

**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          | 44          | 87          | 106         | 125         | 142         | 147         | 147         | 147         |
|   |               | hp         | 15         | 34          | 60          | 118         | 144         | 170         | 193         | 200         | 200         | 200         |
| Propeller shaft power 1) (At full load)<br>With drive | 5             | kW         | 10         | 24          | 42          | 83          | 101         | 119         | 135         | 140         | 140         | 140         |
|   |               | hp         | 14         | 32          | 57          | 112         | 137         | 162         | 183         | 190         | 190         | 190         |
| With reverse gear                                     | 5             | kW         | 11         | 24          | 45          | 84          | 103         | 120         | 135         | 141         | 141         | 141         |
|   |               | hp         | 14         | 33          | 61          | 114         | 140         | 163         | 184         | 192         | 192         | 192         |
| Propellershaft power at prop. load x <sup>2,5</sup>   | 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         | 150        | 199         | 263         | 415         | 422         | 426         | 424         | 390         | 351         | 339,9       |
|   |               | lbf ft     | 111        | 147         | 194         | 306         | 311         | 314         | 313         | 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        | 0,79       | 1,04        | 1,37        | 2,17        | 2,21        | 2,23        | 2,22        | 2,04        | 1,84        | 1,78        |
|   |               | psi        | 113,9      | 151,0       | 199,3       | 315,3       | 320,1       | 323,6       | 321,6       | 296,0       | 266,4       | 258,0       |
| Max combustion pressure 2)                            | 5             | MPa        | 10,1       | 11          | 13,4        | 16          | 16          | 15,8        | 15,7        | 15,5        | 15,8        | 15,8        |
|   |               | psi        | 1465       | 1595        | 1944        | 2321        | 2321        | 2292        | 2277        | 2248        | 2292        | 2292        |

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    | 357  | 264  | 249  | 218  | 209  | 213  | 221  | 227  | 232  | 235   |
|   |        | lb/hph   | 0,58 | 0,43 | 0,4  | 0,35 | 0,34 | 0,35 | 0,36 | 0,37 | 0,38 | 0,381 |
| Fuel consumption, Test cycle E5                 | 5      | g/kWh    | 236  |      |      |      |      |      |      |      |      |       |
|   |        | lb/hph   | 0,38 |      |      |      |      |      |      |      |      |       |
| Fuel consumption at prop. load x <sup>2,5</sup> | 5      | l/h      | 0,8  | 2,2  | 4,2  | 7,2  | 11,2 | 16,4 | 22,2 | 31,5 | 41,0 |       |
|   |        | US gal/h | 0,2  | 0,6  | 1,1  | 1,9  | 3,0  | 4,3  | 5,9  | 8,3  | 10,8 |       |
| Fuel consumption at full load                   | 5      | l/h      | 4,7  | 7,9  | 13,1 | 22,7 | 26,5 | 31,9 | 37,6 | 39,9 | 40,8 | 41,3  |
|   |        | US gal/h | 1,2  | 2,1  | 3,5  | 6,0  | 7,0  | 8,4  | 9,9  | 10,6 | 10,8 | 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      | %                   |     |      |      |      |      |      |      |      | 85   |      |
|  |        |                     |     |      |      |      |      |      |      |      |      |      |
| Exhaust temperature at the exhaust pipe connecting flange after the turbo charger.           | 5      | °C                  |     |      |      |      |      |      |      |      | 527  |      |
|  |        | °F                  |     |      |      |      |      |      |      |      | 981  |      |
| Permitted back pressure in the exhaust line at rated speed.<br>(Installed back pressure)     |        | kPa                 |     |      |      |      |      |      |      |      | Max  | 27   |
|  |        | psi                 |     |      |      |      |      |      |      |      |      | 3,9  |
|  |        | kPa                 |     |      |      |      |      |      |      |      | Min  | 5    |
|  |        | psi                 |     |      |      |      |      |      |      |      |      | 0,7  |
| Engine air consumption at 25°C / 77°F atmospheric pressure 100kPA and relative humidity 30%. | 5      | m <sup>3</sup> /min |     |      |      |      |      |      |      |      | 10,9 |      |
|  |        | cu.ft./min          |     |      |      |      |      |      |      |      | 385  |      |
| Charge air pressure Inlet manifold   | 5      | kPa                 |     |      |      |      |      |      |      |      | 264  |      |
|  |        | psi                 |     |      |      |      |      |      |      |      | 38,3 |      |
| Exhaust gas flow   | 5      | m <sup>3</sup> /min |     |      |      |      |      |      |      |      | 25,1 |      |
|  |        | cu.ft./min          |     |      |      |      |      |      |      |      | 886  |      |

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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      | %                   |     |      |      |      |      |             |      |      | 7          |      |
| Heat rejection to charge air cooler in percent of crankshaft power.    | 5      | %                   |     |      |      |      |      |             |      |      | 20         |      |
| Coolant heat rejection to HE in percent of crankshaft power.           | 5      | %                   |     |      |      |      |      |             |      |      | 53         |      |
| 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 |     |      |      |      |      |      |           |      | 132<br>4,7  |      |
| 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  | 0,1  | 0,1  | 0,1  | 0,2  | 0,5  | 0,6  |      |
| Noise at prop. load x <sup>2,5</sup> . 4) | 5      | dBA  | 92  | 94   | 99   | 105  | 110  | 110  | 110  | 110  | 112  |      |

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

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