

**VOLVO PENTA**

TAD1642GE-B

Document No

23572227

Issue Index

02

**Important**

This Technical Data Sheet and the corresponding Installation Instructions provide important information to ensure the installed engine will operate according to the design specification in the Volvo Penta application for certification.

Requirements marked with  are considered as critical for exhaust emissions compliance according to the design specification in the Volvo Penta application for certification.

Failing to follow and meet these instructions and requirements when installing a certified engine in a piece of nonroad equipment for use in the United States violates U.S. federal law (40 CFR 1068.105(b)), subject to fines or other penalties as described in the Clean Air Act.

General

In-line four stroke diesel engine with direct injection. Rotation direction, anti-clockwise viewed towards flywheel.  
Turbocharged

|                                                      |                                                               |                          |                |
|------------------------------------------------------|---------------------------------------------------------------|--------------------------|----------------|
| Number of cylinders                                  |                                                               |                          | 6              |
| Displacement, total                                  |                                                               | litre<br>in <sup>3</sup> | 16,12<br>983,9 |
| Firing order                                         |                                                               |                          | 1-5-3-6-2-4    |
| Bore                                                 |                                                               | mm<br>in                 | 144<br>5,67    |
| Stroke                                               |                                                               | mm<br>in                 | 165<br>6,50    |
| Compression ratio                                    |                                                               |                          | 16.8:1         |
| Wet weight<br>(Not including after treatment system) | Engine only                                                   | kg                       | 1590           |
|                                                      |                                                               | lb                       | 3505           |
|                                                      | Engine incl. cooling system and air filtration system         | kg                       | 1810           |
|                                                      |                                                               | lb                       | 3990           |
|                                                      | Engine incl. cooling system, air filtration system, and frame | kg                       | 2065           |
|                                                      |                                                               | lb                       | 4553           |

Performance

| Performance                                        |  |               | rpm                                   | 1500         | 1800        |      |
|----------------------------------------------------|--|---------------|---------------------------------------|--------------|-------------|------|
| Prime Power                                        |  | without fan   | kW                                    | 514          | 551         |      |
|                                                    |  |               | hp                                    | 699          | 749         |      |
|                                                    |  | with fan      | kW                                    | 505          | 536         |      |
|                                                    |  |               | hp                                    | 687          | 729         |      |
| Standby Power                                      |  | without fan   | kW                                    | 565          | 604         |      |
|                                                    |  |               | hp                                    | 768          | 821         |      |
|                                                    |  | with fan      | kW                                    | 556          | 589         |      |
|                                                    |  |               | hp                                    | 756          | 801         |      |
| Torque at:                                         |  | Prime Power   |                                       | Nm           | 3272        | 2923 |
|                                                    |  |               |                                       | lbft         | 2413        | 2156 |
|                                                    |  | Standby Power |                                       | Nm           | 3597        | 3204 |
|                                                    |  |               |                                       | lbft         | 2653        | 2363 |
| Power tolerance                                    |  |               | %                                     | +4 / -0      |             |      |
| Mean piston speed                                  |  |               | m/s                                   | 8,3          | 9,9         |      |
|                                                    |  |               | ft/sec                                | 27,1         | 32,6        |      |
| Effective mean pressure at:                        |  | Prime Power   |                                       | MPa          | 2,6         | 2,3  |
|                                                    |  |               |                                       | psi          | 370         | 330  |
| Effective mean pressure at:                        |  | Standby Power |                                       | MPa          | 2,8         | 2,5  |
|                                                    |  |               |                                       | psi          | 407         | 362  |
| Max combustion pressure at:                        |  | Prime Power   |                                       | MPa          | 18,8        | 18,9 |
|                                                    |  |               |                                       | psi          | 2727        | 2741 |
| Max combustion pressure at:                        |  | Standby Power |                                       | MPa          | 17,7        | 18   |
|                                                    |  |               |                                       | psi          | 2567        | 2611 |
| Total mass moment of inertia, J (mR <sup>2</sup> ) |  |               | kgm <sup>2</sup><br>lbft <sup>2</sup> | 4,20<br>99,7 |             |      |
| Friction Power                                     |  |               | kW<br>hp                              | 36<br>48,96  | 53<br>72,08 |      |

Derating due to altitude - see Technical Diagrams

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**Engine noise emission**

Test Standards: ISO 3744-1981 (E) sound power

Tolerance  $\pm 0.75$  dB(A)

|                                     |               | rpm   | 1500  | 1800  |
|-------------------------------------|---------------|-------|-------|-------|
| Measured sound power Lw             | No load       | dB(A) | 116,6 | 118,4 |
|                                     | Prime Power   | dB(A) | 117,5 | 119   |
|                                     | Standby Power | dB(A) | 118,6 | 119,1 |
| Calculated sound pressure Lp at 1 m | No load       | dB(A) | 104,6 | 106,4 |
|                                     | Prime Power   | dB(A) | 105,5 | 107   |
|                                     | Standby Power | dB(A) | 106,6 | 107,1 |

**Test conditions for load acceptance data**

|              |                     |                   |                                 |
|--------------|---------------------|-------------------|---------------------------------|
| Warm engine. | <b>Generator</b>    | <b>Model</b>      | <b>Type of AVR</b>              |
|              | ABB                 | AMG 0355CC04 DBPM | Blaster Electric, DECS-150 1NS1 |
| AVR Settings | UFRO (Hz): 47/57    | DIP (%)*: 0%      | DWELL (%)*: std                 |
|              | Stability (%)*: std | Voltage (V): 400  | Load factor: 1.0                |

Applies to Stamford nomenclature,

(%)\* : % of max potentiometer setting range

Load acceptance performance can vary due to actual alternator inertia, voltage regulator, type of load and local ambient conditions.

| Abbreviation: | Full name:                  | Descriptions                                                    |
|---------------|-----------------------------|-----------------------------------------------------------------|
| AVR           | Automatic Voltage Regulator | Generator performance and safty control unit                    |
| UFRO          | Under Frequency Roll Off    | Overheating protection at under frequency                       |
| DIP           |                             | Controls the slope of voltage drop when the UFRO is active      |
| DWELL         |                             | Controls the slope of voltage recovery when the UFRO is active. |

**Single step load performance at 1500 rpm - PRIME (Resistiv load)**

| Load (%) | Speed diff (%) | Speed Recovery time (s) | Voltage diff (%) | Voltage Recovery time (s) | Remaining load (%) | Speed diff (%) | Speed Recovery time (s) | Voltage diff (%) | Voltage Recovery time (s) |
|----------|----------------|-------------------------|------------------|---------------------------|--------------------|----------------|-------------------------|------------------|---------------------------|
| 0-20     | 2,4            | 1,3                     | 0,4              | 0,0                       | 20-100             | 20,5           | 3,1                     | 21,7             | 2,3                       |
| 0-40     | 5,2            | 1,5                     | 0,9              | 0,0                       | 40-100             | 10,0           | 1,8                     | 6,9              | 1,2                       |
| 0-50     |                |                         |                  |                           | 50-100             |                |                         |                  |                           |
| 0-60     | 12,4           | 2,3                     | 9,6              | 1,6                       | 60-100             | 5,6            | 1,4                     | 2,0              | 1,0                       |
| 0-48     | 7 (G3)         | 1,4                     | 2,1              | 0,9                       | 48-100             | 7,7            | 1,6                     | 3,7              | 1,1                       |
| 0-56     | 10 (G2)        | 1,8                     | 6,4              | 1,4                       | 80-100             | 2,7            | 1,2                     | 1,4              | 0,9                       |
| 0-80     | 22,0           | 3,5                     | 23,4             | 2,7                       | 80-100             | 2,7            | 1,2                     | 1,4              | 0,9                       |
| 0-100    | 30,1           | 4,7                     | 35,3             | 3,9                       |                    |                |                         |                  |                           |
| 100-0    | 7,0            | 1,3                     | 2,1              | 1,0                       |                    |                |                         |                  |                           |

**Single step load performance at 1500 rpm - STAND BY (Resistiv load)**

| Load (%) | Speed diff (%) | Speed Recovery time (s) | Voltage diff (%) | Voltage Recovery time (s) | Remaining load (%) | Speed diff (%) | Speed Recovery time (s) | Voltage diff (%) | Voltage Recovery time (s) |
|----------|----------------|-------------------------|------------------|---------------------------|--------------------|----------------|-------------------------|------------------|---------------------------|
| 0-20     | 2,4            | 1,4                     | 0,4              | 0,0                       | 20-100             | 24,9           | 7,2                     | 27,9             | 3,3                       |
| 0-40     | 6,2            | 0,4                     | 1,1              | 0,6                       | 40-100             | 11,1           | 4,2                     | 8,7              | 1,7                       |
| 0-50     |                |                         |                  |                           | 50-100             |                |                         |                  |                           |
| 0-60     | 15,4           | 2,7                     | 13,8             | 1,9                       | 60-100             | 6,5            | 3,1                     | 2,3              | 1,5                       |
| 0-44     | 7 (G3)         | 1,4                     | 2,1              | 0,9                       | x-100              |                |                         |                  |                           |
| 0-50     | 10 (G2)        | 1,8                     | 6,4              | 1,4                       | x-100              |                |                         |                  |                           |
| 0-80     | 25,7           | 4,0                     | 28,6             | 3,1                       | 80-100             | 3,0            | 1,4                     | 1,6              | 1,1                       |
| 0-100    | 33,4           | 7,8                     | 39,9             | 5,3                       |                    |                |                         |                  |                           |
| 100-0    | 6,1            | 1,3                     | 2,4              | 1,0                       |                    |                |                         |                  |                           |

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Single step load performance at 1800 rpm - PRIME (Resistiv load)

| Load (%) | Speed diff (%) | Speed Recovery time (s) | Voltage diff (%) | Voltage Recovery time (s) | Remaining load (%) | Speed diff (%) | Speed Recovery time (s) | Voltage diff (%) | Voltage Recovery time (s) |
|----------|----------------|-------------------------|------------------|---------------------------|--------------------|----------------|-------------------------|------------------|---------------------------|
| 0-20     | 1,7            | 1,0                     | 0,2              | 0,0                       | 20-100             | 10,7           | 2,1                     | 10,8             | 1,5                       |
| 0-40     | 3,9            | 1,5                     | 1,5              | 0,3                       | 40-100             | 6,6            | 1,5                     | 3,7              | 1,2                       |
| 0-50     |                |                         |                  |                           | 50-100             |                |                         |                  |                           |
| 0-60     | 6,8            | 1,4                     | 3,4              | 1,0                       | 60-100             | 3,9            | 1,4                     | 1,6              | 1,0                       |
| 0-62     | 7 (G3)         | 1,4                     | 4,0              | 1,1                       | 62-92              | 2,9            | 1,3                     | 1,3              | 0,8                       |
| 0-71     | 10 (G2)        | 1,9                     | 8,9              | 1,3                       | 71-100             | 2,0            | 1,0                     | 1,1              | 0,7                       |
| 0-80     | 12,3           | 2,3                     | 13,3             | 1,6                       | 80-100             |                |                         |                  |                           |
| 0-100    | 1,9            | 1,0                     | 1,2              | 0,7                       |                    |                |                         |                  |                           |
| 100-0    | 4,4            | 1,2                     | 4,4              | 1,2                       |                    |                |                         |                  |                           |

Single step load performance at 1800 rpm - STAND BY (Resistiv load)

| Load (%) | Speed diff (%) | Speed Recovery time (s) | Voltage diff (%) | Voltage Recovery time (s) | Remaining load (%) | Speed diff (%) | Speed Recovery time (s) | Voltage diff (%) | Voltage Recovery time (s) |
|----------|----------------|-------------------------|------------------|---------------------------|--------------------|----------------|-------------------------|------------------|---------------------------|
| 0-20     | 2,0            | 1,2                     | 1,0              | 0,0                       | 20-100             | 12,1           | 3,2                     | 13,2             | 1,9                       |
| 0-40     | 4,1            | 1,4                     | 1,3              | 0,3                       | 40-100             | 7,5            | 2,2                     | 5,3              | 1,5                       |
| 0-50     |                |                         |                  |                           | 50-100             |                |                         |                  |                           |
| 0-60     | 8,1            | 1,4                     | 5,8              | 1,1                       | 60-100             | 3,9            | 1,5                     | 1,8              | 1,2                       |
| 0-56     | 7 (G3)         | 1,4                     | 4,0              | 1,1                       | x-100              |                |                         |                  |                           |
| 0-65     | 10 (G2)        | 1,9                     | 9,9              | 1,3                       | x-100              |                |                         |                  |                           |
| 0-80     | 14,3           | 2,7                     | 16,6             | 1,8                       | 80-100             | 1,8            | 1,0                     | 1,3              | 0,9                       |
| 0-100    | 19,9           | 3,6                     | 26,4             | 2,5                       |                    |                |                         |                  |                           |
| 100-0    | 4,4            | 1,2                     | 6,6              | 1,1                       |                    |                |                         |                  |                           |

Cold start performance

| Cold start performance                                                       |    | rpm              | 1500 | 1800  |      |
|------------------------------------------------------------------------------|----|------------------|------|-------|------|
| Time from start to stay within 0.5% of no load speed at ambient temperature: | °C | 20               | s    | 6,5   | 8,4  |
|                                                                              |    | 5                | s    | 6,7   | 8,7  |
|                                                                              |    | -15 *            | s    | 7,3   | 9,8  |
|                                                                              |    | -25**            | s    | 11,2  | 13,2 |
|                                                                              |    | Min start temp** | °C   | -35,0 |      |

\* With manifold heater 4 kW engaged, lubrication oil 10W/30 .

\*\* With manifold heater 4 kW engaged and block heater 2kW, lubrication oil 10W/30.

| Ambient temp. °C | Block heater type and Make | Power kW | Engaged hours | Cooling water temp engine block |
|------------------|----------------------------|----------|---------------|---------------------------------|
| -15              | GENETECH                   | 2        | 12            | 17°C<br>63°F                    |

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| Lubrication system                       |                                  |               | rpm         | 1500      | 1800        |  |
| Lubricating oil consumption              |                                  | Prime Power   | litre/h     | 0,10      | 0,11        |  |
|                                          |                                  |               | US gal/h    | 0,026     | 0,029       |  |
|                                          |                                  | Standby Power | litre/h     | 0,11      | 0,12        |  |
|                                          |                                  |               | US gal/h    | 0,029     | 0,032       |  |
| Oil system capacity including filters    |                                  |               | litre       | 48        |             |  |
|                                          |                                  |               | US gal      | 12,7      |             |  |
| Oil sump capacity:                       |                                  | max           | litre       | 42        |             |  |
|                                          |                                  |               | US gal      | 11,1      |             |  |
|                                          |                                  | min           | litre       | 32        |             |  |
|                                          |                                  |               | US gal      | 8,5       |             |  |
| Oil change intervals/specifications:     | VDS-3, VDS-4, VDS-4.5*           |               | h           | 600       |             |  |
|                                          | VDS, ACEA, E3*                   |               | h           | 400       |             |  |
|                                          | ACEA E2, API CD, CF, CF-4, CG-4* |               | h           | 200       |             |  |
| Engine angularity limits:                |                                  | front up      | °           | 30        |             |  |
|                                          |                                  | front down    | °           | 30        |             |  |
|                                          |                                  | side tilt     | °           | 30        |             |  |
| Oil pressure at rated speed              |                                  |               | kPa         | 300 - 650 |             |  |
|                                          |                                  |               | psi         | 44 - 94   |             |  |
| Lubrication oil temperature in oil sump: |                                  | max           | °C          | 130       |             |  |
|                                          |                                  |               | °F          | 266       |             |  |
| Oil filter                               |                                  |               | μ           | 40,000    |             |  |

\* See also general section in the sales guide

|                                                              |      |                                          |                 |             |             |       |
|--------------------------------------------------------------|------|------------------------------------------|-----------------|-------------|-------------|-------|
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| <b>Fuel system</b>                                           |      |                                          | <b>rpm</b>      | <b>1500</b> | <b>1800</b> |       |
| <b>Prime Power</b><br>Specific <b>fuel</b> consumption at:   | 25%  | g/kWh                                    | 219             | 234         |             |       |
|                                                              |      | lb/hph                                   | 0,356           | 0,380       |             |       |
|                                                              | 50%  | g/kWh                                    | 198             | 203         |             |       |
|                                                              |      | lb/hph                                   | 0,321           | 0,329       |             |       |
|                                                              | 75%  | g/kWh                                    | 196             | 202         |             |       |
|                                                              |      | lb/hph                                   | 0,318           | 0,327       |             |       |
|                                                              | 100% | g/kWh                                    | 193             | 204         |             |       |
|                                                              |      | lb/hph                                   | 0,313           | 0,330       |             |       |
| <b>Standby Power</b><br>Specific <b>fuel</b> consumption at: |      |                                          | 25%             | g/kWh       | 215         | 296   |
|                                                              |      |                                          |                 | lb/hph      | 0,348       | 0,480 |
|                                                              |      |                                          | 50%             | g/kWh       | 197         | 202   |
|                                                              |      |                                          |                 | lb/hph      | 0,320       | 0,327 |
|                                                              |      |                                          | 75%             | g/kWh       | 198         | 205   |
|                                                              |      |                                          |                 | lb/hph      | 0,322       | 0,332 |
|                                                              |      |                                          | 100%            | g/kWh       | 196         | 206   |
|                                                              |      |                                          |                 | lb/hph      | 0,317       | 0,334 |
| <b>Fuel system</b>                                           |      |                                          | <b>rpm</b>      | <b>1500</b> | <b>1800</b> |       |
| Fuel to conform to                                           |      | ASTM-D975-No1 and 2D JIS KK 2204, EN 590 |                 |             |             |       |
| System supply flow at:                                       |      | litre/h                                  | 180,0           | 200,0       |             |       |
|                                                              |      | US gal/h                                 | 47,6            | 52,8        |             |       |
| Fuel supply line max restriction                             |      | kPa                                      | -20,0           | -20,0       |             |       |
| (Measured at fuel inlet connection)                          |      | psi                                      | -2,9            | -2,9        |             |       |
| Fuel supply line max pressure, engine stopped                |      | kPa                                      | 16,5            | 16,5        |             |       |
|                                                              |      | psi                                      | 2,4             | 2,4         |             |       |
| Max system return flow                                       |      | litre/h                                  | 25,0            | 25,0        |             |       |
|                                                              |      | US gal/h                                 | 6,6             | 6,6         |             |       |
| Fuel return line max restriction                             |      | kPa                                      | 20,0            | 20,0        |             |       |
| (Measured at fuel return connection)                         |      | psi                                      | 2,9             | 2,9         |             |       |
| Maximum allowable inlet fuel temp                            |      | °C                                       | 60              | 60          |             |       |
| (Measured at fuel inlet connection)                          |      | °F                                       | 140             | 140         |             |       |
| Prefilter / Water separator                                  |      | μ                                        | 30,000          |             |             |       |
| Fuel filter                                                  |      | μ                                        | 5,000           |             |             |       |
| Governor type/make, standard                                 |      | Volvo / EMS 2.4                          |                 |             |             |       |
| Injection pump type/make                                     |      | Delphi E3.18                             |                 |             |             |       |

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| TAD1642GE-B                                                                                                                   |               |  | 23572227                   |               | 02            |
| Intake and exhaust system                                                                                                     |               |  | rpm                        | 1500          | 1800          |
| Air consumption at:<br>(+25°C and 100kPa)                                                                                     | Prime Power   |  | m <sup>3</sup> /min<br>cfm | 41,2<br>1455  | 46,6<br>1646  |
|                                                                                                                               | Standby Power |  | m <sup>3</sup> /min<br>cfm | 39<br>1377    | 45,4<br>1603  |
| <br>See front page for important information |               |  |                            |               |               |
| Max allowable air intake restriction including piping                                                                         |               |  | kPa<br>psi                 | 5<br>0,7      | 5<br>0,7      |
| Air filter restriction clean Volvo Penta filter                                                                               |               |  | kPa<br>psi                 | 1,5<br>0,2    | 2,0<br>0,3    |
| Heat rejection to exhaust at:                                                                                                 | Prime Power   |  | kW<br>BTU/min              | 427<br>24283  | 500<br>28435  |
|                                                                                                                               | Standby Power |  | kW<br>BTU/min              | 407<br>23146  | 439<br>24965  |
| Exhaust gas temperature after turbine at:                                                                                     | Prime Power   |  | °C<br>°F                   | 456<br>853    | 468<br>874    |
|                                                                                                                               | Standby Power |  | °C<br>°F                   | 482<br>900    | 512<br>954    |
| <br>See front page for important information |               |  |                            |               |               |
| Max allowable back pressure in exhaust line<br>(after turbine)<br>Pipe dimension Ø:                    125 mm                 | Prime Power   |  | kPa<br>psi                 | 8<br>1,2      | 8<br>1,2      |
|                                                                                                                               | Standby Power |  | kPa<br>psi                 | 10<br>1,5     | 10<br>1,5     |
| Exhaust gas flow at:<br>(temp and pressure after turbine at the corresponding<br>power setting)                               | Prime Power   |  | m <sup>3</sup> /min<br>cfm | 94,4<br>3334  | 108,9<br>3846 |
|                                                                                                                               | Standby Power |  | m <sup>3</sup> /min<br>cfm | 102,5<br>3620 | 117,6<br>4153 |

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|                                                                                                                                                                |                                    |                |               |             |
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|                                                                               |                                    |                |               |             |
| <b>Cooling system</b>                                                                                                                                          |                                    | <b>rpm</b>     | <b>1500</b>   | <b>1800</b> |
| Heat rejection radiation from engine at:                                                                                                                       | Prime Power                        | kW             | 18            | 20          |
|                                                                                                                                                                |                                    | BTU/min        | 1024          | 1137        |
|                                                                                                                                                                | Standby Power                      | kW             | 20            | 24          |
|                                                                                                                                                                |                                    | BTU/min        | 1137          | 1365        |
| Heat rejection to coolant at:                                                                                                                                  | Prime Power                        | kW             | 187           | 218         |
|                                                                                                                                                                |                                    | BTU/min        | 10635         | 12397       |
|                                                                                                                                                                | Standby Power                      | kW             | 218           | 248         |
|                                                                                                                                                                |                                    | BTU/min        | 12397         | 14104       |
| Radiator cooling system type                                                                                                                                   |                                    | Closed circuit |               |             |
| Standard radiator core area                                                                                                                                    |                                    | m²             | 1,3           |             |
|                                                                                                                                                                |                                    | foot²          | 13,99         |             |
| Fan diameter                                                                                                                                                   |                                    | mm             | 890           |             |
|                                                                                                                                                                |                                    | in             | 35,04         |             |
| Fan power consumption                                                                                                                                          |                                    | kW             | 9             | 15          |
|                                                                                                                                                                |                                    | hp             | 12            | 20          |
| Fan drive ratio                                                                                                                                                |                                    |                | 0,97 : 1      |             |
| Coolant capacity,                                                                                                                                              | engine                             | litre          | 33            |             |
|                                                                                                                                                                |                                    | US gal         | 8,72          |             |
|                                                                                                                                                                | engine with std radiator and hoses | litre          | 60            |             |
|                                                                                                                                                                |                                    | US gal         | 15,85         |             |
| Coolant pump                                                                                                                                                   |                                    | drive/ratio    | Belt / 1,85:1 |             |
| Coolant flow with standard system                                                                                                                              |                                    | l/s            | 6,4           | 7,7         |
|                                                                                                                                                                |                                    | US gal/s       | 1,69          | 2,03        |
| Minimum coolant flow                                                                                                                                           |                                    | l/s            | 6,4           | 7,7         |
|                                                                                                                                                                |                                    | US gal/s       | 1,69          | 2,03        |
| Maximum outer circuit restriction, including piping                                                                                                            |                                    | kPa            | 50            | 70          |
|                                                                                                                                                                |                                    | psi            | 7,3           | 10,2        |
| Thermostat                                                                                                                                                     | start to open                      | °C             | 86            |             |
|                                                                                                                                                                |                                    | °F             | 187           |             |
|                                                                                                                                                                | fully open                         | °C             | 96            |             |
|                                                                                                                                                                |                                    | °F             | 205           |             |
| Maximum static pressure head<br>(expansion tank height + pressure cap setting)                                                                                 |                                    | kPa            | 100           |             |
|                                                                                                                                                                |                                    | psi            | 14,5          |             |
| Minimum static pressure head<br>(expansion tank height + pressure cap setting)                                                                                 |                                    | kPa            | 70            |             |
|                                                                                                                                                                |                                    | psi            | 10,2          |             |
| Standard pressure cap setting                                                                                                                                  |                                    | kPa            | 100           |             |
|                                                                                                                                                                |                                    | psi            | 14,5          |             |
| Maximum top tank temperature                                                                                                                                   |                                    | °C             | 107           |             |
|                                                                                                                                                                |                                    | °F             | 225           |             |
| Draw down capacity. The difference between min coolant level in the expansion tank and the lowest level where the engine's coolant system still is functioning |                                    | litre          | 58            |             |
|                                                                                                                                                                |                                    | US gal         | 15,32         |             |

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| Charge air cooler system                                                                                                      |               | rpm     | 1500  | 1800 |
|-------------------------------------------------------------------------------------------------------------------------------|---------------|---------|-------|------|
| Heat rejection to charge air cooler                                                                                           | Prime Power   | kW      | 112   | 145  |
|                                                                                                                               |               | BTU/min | 6369  | 8246 |
|                                                                                                                               | Standby Power | kW      | 131   | 159  |
|                                                                                                                               |               | BTU/min | 7450  | 9042 |
| Charge air mass flow                                                                                                          | Prime Power   | kg/s    | 0,78  | 0,9  |
|                                                                                                                               | Standby Power | kg/s    | 0,83  | 0,92 |
| Charge air inlet temp.<br>(Charge air temp after turbo compressor)                                                            | Prime Power   | °C      | 214   | 228  |
|                                                                                                                               |               | °F      | 417   | 442  |
|                                                                                                                               | Standby Power | °C      | 229   | 243  |
|                                                                                                                               |               | °F      | 444   | 469  |
| <br>See front page for important information |               |         |       |      |
| Max allowable Charge air outlet temp.<br>(Charge air temp after intercooler)                                                  | Prime Power   | °C      | 43    | 43   |
|                                                                                                                               |               | °F      | 109   | 109  |
|                                                                                                                               | Standby Power | °C      | 45    | 45   |
|                                                                                                                               |               | °F      | 113   | 113  |
| <br>See front page for important information |               |         |       |      |
| Maximum pressure drop over charge air cooler incl. piping                                                                     |               | kPa     | 12    | 17   |
|                                                                                                                               |               | psi     | 1,74  | 2,47 |
| Charge air pressure<br>(After charge air cooler)                                                                              | kPa           | 274     | 262   |      |
|                                                                                                                               | psi           | 39,70   | 38,03 |      |
| Standard charge air cooler core area                                                                                          |               | m²      | 0,765 |      |
|                                                                                                                               |               | foot²   | 8,23  |      |

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Cooling performance

Standard fan: STD cooling Fan ratio: 1 : 1.13 Fan type: FIX

Cooling air flow and external restriction at different radiator air temperatures based on 107°C TTT and 40% antifreeze.

Valid at 1 atm. (radiator and cooling fan, see optional equipment)

| Engine speed<br>rpm | Air on<br>temp<br>°C | PRIME POWER      |                            | STANDBY POWER    |                            |
|---------------------|----------------------|------------------|----------------------------|------------------|----------------------------|
|                     |                      | Air flow<br>m³/s | External restriction<br>Pa | Air flow<br>m³/s | External restriction<br>Pa |
| 1500                | 55                   |                  |                            | 7,6              | 450,0                      |
|                     | 56                   |                  |                            | 8,2              | 300,0                      |
|                     | 58                   |                  |                            | 8,7              | 150,0                      |
|                     | 59                   |                  |                            | 9,1              | 0,0                        |
|                     | 60                   | 7,6              | 450,0                      |                  |                            |
|                     | 61                   | 8,2              | 300,0                      |                  |                            |
|                     | 63                   | 8,7              | 150,0                      |                  |                            |
|                     | 64                   | 9,1              | 0,0                        |                  |                            |
| 1800                | 56                   |                  |                            | 9,9              | 450,0                      |
|                     | 58                   |                  |                            | 10,0             | 300,0                      |
|                     | 59                   |                  |                            | 10,5             | 150,0                      |
|                     | 60                   | 9,9              | 450,0                      | 10,9             | 0,0                        |
|                     | 62                   | 10,0             | 300,0                      |                  |                            |
|                     | 63                   | 10,5             | 150,0                      |                  |                            |
|                     | 64                   | 10,9             | 0,0                        |                  |                            |

Note! External restrictions are calculated for values >0 Pa

Optional fan: STD cooling Fan ratio: 1 : 1.04 Fan type: FIX

Cooling air flow and external restriction at different radiator air temperatures based on 107°C TTT and 40% antifreeze.

Valid at 1 atm. (radiator and cooling fan, see optional equipment)

| Engine speed<br>rpm | Air on<br>temp<br>°C | PRIME POWER      |                            | STANDBY POWER    |                            |
|---------------------|----------------------|------------------|----------------------------|------------------|----------------------------|
|                     |                      | Air flow<br>m³/s | External restriction<br>Pa | Air flow<br>m³/s | External restriction<br>Pa |
| 1500                | 52                   |                  |                            | 6,8              | 450,0                      |
|                     | 53                   |                  |                            | 7,4              | 300,0                      |
|                     | 55                   |                  |                            | 7,9              | 150,0                      |
|                     | 56                   |                  |                            | 8,6              | 0,0                        |
|                     | 58                   | 6,8              | 450,0                      |                  |                            |
|                     | 59                   | 7,4              | 300,0                      |                  |                            |
|                     | 60                   | 7,9              | 150,0                      |                  |                            |
|                     | 61                   | 8,6              | 0,0                        |                  |                            |
| 1800                | 53                   |                  |                            | 9,0              | 450,0                      |
|                     | 55                   |                  |                            | 9,3              | 300,0                      |
|                     | 56                   |                  |                            | 9,9              | 150,0                      |
|                     | 57                   |                  |                            | 10,3             | 0,0                        |
|                     | 58                   | 9,0              | 450,0                      |                  |                            |
|                     | 59                   | 9,3              | 300,0                      |                  |                            |
|                     | 60                   | 9,9              | 150,0                      |                  |                            |
|                     | 61                   | 10,3             | 0,0                        |                  |                            |

Note! External restrictions are calculated for values >0 Pa

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Optonal fan: STD cooling Fan ratio: 1 : 0.97 Fan type: FIX  
Cooling air flow and external restriction at different radiator air temperatures based on 107°C TTT and 40% antifreeze.  
Valid at 1 atm. (radiator and cooling fan, see optional equipment)

| Engine speed<br>rpm | Air on<br>temp<br>°C | PRIME POWER      |                            | STANDBY POWER    |                            |
|---------------------|----------------------|------------------|----------------------------|------------------|----------------------------|
|                     |                      | Air flow<br>m³/s | External restriction<br>Pa | Air flow<br>m³/s | External restriction<br>Pa |
| 1500                | 49                   |                  |                            | 6,4              | 450,0                      |
|                     | 50                   |                  |                            | 6,8              | 300,0                      |
|                     | 52                   |                  |                            | 7,3              | 150,0                      |
|                     | 53                   |                  |                            | 7,5              | 0,0                        |
|                     | 55                   | 6,4              | 450,0                      |                  |                            |
|                     | 56                   | 6,8              | 300,0                      |                  |                            |
|                     | 58                   | 7,3              | 150,0                      |                  |                            |
|                     | 58                   | 7,5              | 0,0                        |                  |                            |
| 1800                | 51                   |                  |                            | 8,0              | 450,0                      |
|                     | 52                   |                  |                            | 8,4              | 300,0                      |
|                     | 54                   |                  |                            | 8,9              | 150,0                      |
|                     | 55                   | 8,0              | 450,0                      | 9,3              | 0,0                        |
|                     | 56                   | 8,4              | 300,0                      |                  |                            |
|                     | 58                   | 8,9              | 150,0                      |                  |                            |
|                     | 59                   | 9,3              | 0,0                        |                  |                            |

Note! External restrictions are calculated for values >0 Pa

Optonal fan: VISCO Fan ratio: 1 : 1.04 Fan type: VISCO  
Cooling air flow and external restriction at different radiator air temperatures based on 107°C TTT and 40% antifreeze.  
Valid at 1 atm. (radiator and cooling fan, see optional equipment)

| Engine speed<br>rpm | Air on<br>temp<br>°C | PRIME POWER      |                            | STANDBY POWER    |                            |
|---------------------|----------------------|------------------|----------------------------|------------------|----------------------------|
|                     |                      | Air flow<br>m³/s | External restriction<br>Pa | Air flow<br>m³/s | External restriction<br>Pa |
| 1500                | 51                   |                  |                            | 6,8              | 450                        |
|                     | 52                   |                  |                            | 7,4              | 300                        |
|                     | 54                   |                  |                            | 7,9              | 150                        |
|                     | 55                   |                  |                            | 8,6              | 0                          |
|                     | 57                   | 6,8              | 450                        |                  |                            |
|                     | 58                   | 7,4              | 300                        |                  |                            |
|                     | 60                   | 7,9              | 150                        |                  |                            |
|                     | 60                   | 8,6              | 0                          |                  |                            |
| 1800                | 52                   |                  |                            | 8,7              | 450                        |
|                     | 53                   |                  |                            | 9,1              | 300                        |
|                     | 55                   |                  |                            | 9,5              | 150                        |
|                     | 56                   |                  |                            | 10,1             | 0                          |
|                     | 57                   | 8,7              | 450                        |                  |                            |
|                     | 58                   | 9,1              | 300                        |                  |                            |
|                     | 59                   | 9,5              | 150                        |                  |                            |
|                     | 60                   | 10,1             | 0                          |                  |                            |

Note! External restrictions are calculated for values >0 Pa

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Optonal fan: Heavy Dust Fan ratio: 1 : 0.97 Fan type: FIX  
Cooling air flow and external restriction at different radiator air temperatures based on 107°C TTT and 40% antifreeze.  
Valid at 1 atm. (radiator and cooling fan, see optional equipment)

| Engine speed<br>rpm | Air on<br>temp<br>°C | PRIME POWER      |                            | STANDBY POWER    |                            |
|---------------------|----------------------|------------------|----------------------------|------------------|----------------------------|
|                     |                      | Air flow<br>m³/s | External restriction<br>Pa | Air flow<br>m³/s | External restriction<br>Pa |
| 1500                | 51                   |                  |                            |                  | 400                        |
|                     | 55                   |                  |                            |                  | 300                        |
|                     | 58                   |                  |                            |                  | 200                        |
|                     | 60                   |                  | 400                        |                  |                            |
|                     | 61                   |                  |                            |                  | 100                        |
|                     | 62                   |                  | 300                        |                  |                            |
|                     | 64                   |                  |                            |                  | 0                          |
|                     | 66                   |                  | 200                        |                  |                            |
|                     | 68                   |                  | 100                        |                  |                            |
|                     | 71                   |                  | 0                          |                  |                            |
| 1800                | 58                   |                  |                            |                  | 400                        |
|                     | 60                   |                  |                            |                  | 300                        |
|                     | 61                   |                  |                            |                  | 200                        |
|                     | 63                   |                  |                            |                  | 100                        |
|                     | 65                   |                  | 400                        |                  | 0                          |
|                     | 67                   |                  | 300                        |                  |                            |
|                     | 68                   |                  | 200                        |                  |                            |
|                     | 69                   |                  | 100                        |                  |                            |
|                     | 71                   |                  | 0                          |                  |                            |

Note! External restrictions are calculated for values >0 Pa

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Engine management system

| Functionality         | Alternatives                     | Default setting       |
|-----------------------|----------------------------------|-----------------------|
| Governor mode         | Isochronus / Droop               | Isochronus            |
| Governor droop        | 0-8 %                            | 4,0                   |
| Governor response     | Adjustable PID-constants (VODIA) | Standard              |
| Dual speed            | 1500 / 1800 RPM                  | According to customer |
| Idle speed            | 600-1200 rpm                     | 900rpm                |
| Fine speed adjustment | ± 90 rpm                         | 0,0                   |
| Stop function         | Energized to Run / Stop          | Energized to Stop     |
| Preheating function   | On / Off                         | Off                   |
| Lamp test             | On / Off                         | On                    |
|                       |                                  |                       |
|                       |                                  |                       |

Engine sensor and switch settings

|                                                                                                         |           | Alarm level               |                     | Engine protection |                                          |
|---------------------------------------------------------------------------------------------------------|-----------|---------------------------|---------------------|-------------------|------------------------------------------|
| Parameter                                                                                               | Unit      | Setting range             | Default setting     | Level             | Action. Default/Alternative              |
| Oil temp                                                                                                | °C        | -                         | 127                 | 130,0             | Shut down                                |
| Oil pressure                                                                                            | Low idle  | kPa                       | -                   | 170,0             | Shut down                                |
|                                                                                                         | 1500 rpm  | kPa                       | -                   | 300,0             | Shut down                                |
|                                                                                                         | 1800 rpm  | kPa                       | -                   | 300,0             | Shut down                                |
| Oil level                                                                                               |           | -                         | Min Level           | -                 | Fault code                               |
| Piston cooling pressure >1000 rpm                                                                       | kPa       | -                         | 150                 | 150,0             | Shut down                                |
| Coolant temp                                                                                            | °C        | -                         | 105                 | 107,0             | Shut down                                |
| Coolant level                                                                                           |           | -                         | On                  | Low level         | Shut down                                |
| Fuel feed pressure                                                                                      | Low idle  | kPa                       | -                   | 150               | -                                        |
|                                                                                                         | >1400 rpm |                           | -                   | 300               | -                                        |
| Water in fuel                                                                                           |           | -                         | High level          | -                 | Fault code                               |
| Crank case pressure                                                                                     | kPa       | -                         | -                   | -                 | Shut down                                |
| Air filter pressure droop                                                                               | kPa       | -                         | 5                   | -                 | Fault code                               |
| 0,0                                                                                                     |           | Alarm level               |                     | Engine protection |                                          |
| Altitude, above sea                                                                                     | m         | -                         | -                   | -                 | Automatic derating, see section derating |
| Charge air temp                                                                                         | °C        | -                         | 80                  | 85,0              | Shut down                                |
| Charge air pressure                                                                                     | kPa       | -                         | 315                 | 325,0             | Shut down                                |
| Engine speed                                                                                            | rpm       | 100 - 120% of rated speed | 115% of rated speed | Alarm level       | -                                        |
| Low voltage                                                                                             | V         | -                         | 25,5                | -                 | -                                        |
| Engine protection can be disabled. For consequences please see VP International Limited Warranty Policy |           |                           |                     |                   |                                          |

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Electrical system

|                                     |               |                             |            |
|-------------------------------------|---------------|-----------------------------|------------|
| Voltage and type                    |               | 24 V / insulated from earth |            |
| Alternator:                         | make/output   | A                           | Bosch / 80 |
|                                     | tacho output  | Hz/alt. Rev                 | 6          |
|                                     | drive ratio   |                             | 3.9:1      |
| Starter motor                       | make          |                             | Melco      |
|                                     | type          |                             | 105 P70    |
|                                     | kW            |                             | 7,0        |
| Number of teeth on:                 | flywheel      |                             | 153        |
|                                     | starter motor |                             | 12         |
| Max wiring resistance main circuit  |               | mΩ                          | 2          |
| Cranking current at +20°C           |               | A                           | 280        |
| Crank engine speed at 20°C          |               | rpm                         | 150        |
| Starter motor battery capacity:     | max           | Ah/A                        | 2x225      |
|                                     | min at +5°C   | Ah/A                        | -          |
| Inlet manifold heater (at 20 V)     |               | kW                          | 4,0        |
| Power relay for the manifold heater |               | A                           | 1          |

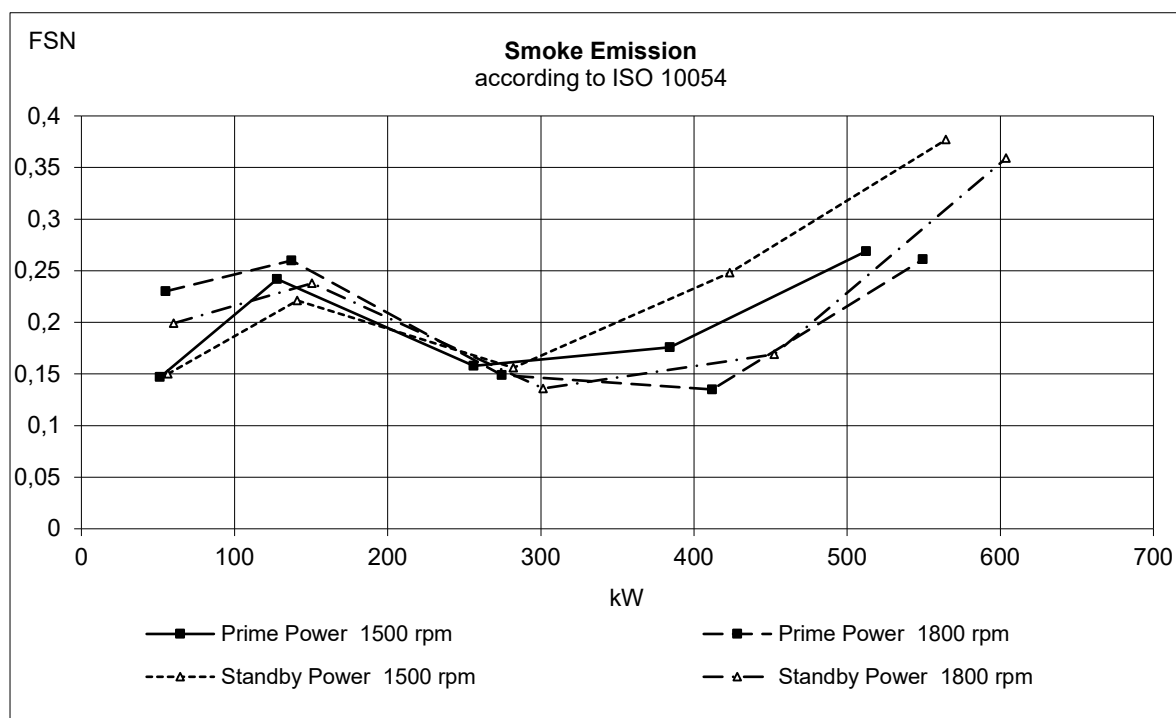
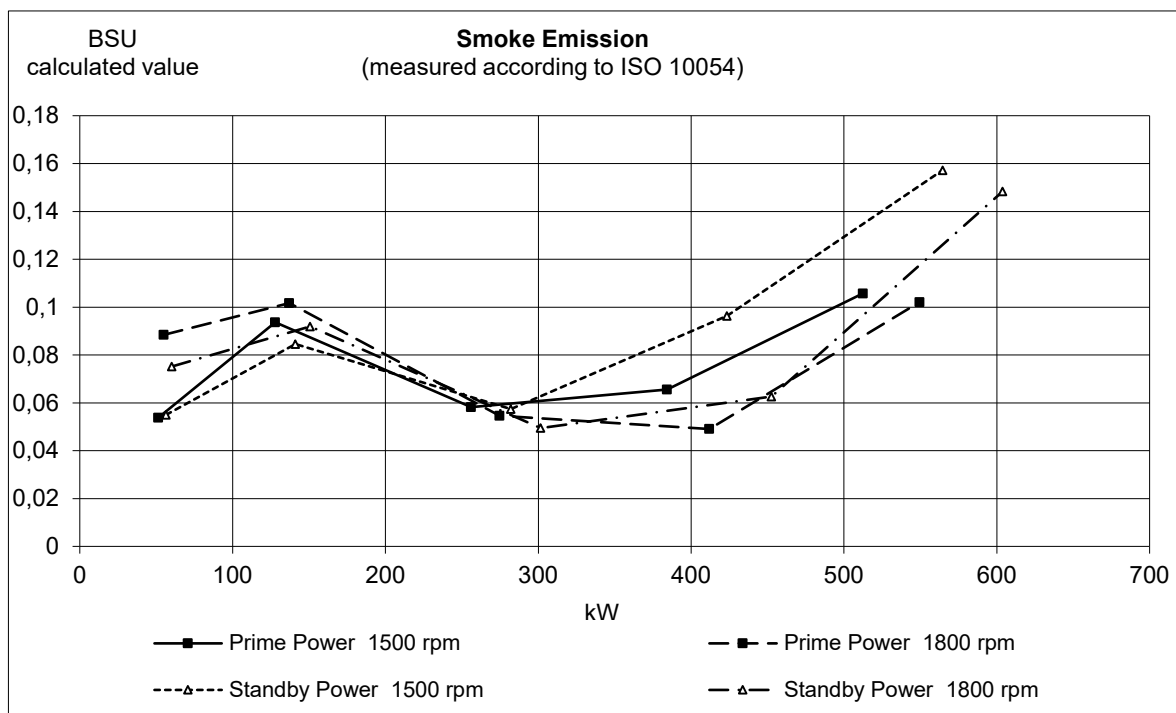
Power take off

|                                                |      |        |      |
|------------------------------------------------|------|--------|------|
|                                                | rpm  | 1500   | 1800 |
| Max allowed bending moment in flywheel housing | Nm   | 15000  |      |
|                                                | lbft | 11063  |      |
| Max. rear main bearing load                    | N    | 5000   |      |
|                                                | lbf  | 1124,0 |      |

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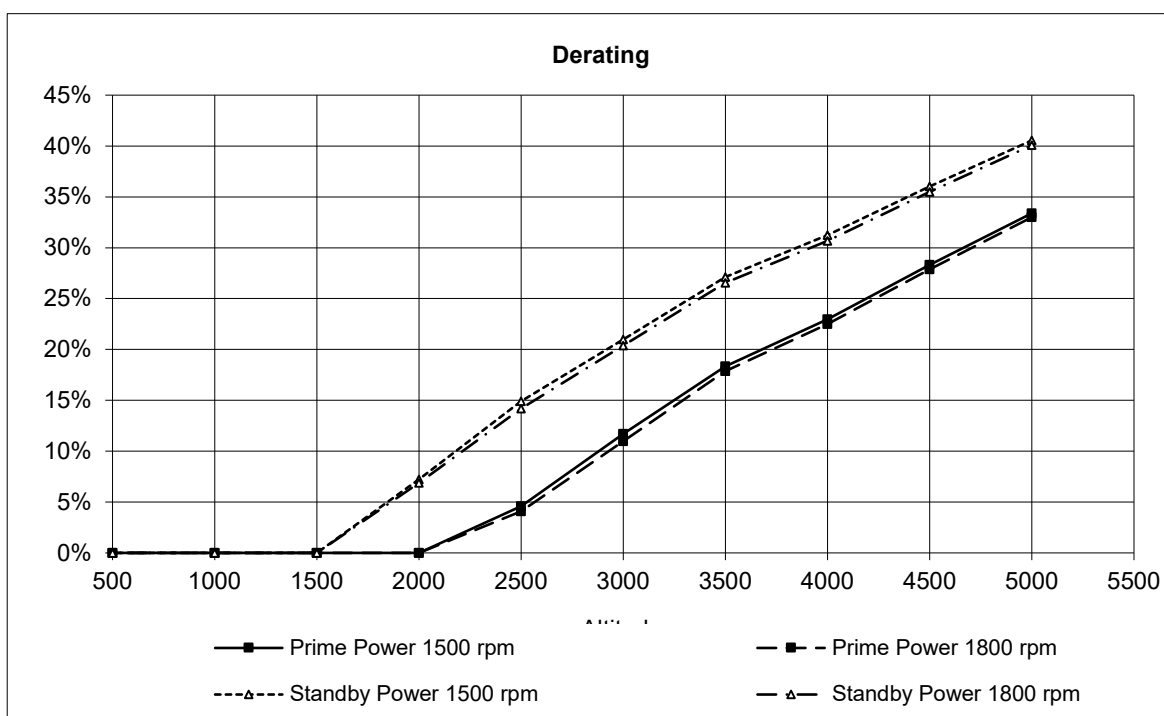
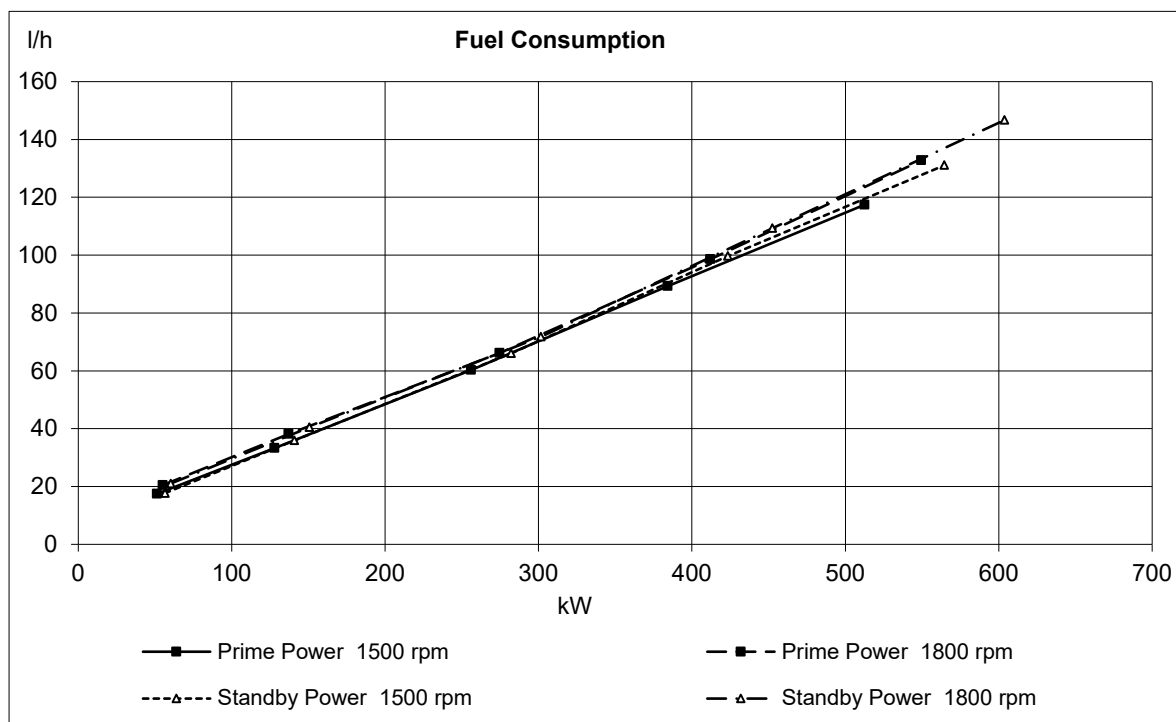
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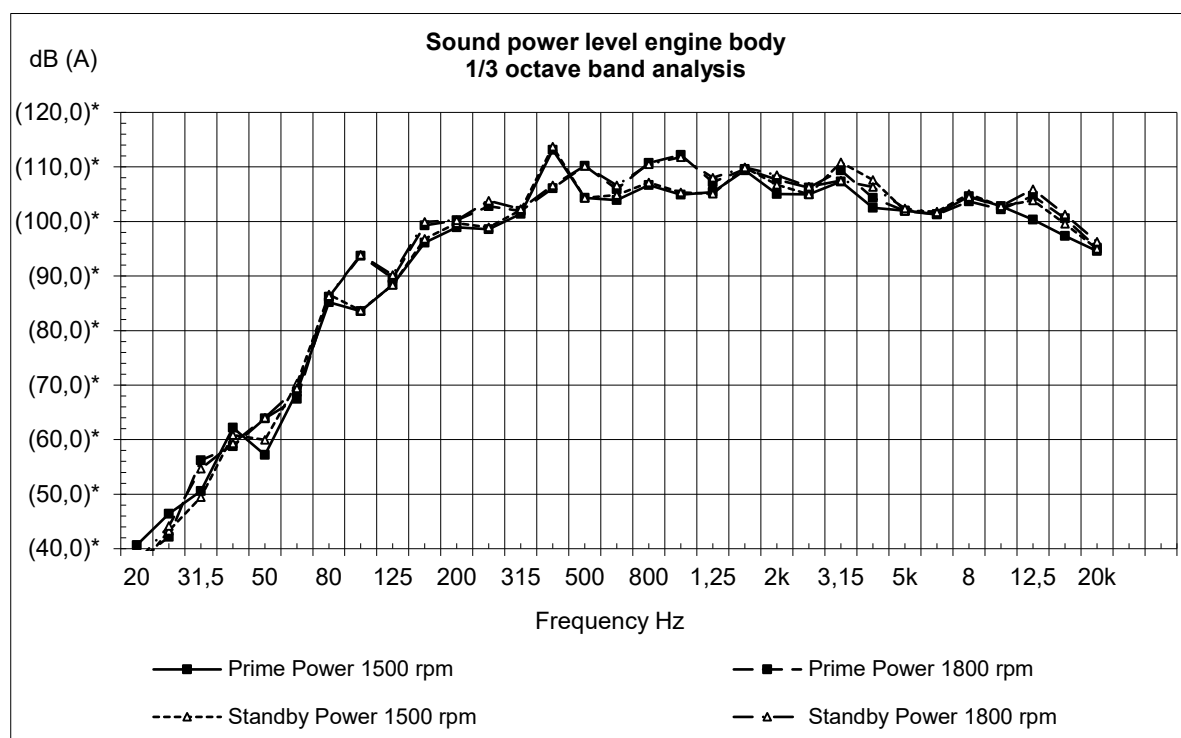
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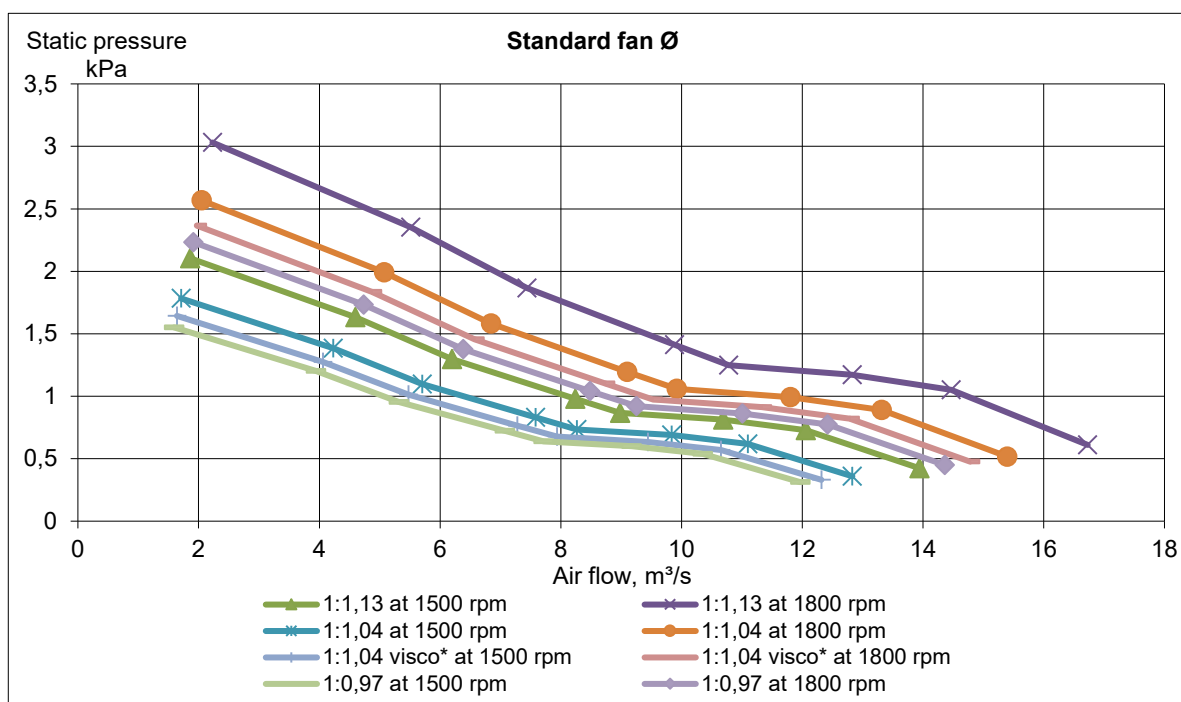
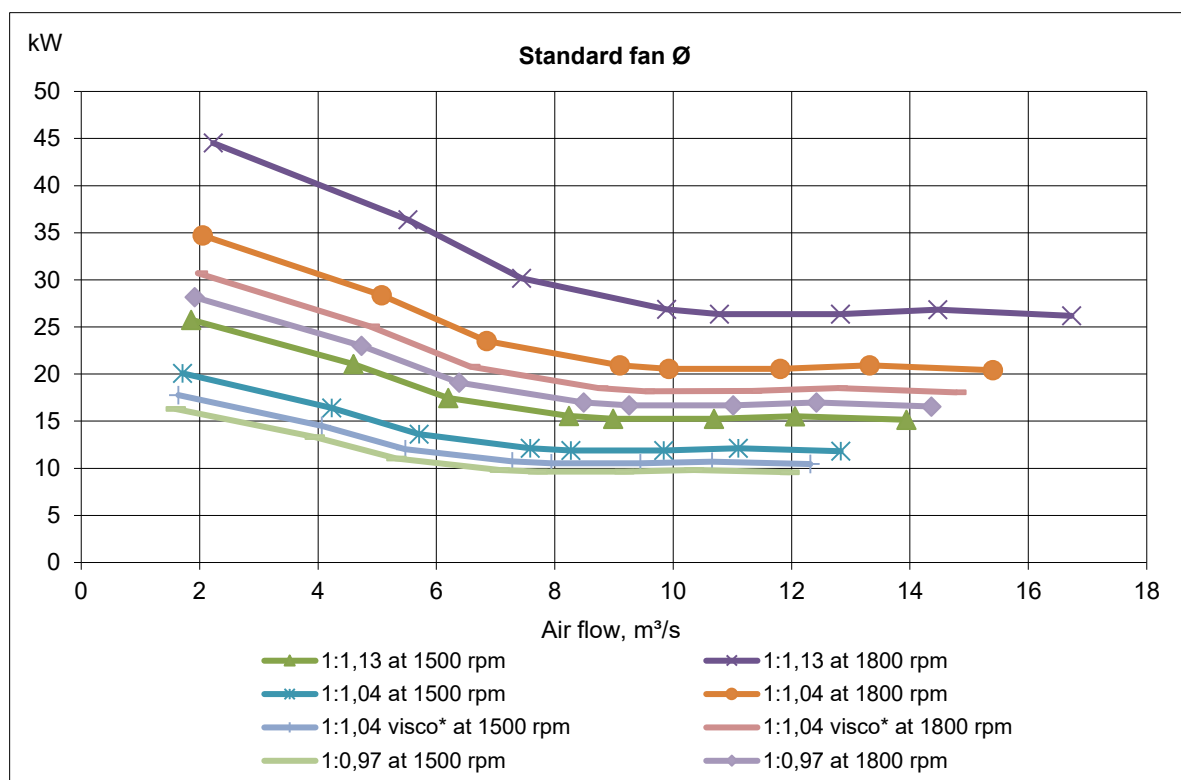
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Note:

\*when fully engaged.

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