

## Extended Data Sheet


**C87 TE3F**  
**Power Generation**  
**Tier 3 - Stage IIIA**

Industrial Market

Rev. 1.0\_Oct 2017

|                      |                                |         |       |
|----------------------|--------------------------------|---------|-------|
| Number of cylinders: | 6                              | Bore:   | 117mm |
| Displacement:        | 8.7l                           | Stroke: | 135mm |
| Aspiration:          | turbocharged charge air cooled |         |       |

| General                                 |                  | @1500rpm                          | @1800rpm    |
|---|------------------|-----------------------------------|-------------|
| Engine model                            |                  | C87 TE3F                          |             |
| Basic engine type                       |                  | F2CCA615A*H001 - 5802321731       |             |
| Number of cylinders                     |                  | 6                                 |             |
| Firing order (1 <sup>st</sup> from fan) |                  | 1-4-2-6-3-5                       |             |
| Cylinder arrangement                    |                  | in line                           |             |
| Valves per cylinder                     |                  | 4                                 |             |
| Cycle                                   |                  | Diesel 4 stroke                   |             |
| Injection system                        |                  | direct, Electronic Common Rail    |             |
| Electronic Engine Control Unit          |                  | Bosch EDC7 UC31                   |             |
| Induction system                        |                  | turbo aftercooler air/air         |             |
| Bore                                    | mm               | 117                               |             |
| Stroke                                  | mm               | 135                               |             |
| Displacement                            | l                | 8.7                               |             |
| Mean piston speed                       | m/s              | 6.75                              | 8.1         |
| Compression ratio                       |                  | 16.5:1                            |             |
| Flywheel rotation                       |                  | anti clockwise viewed on flywheel |             |
| Flywheel housing                        |                  | SAE1                              |             |
| Flywheel                                | in               | 14                                |             |
| Moment of inertia                       |                  |                                   |             |
| Without flywheel                        | kgm <sup>2</sup> | 0.3                               |             |
| Flywheel only                           | kgm <sup>2</sup> | 1.94                              |             |
| BMEP gross                              |                  |                                   |             |
| Prime power                             | bar (kPa)        | 21.4 (2170)                       | 19.7 (2000) |
| Stand-by power                          | bar (kPa)        | 23.8 (2409)                       | 21.9 (2222) |
| Heat rejection (in stand by power)      |                  |                                   |             |
| Energy to coolant                       | kW               | 115                               | 126         |
| Energy to charge cooler                 | kW               | 63                                | 81          |
| Heat rejection (in prime)               |                  |                                   |             |
| Energy to coolant                       | kW               | 110                               | 120         |
| Energy to air                           | kW               | 60                                | 77          |
| Bare engine                             |                  |                                   |             |
| Dry weight                              | kg               | 860                               |             |
| Dimensions LxWxh                        | mm               | 1174 x 796 x 1004                 |             |
| Centre of gravity from FOB (X,Y,Z)      |                  | n/a                               |             |
| Assembled engine (G_Drive)              |                  |                                   |             |
| Dry weight                              | kg               | ~1050                             |             |
| Dimensions LxWxh                        | mm               | 2050 x 1055 x 1380                |             |
| Centre of gravity                       |                  | n/a                               |             |



| Performances                   |           | @1500rpm                      | @1800rpm                  |
|--------------------------------|-----------|-------------------------------|---------------------------|
| Continuous power (gross)       | kWm       | 189                           | 209                       |
| Prime power (gross)            | kWm       | 236                           | 261                       |
| Stand-by power (gross)         | kWm       | 262                           | 290                       |
| Fan consumption                | kWm       | 6                             | 10                        |
| Continuous power (net)         | kWm       | 179                           | 199                       |
| Prime power (net)              | kWm       | 230                           | 251                       |
| Stand-by power (net)           | kWm       | 256                           | 280                       |
| Switchable                     |           | yes                           |                           |
| Emissions                      |           | Stage IIIA emission compliant | Tier 3 emission complaint |
| Performance conditions         |           |                               |                           |
| Temperature                    | °C        | ≤ 40                          |                           |
| Altitude a.s.l.                | m         | ≤ 1000                        |                           |
| Power derate                   |           |                               |                           |
| Temperature > 40°C             | %         | 3 @ 5°C                       |                           |
| Altitude > 1000 < 3000m        | %         | 3 @ 500m                      |                           |
| Altitude > 3000m               | %         | 6 @ 500m                      |                           |
| Cooling system                 |           | @1500rpm                      | @1800rpm                  |
| Type                           |           | liquid                        |                           |
| Recommended coolant            |           | see dedicated document        |                           |
| Coolant capacity               |           |                               |                           |
| Engine only                    | l         | 15                            |                           |
| Radiator & hoses               | l         | 48                            |                           |
| Coolant engine flow            | l/min     | 239.5                         | 287.5                     |
| Cap pressure                   | kPa (bar) | 70 (0.7)                      |                           |
| Warnig setting first threshold | °C        | 103                           |                           |
| Maximum additional restriction | kPa       | 196                           |                           |
| Air to boil (prime power)      | °C        | 59                            | 57                        |
| Air to boil (stand-by)         | °C        |                               |                           |
| Fan                            |           |                               |                           |
| Diameter                       | mm        | 700                           |                           |
| Number of blades               |           | 8                             |                           |
| Drive ratio                    |           | 1.03 : 1                      |                           |
| Speed                          | rpm       | 1545                          | 1854                      |
| Air flow                       | m³/s      | 5.14                          | 6.5                       |
| Power consumption              | kWm       | 6.8                           | 10                        |
| Radiator                       |           |                               |                           |
| Core dimensions LxWxh          | mm        | 1054 x 551 x 1357             |                           |
| Dry weight                     | kg        | 160                           |                           |
| Radiator coolant capacity      | l         | 33                            |                           |



| <b>Lubrication system</b>            |                          | <b>@1500rpm</b>   | <b>@1800rpm</b>        |
|--------------------------------------|--------------------------|-------------------|------------------------|
| Oil sump capacity                    |                          |                   |                        |
| Max.                                 | l                        |                   | 23                     |
| Min.                                 | l                        |                   | 12.5                   |
| Oil system capacity including filter | l                        |                   | 28                     |
| Oil pressure at rated speed          | kPa                      |                   | 300 - 500              |
| Max. oil temperature                 | °C                       |                   | 120                    |
| Engine angularity                    |                          |                   |                        |
| Longitudinal                         | deg                      |                   | 19                     |
| Transversal                          | deg                      |                   | 19                     |
| Servicing intervals                  | h                        |                   | 600                    |
| Oil specifications                   |                          |                   | see dedicated document |
| Oil consumption                      | % fuel                   |                   | < 0.1                  |
| <b>Intake system</b>                 |                          | <b>@1500rpm</b>   | <b>@1800rpm</b>        |
| Air consumption at 100% load         | m <sup>3</sup> /h (kg/h) | 1200 (1440)       | 1410 (1690)            |
| Air intake restriction, clean filter | kPa (mbar)               |                   | 2 (20)                 |
| Air intake restriction, dirty filter | kPa (mbar)               |                   | 5 (50)                 |
| Air filter type                      |                          |                   | dry                    |
| <b>Exhaust system</b>                |                          | <b>@1500rpm</b>   | <b>@1800rpm</b>        |
| Gas flow at stand-by power           | kg/h                     | 1496              | 1760                   |
| Max. temperature at PRP              | °C                       | 504               | 508                    |
| Max. allowable back pressure         | kPa (mbar)               |                   | 10 (100)               |
| Energy to exhaust                    | kW                       | 215               | 262                    |
| <b>Fuel system</b>                   |                          | <b>@1500rpm</b>   | <b>@1800rpm</b>        |
| Fuel consumption                     |                          |                   |                        |
| Stand-by                             | l/h (kg/h) [g/kWh]       | 65.2 (54.8) [209] | 72.5 (60.9) [210]      |
| Prime power                          | l/h (kg/h) [g/kWh]       | 60.4 (50.7) [215] | 67.1 (56.4) [216]      |
| 80% prime power                      | l/h (kg/h) [g/kWh]       | 49.0 (41.2) [218] | 54.4 (45.7) [219]      |
| 50% prime power                      | l/h (kg/h) [g/kWh]       | 31.3 (26.3) [223] | 34.8 (29.2) [224]      |
| Fuel density (EN 590)                | kg/l                     |                   | 0.84                   |
| Fuel specifications                  |                          |                   | see dedicated document |
| Feed pump max. suction head          | m                        |                   | 0.5 - 1 bar (ABS)      |
| Injection pump                       |                          |                   |                        |
| Type                                 |                          |                   | Bosch                  |
| Model                                |                          |                   | CP3.3                  |
| <b>Electric system</b>               |                          | <b>@1500rpm</b>   | <b>@1800rpm</b>        |
| Voltage (negative to ground)         | V                        |                   | 24                     |
| Starter motor                        |                          |                   |                        |
| Maker                                |                          |                   | Bosch                  |
| Power                                | kW                       |                   | 4.5                    |
| Pull current                         | A                        |                   | 12                     |
| Hold current                         | A                        |                   | 12                     |
| Break away current (+20°C)           | A                        |                   | 1020                   |
| Cranking current (+20°C)             | A                        |                   | 0                      |
| Number of teeth of the starter motor |                          |                   | 10                     |
| Number of teeth of the flywheel      |                          |                   | 149                    |
| Starting battery                     |                          |                   |                        |
| Recommended capacity                 | Ah                       |                   | 2 x 185                |
| Discharge current                    | A                        |                   | 1200                   |
| Stop solenoid                        |                          |                   | from ECU               |
| Alternator                           |                          |                   |                        |
| Voltage                              | V                        |                   | 28                     |
| Charge                               | A                        |                   | 90                     |

| <b>Cold starting</b>   |                    | <b>@1500rpm</b> | <b>@1800rpm</b> |
|--|--------------------|-----------------|-----------------|
| Without air preheating   | °C                 |                 | -10             |
| With air preheating  | °C                 |                 | -25             |
| <b>Emission gases and particles</b>  |                    | <b>@1500rpm</b> | <b>@1800rpm</b> |
| Emissions limits norm  |                    | n/a             | n/a             |
| TAA luft   |                    | n/a             | n/a             |
| NOx  | oxides of nitrogen | g/kWh           | 3.74            |
| HC   | hydrocarbons       | g/kWh           | 0.15            |
| NOx  | +HC                | g/kWh           | 3.89            |
| CO   | carbon monoxide    | g/kWh           | 0.51            |
| PT   | particles          | g/kWh           | 0.076           |
| <b>*** Sound level</b>   |                    | <b>@1500rpm</b> | <b>@1800rpm</b> |
| Overall sound pressure (engine only)   |                    | dBA             | n/a             |
| Overall sound pressure (with accessories only)   |                    | dBA             | n/a             |
| Exhaust noise (w/o muffler)  |                    | dBA             | -               |
| Noise spectrum<br>(octave analysis performed at the position of maximum noise) - diagram |                    | Table<br>dB-Hz  | -               |
| <b>** Step load</b>  |                    | <b>@1500rpm</b> | <b>@1800rpm</b> |
| G2 (% of PrP)  |                    | 65              | 61              |
| G3 (% of PrP)  |                    | 60              | 55              |
| <b>Scope of Supply</b>   |                    | <b>@1500rpm</b> | <b>@1800rpm</b> |
| Bare engine → in "option list"   |                    |                 | n/a             |
| Gdrive (S500 version) → in "option list"   |                    |                 | n/a             |

\* Power at flywheel according dir. 97/68 EC (w/o fan), after 50 hours of run-in, tolerance ±3%, fuel EN 590; Test according ISO 3046/1, turbo air inlet temperature 25°C, atmospheric pressure 100kPa, humidity 30% - According also to DIN 6271, BS 5514, SAE J1349. All data is based on the engine operating with fuel system, water pump, lubricating oil pump with inlet and exhaust restriction at or below datasheet limits.

### Rating Guidelines

**Prime power** is the maximum power available with varying loads for an unlimited of hours. The average power output during a 24 hours period of operation, must not exceed 80% of the declared primo power between the prescribed maintenance intervals at standard environmental conditions. A 10% overload is available for 1h every 12 hours of operation.

**Stand-by power** is the maximum power available for a period of 500h/y with a mean load of 90% of the declared stand-by power. No overload is permissible for this use.

\*\* Generator powers are typical and are based on an average alternator efficiency and a power factor (cos.  $\Theta$ ) of 0.8 and are for guidance only.

$$kWe = kWm \times \text{gen. eff.}$$

$$kVA = kWe / 0.8$$

The above impact load values comply with requirements of classification 3 & 4 of ISO 8528 - 12 and G2 operating limits stated in ISO 8528 - 5 (% of prime power).

All tests were conducted using an engine installed and serviced to FPT recommendations, standard ambient condition.

\*\*\*The figures for total noise levels are typical for an engine running at prime power rating in a semi-reverberant environment and measured at a distance of one metre from the periphery of the engine.



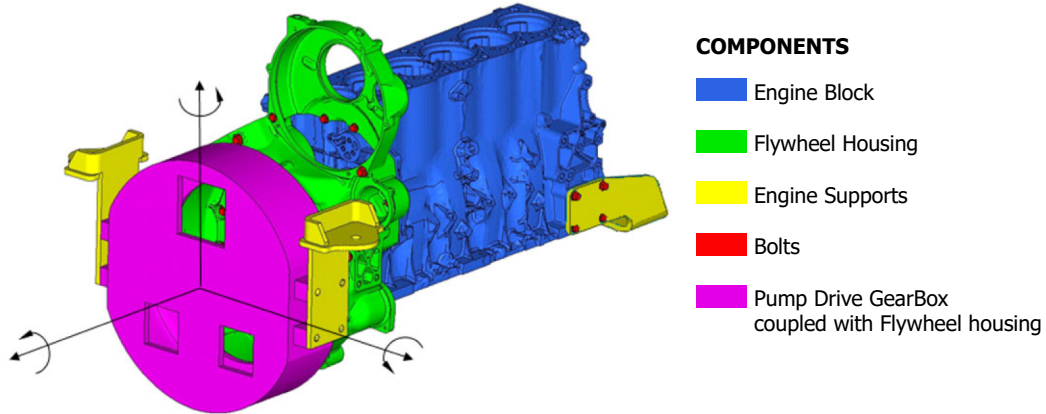


Figure 1. Components

236553

## ACRONYMS LIST

| Acronyms | Description                                  |
|----------|--|
| -        | Not Needed                                   |
| 2stTC    | Two Stage Turbo (sequential)                 |
| Ag       | Agricultural                                 |
| ASC      | Ammonia Slip Catalyst (same as CUC)          |
| ATS      | After Treatment System                       |
| BSFC     | Brake Specific Fuel Consumption              |
| CAC      | Charge Air Cooler                            |
| CCDPF    | Close Coupled DPF                            |
| CCV      | Crankcase Ventilation                        |
| CE       | Construction Equipment                       |
| CI       | Cast Iron                                    |
| CRS      | Common Rail System                           |
| CRSN     | Common Rail System NKW (Commercial vehicles) |
| CUC      | Clean Up Catalyst for ammonia (same as ASC)  |
| DAVNT    | Dual Axis Variable Nozzle Turbine            |
| DCS      | Drawing Coordinate System                    |
| DI       | Direct Injection                             |
| DOC      | Diesel Oxidation Catalyst                    |
| DOHC     | Double Over Head Camshaft                    |
| DPF      | Diesel Particulate Filter                    |
| ECEGR    | External Cooled EGR                          |
| ECU      | Engine Control Unit                          |
| EEGR     | External EGR                                 |
| EGR      | Exhaust Gas Recirculation                    |
| epWG     | Electro pneumatic WG                         |
| eVGT     | Electrical VGT                               |
| eWG      | Electrical WG                                |
| FFOB     | Front Face of Block                          |
| FGT      | Fixed Geometry Turbocharger (no WG)          |
| FIE      | Fuel Injection System                        |
| HD       | Heavy Duty                                   |
| HLA      | Hydraulic Lash Adjusters                     |

| Acronyms | Description                                     |
|----------|---|
| IDI      | Indirect Injection                              |
| iEGR     | Internal EGR                                    |
| ISC      | Interstage Cooling                              |
| LD       | Light Duty                                      |
| LDCV     | Light Duty Commercial Vehicles                  |
| LH       | Left Hand Side                                  |
| LWR      | Laser Welded Rail                               |
| MD       | Medium Duty                                     |
| n/a      | Not Available                                   |
| NA       | Natural Aspirated                               |
| NS       | Non Structural                                  |
| OHV      | Over Head Valves                                |
| OPT      | Option  |
| PCP      | Peak Cylinder Pressure                          |
| PTO      | Power Take Off                                  |
| RFOB     | Rear Face of Block                              |
| RH       | Right Hand Side                                 |
| S        | Structural                                      |
| SAPS     | Sulphated Ash, Phosphorus, Sulphur              |
| SCR      | Selective Catalytic Reduction catalyst          |
| SOHC     | Single Over Head Camshaft                       |
| STD      | Standard  |
| TC       | Turbocharged                                    |
| TCA      | Turbocharged, Charge Air Cooled                 |
| THM      | Thermal Management                              |
| UFDPF    | Under Floor DPF                                 |
| UQS      | Urea Quality Sensor                             |
| VE       | Bosch Distributor Mechanical Pump               |
| VFT      | Variable Flow Turbine                           |
| VGT      | Variable Geometry Turbocharger                  |
| WG       | Waste Gate Turbocharger                         |
| XPI      | Extra high Pressure Injection (Scania, Cummins) |

**Unit of misure according to international system of unit.  
Engine accessories and Options available on Option List.  
All data is subject to change without notice.**

## UPDATING

| Revision | Description            | Date     |
|----------|------------------------|----------|
| 1.0      | First document release | Oct 2017 |

