201   |      |      |            |      |

| Raw water circuit  | rpm                 | 700 | 1200 | 1600 | 2000 | 2400 | 2800      | 3200 | 3600 | 4000        | 4130 |
|--|---------------------|-----|------|------|------|------|-----------|------|------|-------------|------|
| Nominal raw water design flow  | l/min<br>cu.ft./min |     |      |      |      |      |           |      |      | 131<br>4,6  |      |
| Nominal raw water pump pressure head at design flow.<br>(measured before and after pump) | kPa<br>psi          |     |      |      |      |      |           |      |      | 125<br>18,1 |      |
| Maximum raw water pump suction head  | kPa<br>psi          |     |      |      |      |      | 30<br>4,4 |      |      |             |      |
| Maximum additional pressure drop excl. reverse gear oil cooler and riser                 | kPa<br>psi          |     |      |      |      |      |           |      |      | 28<br>4,1   |      |
| Pressure drop over reverse gear oil cooler (optional equipment)                          | kPa<br>psi          |     |      |      |      |      |           |      |      | 9<br>1,3    |      |
| Maximum raw water temperature entering charge air cooler                                 | °C<br>°F            |     |      |      |      |      | 30<br>86  |      |      |             |      |

| Emissions                                 | Rating | rpm  | 700 | 1200 | 1600 | 2000 | 2400 | 2800 | 3200 | 3600 | 4000 | 4130 |
|---|--------|------|-----|------|------|------|------|------|------|------|------|------|
| Smoke at prop. load x <sup>2,5</sup>      | 5      | *BSU | 0,0 | 0,0  | 0,0  | 0,2  | 0,1  | 0,3  | 0,1  | 0,2  | 0,5  |      |
| Noise at prop. load x <sup>2,5</sup> . 4) | 5      | dBA  | 92  | 92   | 96   | 100  | 109  | 108  | 108  | 109  | 111  |      |

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

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