# 3612

**DIESEL ENGINE TECHNICAL DATA**

CATERPILLAR®

RATING: Industrial/Continuous

| | | | |
|---|---|---|---|
| ENGINE SPEED (rpm): | 750 | TURBOCHARGER PART #: | 115-0479 |
| COMPRESSION RATIO: | 12:5 | FUEL TYPE: | CRUDE |
| AFTERCOOLER WATER (°C): | 50 | RATED ALTITUDE @ 45°C (m): | 7 |
| JACKET WATER INLET (°C): | 90 | | |
| IGNITION SYSTEM: | MUI | | |
| EXHAUST MANIFOLD: | DRY | | |

| RATING | | NOTES | LOAD | | 100% | 75% | 50% |
|---|---|---|---|---|---|---|---|
| ENGINE POWER | | (2) | bkW | | 2533 | 1900 | 1267 |
| **ENGINE EFFICIENCY** | **(ISO 3046/1)** | **(1)** | **%** | | **42.3%** | **41.3%** | **33.0%** |
| ENGINE EFFICIENCY | (NOMINAL) | (1) | % | | 41.0% | 40.0% | 32.0% |

| ENGINE DATA | | | | | | | |
|---|---|---|---|---|---|---|---|
| **FUEL CONSUMPTION** | **(ISO 3046/1)** | **(1)** | **g/bkw-hr** | | **200.1** | **205.2** | **256.4** |
| FUEL CONSUMPTION | (NOMINAL) | (1) | g/bkw-hr | | 204.0 | 209.1 | 261.4 |
| FUEL CONSUMPTION | (90% CONFIDENCE) | (1) | g/bkw-hr | | 206.4 | 211.8 | 264.3 |
| AIR FLOW (@ 25°C, 96 kPaa) | | | m3/min | | 286.8 | 222.9 | 149.8 |
| AIR MASS FLOW | | | kg/hr | | 19197 | 14919 | 10026 |
| COMPRESSOR OUTLET PRESSURE | | | kPa (abs) | | 250 | 169 | 83 |
| COMPRESSOR OUTLET TEMPERATURE | | | °C | | 195 | 154 | 102 |
| INLET MANIFOLD PRESSURE | | | kPa (abs) | | 247 | 167 | 82 |
| INLET MANIFOLD TEMPERATURE | | | °C | | 46 | 42 | 40 |
| TIMING | | (9) | °BTDC | | 11.5 | 11.5 | 11.5 |
| EXHAUST STACK TEMPERATURE | | | °C | | 322 | 336 | 348 |
| EXHAUST GAS FLOW (@ stack temp, 99 kPa) | | | m3/min | | 558 | 433 | 301 |
| EXHAUST GAS MASS FLOW | | | kg/hr | | 19742 | 15339 | 10320 |

| EMISSIONS | | | | | | |
|---|---|---|---|---|---|---|
| NOx (as NO) | (3) | g/bkW-hr | | 14.96 | 16.45 | 18.95 |
| CO | (3) | g/bkW-hr | | 0.81 | 1.01 | 1.72 |
| THC (molecular weight of 13.018) | (3) | g/bkW-hr | | 0.59 | 0.62 | 0.79 |
| Particulates | (3) | g/bkW-hr | | 0.77 | 0.80 | 0.95 |

| ENERGY BALANCE DATA | | | | | | | |
|---|---|---|---|---|---|---|---|
| FUEL INPUT ENERGY (LHV) | (NOMINAL) | (1) | KW | | 6174 | 4746 | 3955 |
| HEAT REJ. TO JACKET WATER | (NOMINAL) | (4) | KW | | 545 | 457 | 361 |
| HEAT REJ. TO ATMOSPHERE | (NOMINAL) | (5) | KW | | 396 | 383 | 404 |
| HEAT REJ. TO OIL COOLER | (NOMINAL) | (6) | KW | | 297 | 258 | 217 |
| HEAT REJ. TO EXH. (LHV to 25°C) | (NOMINAL) | (4) | KW | | 1671 | 1349 | 1265 |
| HEAT REJ. TO EXH. (LHV to 177°C) | (NOMINAL) | (4) | KW | | 1751 | 1292 | 1124 |
| HEAT REJ. TO AFTERCOOLER | (NOMINAL) | (7) (8) | KW | | 718 | 389 | 435 |

**CONDITIONS AND DEFINITIONS**

ENGINE RATING OBTAINED AND PRESENTED IN ACCORDANCE WITH ISO 3046/1 AND SAE J1995 JAN90 STANDARD REFERENCE CONDITIONS OF 25°C, 100 KPA, 30% RELATIVE HUMIDITY AND 150M ALTITUDE AT THE STATED AFTERCOOLER WATER TEMPERATURE.
CONSULT ALTITUDE CURVES FOR APPLICATIONS ABOVE MAXIMUM RATED ALTITUDE AND/OR TEMPERATURE.
PERFORMANCE AND FUEL CONSUMPTION ARE BASED ON 35 API, 16°C FUEL HAVING A LOWER HEATING VALUE OF 42.780 KJ/KG USED AT 29°C WITH A DENSITY OF 838.9 G/LITER.

**NOTES**

1) FUEL CONSUMPTION TOLERANCE. ISO 3046/1 IS 0, + 5% OF FULL LOAD DATA. NOMINAL IS ± 3 % OF FULL LOAD DATA.
2) ENGINE POWER TOLERANCE IS ± 3 % OF FULL LOAD DATA.
3) EMISSION DATA SHOWN ARE NOT TO EXCEED VALUES.
4) HEAT REJECTION TO JACKET AND EXHAUST TOLERANCE IS ± 10% OF FULL LOAD DATA. (heat rate based on treated water)
5) HEAT REJECTION TO ATMOSPHERE TOLERANCE IS ±50% OF FULL LOAD DATA. (heat rate based on treated water)
6) HEAT REJECTION TO LUBE OIL TOLERANCE IS ± 20% OF FULL LOAD DATA. (heat rate based on treated water)
7) HEAT REJECTION TO AFTERCOOLER TOLERANCE IS ± 5% OF FULL LOAD DATA. (heat rate based on treated water)
8) TOTAL AFTERCOOLER HEAT = AFTERCOOLER HEAT x ACHRF (heat rate based on treated water)
9) TIMING BASED ON AFM INJECTORS.

## AFTERCOOLER HEAT REJECTION FACTORS

| AIR TO TURBO (°C) | 0 | 250 | 500 | 750 | 1000 | 1250 | 1500 | 1750 | 2000 | 2250 | 2500 | 2750 | 3000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **50** | 1.24 | 1.27 | 1.31 | 1.35 | 1.38 | 1.42 | 1.46 | 1.49 | 1.53 | 1.57 | 1.60 | 1.64 | 1.68 |
| **45** | 1.19 | 1.22 | 1.26 | 1.29 | 1.33 | 1.36 | 1.40 | 1.43 | 1.47 | 1.50 | 1.54 | 1.58 | 1.61 |
| **40** | 1.14 | 1.17 | 1.20 | 1.24 | 1.27 | 1.31 | 1.34 | 1.37 | 1.41 | 1.44 | 1.48 | 1.51 | 1.54 |
| **35** | 1.09 | 1.12 | 1.15 | 1.18 | 1.22 | 1.25 | 1.28 | 1.31 | 1.35 | 1.38 | 1.41 | 1.44 | 1.48 |
| **30** | 1.04 | 1.07 | 1.10 | 1.13 | 1.16 | 1.19 | 1.22 | 1.25 | 1.29 | 1.32 | 1.35 | 1.38 | 1.41 |
| **25** | 1.00 | 1.02 | 1.05 | 1.08 | 1.11 | 1.14 | 1.17 | 1.19 | 1.22 | 1.25 | 1.28 | 1.31 | 1.34 |
| **20** | 1.00 | 1.00 | 1.00 | 1.02 | 1.05 | 1.08 | 1.11 | 1.13 | 1.16 | 1.19 | 1.22 | 1.25 | 1.27 |
| **15** | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.02 | 1.05 | 1.08 | 1.10 | 1.13 | 1.15 | 1.18 | 1.21 |
| **10** | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.02 | 1.04 | 1.07 | 1.09 | 1.12 | 1.14 |

ALTITUDE (METERS ABOVE SEA LEVEL)

## FREE_FIELD MECHANICAL NOISE

**SOUND PRESSURE LEVEL dB(A)**

| DISTANCE FROM THE ENGINE (M) | Overall | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
|---|---|---|---|---|---|---|---|---|---|
| **15M** | 90 | 79.2 | 85.2 | 84.7 | 85.3 | 84.3 | 82.3 | 81 | 78.6 |
| **7M** | 95 | 94.7 | 90.7 | 90.2 | 90.8 | 89.8 | 87.8 | 86.5 | 84.1 |
| **1M** | 107 | 96.2 | 102.2 | 101.7 | 102.3 | 101.3 | 99.3 | 98 | 95.6 |

Octave Band (Hz)

## FREE_FIELD EXHAUST NOISE

**SOUND PRESSURE dB(A)**

| DISTANCE FROM THE ENGINE (M) | Overall | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
|---|---|---|---|---|---|---|---|---|---|
| **15M** | 97 | 110.0 | 107.0 | 98.0 | 93.0 | 89.0 | 89.0 | 88.0 | 82.0 |
| **7M** | 104 | 116.0 | 114.0 | 105.0 | 100.0 | 95.0 | 96.0 | 94.0 | 89.0 |
| **1.5M** | 117 | 130.0 | 127.0 | 118.0 | 113.0 | 109.0 | 109.0 | 108.0 | 102.0 |

Octave Band (Hz)

**AFTERCOOLER HEAT REJECTION FACTORS:**

Aftercooler heat rejection is given for standard conditions of 25°C and 150 m altitude. To maintain a constant air inlet manifold temperature, as the air to turbo temperature goes up, so must the heat rejection. As altitude increases, the turbocharger must work harder to overcome the lower atmospheric pressure. This increases the amount of heat that must be removed from the inlet air by the aftercooler. Use the aftercooler heat rejection factor to adjust for ambient and altitude conditions. Multiply this factor by the standard aftercooler heat rejection.

**GENERATOR EFFICIENCY:**

Generator power determined with an assumed generator effeciency of 96% [generator power = engine power x 0.96]. If the actual generator efficiency is less than 96% [and greater than 94.5%], the generator power [ekW] listed in the technical data can still be achieved. The BSFC values must be increased by a factor.

The factor is a percentage = 96% - actual generator efficiency.

**SOUND DATA:**

Data determined by methods similar to ISO Standard DIS-8528-10. Accuracy Grade 3.