

Extended Data Sheet

**N67 570/550 Plesure****Marine Application**1st Release - Rev. 1.0
Date: 29/09/2017

| | |
|--|---------------|
| Number Cylinders: 6 | Bore: 104mm |
| Displacement: 6.7l | Stroke: 132mm |
| Aspiration: Turbocharged Charge Air Cooled | |

Main characteristics

| | | |
|--|--|--|
| Emission certification N67 570/550/500/480 Plesure | For emissions details see Option List | |
| Technical code / Family (only for homologation purpose) | F4HFA616A*H (419 kW - 570 hp) F4HFA616C*H (404 kW - 550 hp) F4HFA616D*H (368 kW - 500 hp) F4HFA616E*H (353 kW - 480 hp) | |
| Cycle | Diesel 4 stroke | |
| Charging system | TCA | |
| Number of cylinder | 6 | |
| Configuration | in line | |
| Power range | N67 570 | |
| | kw - hp | A1 (419kW - 570hp) |
| | N67 550 | |
| | kw - hp | A1 (404kW - 550hp) A2 - B1 (368 kW - 500 hp) B (353 kW - 480 hp) |
| Bore | mm | 104 |
| Stroke | mm | 132 |
| Stroke / Bore | 1.27 | |
| Displacement | liters | 6.728 |
| Unit Displacement | liters | 1.121 |
| Valves per cylinder | 4 | |
| Cooling | liquid | |
| Revolution (from flywheel side) | anti-clockwise | |
| Compression ratio | 15.8 : 1 | |
| Firing order | 1-5-3-6-2-4 | |
| Injection type | Electronic Common Rail | |
| Engine optimum working temperature (operation temperature) | °C | 0/50 (w/o auxiliary) |
| Max application PCP | bar | 180 |
| Cylinder Head | Single | |
| Single / Multiple | Single | |
| Material used | Cast Iron | |
| Type of ports | crossflow | |
| Intake valve dia. | mm | 33 |
| Exhaust valve dia. | mm | 33 |
| Camshaft | chilled cast iron | |
| Layout | OHV | |
| Cam carrier | no | |
| Material and Heat treatment | chilled cast iron | |
| Valve train | mechanical tappet & push rod | |
| Drivetrain (timing system) | gear tappet | |
| Valve actuation | tappet & push rod | |
| Variable valve actuation system | no | |

(continue...)



Main characteristics

| | | |
|---|------------------|---|
| Cylinder Block (crankcase) | | non structural |
| Material of cylinder block | | cast Iron |
| Wet or dry liners | | dry |
| Liners replaceable; (Slip fit or interference fit) | | no |
| Liner bores finished in situ | | 104.000 - 104.024 |
| Liner bridge | mm | 16 |
| Bearing caps | mm | machined cast iron |
| Crankcase Ventilation | | mechanical |
| Crankshaft & counterweights | | |
| Material | | forged Steel |
| Balance weight on crank shaft – bolted type or integral | | Integral |
| Size of Journals | mm | 69 |
| Size of Pins | mm | 66 |
| Induction Hardening / Journal/Pin dia / Fillet radius | | "Induction harden all main journals, crankpins and rear diameter" |
| Induction Hardening required for each U/S grinding | | YES |
| Acceptable Inertia (clutch) | kgm ² | 0.75 |
| Main bearings type | | trimetallic layer |
| Balancing | | YES |
| Damper type | | Viscous damper |
| Piston | | - |
| Material | | cast Al |
| bearing | | bushless / graph. |
| Pin size | mm | cast pin Ø38 |
| Con-rod | | forged-fractured |
| Con-rod length | mm | 195 |
| Con-rod ratio | | 0.338 |
| Big-end bearing type | | bimetallic layer |
| Turbocharger type | | fix geometry / wastegate |
| Turbocharger Supplier | | CTT |
| Turbocharger Control | | WG pneumatic control |
| Max Turbine inlet temperature | °C | 780 |
| Max boost pressure | mbar | 1600 (depending on rating) |
| Method of cooling the Turbocharger | | lubricated /Oil |
| turbo protection devices | | (WG - Software strategy open loop) |
| Exhaust flap | | N/A |
| Engine brake configuration | | N/A |
| Be10 | hours | 8000 |

Front Power take off

| | | |
|---|----|-------|
| PTO type | - | front |
| Frontal pulley with 2 gulch for trapezoidal belts | - | - |
| Power taken at 900 rpm | kW | ≤ 6 |
| Power taken at 1800 rpm | kW | ≤ 12 |
| Frontal pulley with 2 gulch + elastic coupler | Nm | ≤ 150 |

Power take off on gear train

| | | |
|------------------------------|----|----|
| SAE A 9 teeth | Nm | na |
| SAE A 11 teeth | Nm | na |
| SAE B 13 teeth | Nm | na |
| SAE B (DIN 5482) | Nm | na |
| SAE 2B 15 teeth(ANSI B92,1) | Nm | na |



Main dimensions and weight

| | | | |
|---|-------|-------------------|-------|
| * Engine Length | | mm | 1089 |
| * Engine Width | | mm | 847 |
| * Engine Height | | mm | 825 |
| ** Approximate Engine Weight – Dry (without gear) | | kg | 721 |
| Approximate Engine Weight - Wet | | kg | - |
| * Centre of gravity (Ref. to DCS) | X | mm | -8.2 |
| | Y | mm | 188.8 |
| | Z | mm | 314.1 |
| * Principal Moment of Inertia (Ref. to the centre of gravity) | I_x | kg*m ² | - |
| | I_y | kg*m ² | - |
| | I_z | kg*m ² | - |
| Mass moment of inertia - rotating components (excluding flywheel) | | kgm ² | - |
| Mass moment of inertia - standard flywheel | | kgm ² | - |
| Bending moment on the flywheel housing | | | - |
| point 1 | | | - |
| point 2 | | | - |
| point 3 | | | - |
| Bending moment on PTO | | Nm | - |
| Maximum static mounting surface load | | | - |
| Maximum crankshaft thrust bearing pressure limit | | | |
| Intermittent load | | MPa | - |
| Continuous load | | MPa | - |
| Rear main bearing load | | MPa | - |
| Maximum bending moment available from front of the crankshaft: | | | - |
| 0 degrees | | Nm | - |
| 90 degrees | | Nm | - |
| 180 degrees | | Nm | - |
| Reciprocating mass | | kg | - |

* Values of base engine version; to be finalized with FPT for different engine dressing.

** Indicative dry weight of base engine without AC compressor, clutch, oil and coolant.

Environmental operating conditions

| | | | |
|--|--|-------|-----|
| Maximum Altitude without de-rating | | m | 500 |
| Minimum guaranteed temperature for cold start w/o any aid | | °C | 0 |
| Minimum guaranteed temperature for cold start with grid heater | | °C | - |
| Time preheating for manifold heater | | sec | - |
| Time post heating for manifold heater | | sec | - |
| Low idle continuous operation time | | hours | - |

* Minimum cranking temperature for bare engine (no transmission) with required cold start kit, sufficient battery capacity, low viscosity oil and arctic fuel.

Engine performance de-rating

| | | | |
|--|--|-----|-----|
| Maximum water temperature (Switch on of the MIL lamp) | | °C | 32 |
| Start Derating: Switch on of the warning coolant temperature lamp (amber color) | | °C | 102 |
| Maximum Derating (50% derating) Switch on of the high coolant temperature lamp (red color) | | °C | 120 |
| Altitude level: Gradual reduction of transient response by smoke map correction from | | m | 500 |
| Fuel Temperature | | °C | 80 |
| Intake Manifold Air Temperature | | °C | 70 |
| Turbine overheating protection | | °C | 810 |
| Oil temperature protection | | °C | 125 |
| Oil pressure protection | | bar | |

Fuel System

| | | |
|---|-------------------|---|
| Fuel injection system | | Bosch CRIN3-18 |
| Injection pump | | Bosch CP3.3 |
| Injection pressure | bar | 1800 |
| Injector | | Bosch CRIN3-18 |
| Injector installation (sleeve, sealing flat or conical) | | vertical - no sleeve CRIN3-18 |
| Injector nozzle | | - |
| Rail | | forged |
| Engine fuel compatibility | | see FPT Fuel Prescription document |
| Feed pump | | |
| max flow | l/hr | 280 |
| nominal feed pressure | bar | 0.5 - 1 |
| Fuel filter | | Cartridge with element filter replaceable |
| Maximum continuous allowable fuel temperature (without derating) | °C | 70 |
| Maximum allowable temperature for short time (gear pump inlet) | °C | - |
| Maximum relative pressure at gear pump inlet | bar | - |
| Maximum absolute pressure at gear pump inlet (in case of tank above engine) | bar | - |
| Minimum relative pressure at gear pump inlet | bar | 0.5 |
| Maximum relative average pressure at gear pump outlet | bar | - |
| Maximum back flow relative pressure | bar | 1.2 |
| Maximum back flow @ rated speed | l/hr | - |
| Maximum allowable fuel temperature from transfer pump inlet | °C | - |
| Maximum allowable fuel supply line restriction | bar | - |
| Maximum allowable fuel return line restriction | bar | - |
| Maximum heat rejection to return fuel | kW | - |
| Maximum fuel flow to transfer pump (to engine) | l/hr | - |
| Minimum fuel tank venting requirement | m ³ /h | - |
| Prefilter / Water separator micron size | μ | - |
| Fuel pump max suction head | kPa | - |
| Max static pressure to AC pump with overlying tank | bar | - |

Air Intake System

| | | |
|--|-----|-----------|
| Reference ambient temperature | °C | 25 |
| Compressor intake temperature raise | °C | ≤ 5 |
| Filter air intake temperature (warm air recirculation) | °C | ≤ 5 |
| Maximum turbo inlet air temperature | °C | 780 |
| Maximum inlet air filter temperature | | 50 |
| Compressor inlet pressure (with new air filter) | bar | ≥ - 0.045 |
| Compressor inlet pressure (with dirty air filter) | bar | ≥ - 0.065 |
| Loads on turbocharger On compressor intake | kg | na |
| Loads on turbocharger On compressor outlet | kg | na |

Exhaust System

| | | |
|---|------|-------------|
| Maximum allowable system back pressure | bar | 0.2 |
| Exhaust manifold type | | Watercooled |
| Maximum allowable static weight on exhaust connection | kg | - |
| Maximum exhaust flow rate | kg/h | - |



Lubrication System

| | | |
|--|---------|-------------------------------------|
| Oil pump type | | gear pump |
| Oil pump drive arrangement | | Gear Pump Forged of Block |
| Min oil pump flow | l/min | ~ 12 |
| Max oil pump flow | l/min | ~ 50 |
| Min oil pressure (engine oil temp at 120°C) | bar | 0,6 |
| Max oil pressure (engine oil temp at 120°C) | bar | 3,5 |
| Max oil temperature @ full load (in main gallery) | °C | 120 |
| Maximum oil pressure peak on cold engine | bar | 15 |
| Crankcase Ventilation System | | closed |
| Oil cooler type | | water cooled |
| Transducer for indicating oil temperature and pressure | | signal from ECU |
| Max operating angle (any direction) | degrees | |
| Max installation angle (any direction) | degrees | |
| Total system capacity (std oil pan) | liters | |
| Center sump capacity at max mark | liters | 19 |
| Center sump capacity at min mark | liters | 14 |
| Oil filter type | | cartridge |
| oil filter capacity | liters | |
| Lube system oil cooler type | | plate cooler. Jacket water |
| Max oil content admitted in blow by gas (after filter) | g/h | 0,3 |
| Approved engine oil specification | | ref. FPT Fuel Prescription Document |
| Oil for cold condition mission (T° ambient < -25°C) | | |

Cooling system

| | | |
|---|-----------------|------------|
| Optimum coolant temperature range @ engine out (50% glycol) | °C | 83° ÷ 99° |
| Water pump Type | | centrifuge |
| Water pump drive | | belt |
| Coolant Capacity (engine only) | liters | 11 |
| Thermostat type | | Wax type |
| Thermostat position | | Left side |
| Thermostat opening / fully open temperature | °C | 80° ÷ 90° |
| Recommended coolant circuit pressurization range (relative) | $P_9 - P_8$ bar | 0.7-1.20 |
| Coolant engine pressure outlet – inlet | bar | <0.2 |
| Minimum coolant pressure (no pressure cap and Thermostat closed) | P_8 bar | 1 |
| Coolant water pump inlet pressure (water temperature 60-100°C) | bar | 0.5 |
| Max coolant flow to accessories @ rated speed from cab heater | l/h | - |
| Minimum coolant pressure difference to accessories @ rated speed | bar | - |
| Minimum operating block coolant temperature | °C | - |
| Min and Max fill rate (low level alarm required for most engines) | l/min | 8 |
| Minimum coolant expansion space (% total cooling system capacity) | l/min | - |



Electrical, Electronic and Control Systems

| | | |
|---|------|---------------------------------|
| System voltage | Volt | 12 |
| Engine control unit | | Bosch EDC17 CV41 |
| ECU software | | P662 |
| ECU Vehicle connection | | Via body computer with CAN line |
| ECU operating range | °C | -30 / +95 |
| Temperature of ECU case for <5' after power up | °C | + 85 |
| ECU rated continuous temperature | °C | + 80 |
| ECU communication protocol | | SAE J1939 |
| Min power supply for ECU operation | Volt | 7 |
| Max power supply for ECU operation | Volt | 32 |
| Battery wire connection resistance value @ 20°C (from Battery to ECU) | mΩ | - |
| Diagnostic | | On board |
| Alternator | | Bosch |
| Capacity in Amps | A | 90 |
| Drive / ratio | | Belt |
| Starter motor type | | Bosch |
| Starter motor power | kW | 3.2 |
| Min. cranking speed TDC @ -30°C | rpm | 75 |
| Average cranking speed | rpm | 115 |
| N° tooth pinion/crown gear | | 10 / 132 |
| Min. battery voltage | Volt | - |
| Mean battery voltage | Volt | - |
| Battery - minimum capacity recommended | Ah | 120 |
| Battery - minimum cold cranking capacity recommended | A | 900 |

Maintenance

| | | |
|------------------------------|---------------|--|
| Oil drain interval | hours | 300 |
| Oil filter change | hours | 300 |
| Oil refilling time | | Daily check to evaluate oil refill necessity |
| Air filter pulizia | hours | 300 |
| Air filter change | years | 2 |
| CCV filter change | hours | 2 years |
| Fuel filter change | hours | 600 |
| Fuel pre-filter change | hours | 600 |
| Belt replacement | hours / years | 1,200 or 2 years |
| Valve lash check /adjustment | hours | 3000 |
| Coolant change | hours (km) | 1,200 or 3 years |



Standard Engine Dressing

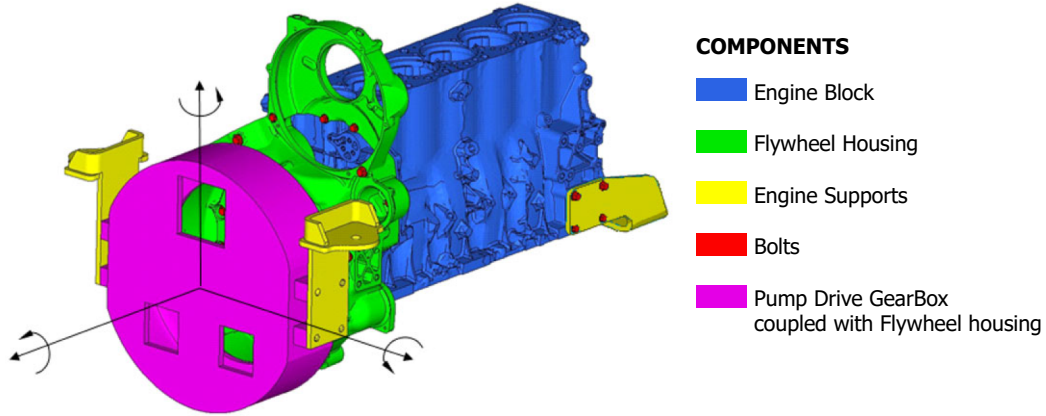
| | |
|-------------------------------------|--|
| Engine Rating | N67 570 kw - hp A1 (419kW - 570hp) N67 550 kw - hp A1 (404kW - 550hp) A2 - B1 (368 kW - 500 hp) B (353 kW - 480 hp) |
| Homologation | For emissions details see Option List |
| Software configuration | P662 |
| High Pressure Pump | Bosch CP3.3 |
| Fuel Pump | By gears, incorporated into the high pressure pump |
| ECU | Bosch EDC17 CV41 |
| Gear Train | Rear |
| Gear Housing | Rear, alluminium |
| Flywhell housing | SAE 3 |
| flywhell size | inch 11" 1/2 |
| Air filter | Rear side |
| Crankshaft | Steel |
| Crankshaft Pulley | 8 groove - ø 173 mm |
| Damper | viscous damper |
| Fan position | mm na |
| Fan ratio | na |
| A/C Predisposition | |
| Noise Panel | none |
| Belt Tensioner | Automatic - with steel pulley |
| Main Belt | 8 groove belt |
| Alternator position / type | 12 V - 90 A |
| Starter motor position | 12 V - 3 kW |
| Intake manifold connection | Left side |
| Intake throttle valve | none |
| Intake manifold location | Left side |
| Exhaust manifold location | Right side |
| Turbocharger type | Waste Gate (water cooled) Turbo with Aftercooler (TCA) |
| Double water circuit heat exchanger | tube type |
| Water charge tank | Included |
| Turbocharger location | rear engine position |
| Turbo CAC connection | |
| Exhaust flange | |
| Sea water filter | not supplied |
| Water Pump | Into the block, front side |
| Air-water heat exchanger | not supplied (optional) |
| Water-water heat exchanger | yes, incorporate water tank |
| Thermostat | Available on engine 80° ÷ 90° C |
| Sea water Inlet | OD=50,8 mm, left side , horizontall inlet |
| Sea water Outlet | |
| Fresh water filler | high/front engine position |
| Water heater | not included |
| Coolant Temperature Sensor | Included |
| Oil pressure sensor | Included |
| Oil Temperature Sensor | Included |
| | (continue...) |
| Coolant level sensor | Included |



Standard Engine Dressing

| | | |
|----------------------------------|--------|--|
| Sea Water Pressure Sensor | | Included |
| Raiser | | Included |
| Crankcase Ventilation System | | rear |
| Oil cooler | | Oil / water engine cooler |
| Oil Pump | | By gears, rear side |
| Oil Sump | | Alluminium |
| Center sump capacity at max mark | liters | 19 |
| Center sump capacity at min mark | liters | 14 |
| Oil Dipstik | | Vertical left side |
| Oil filter position | | 1 - right side |
| Oil fill position | | by cylinder head cover |
| Air compressor brake type | cm3 | na |
| Drive arrangement / ratio | | na |
| Compressor cooling | | na |
| Hydraulic Pump | | na |
| Displacement | l/min | na |
| Drive arrangement | | na |
| Reservoir | | na |
| Fuel filter position/type | | 1 - Left side |
| Fuel pre-filter | | with Separator, water in Fuel Switch and hand-primer |
| Fuel inlet | | |
| Fuel outlet | | left side OD=ø11 |
| Grid Heater | | included |
| Engine stop device | | by electronic central unit |
| Wiring harness | | with negative to ground connection |
| Engine mountings | | included |
| Paint color | | white "ICE" |





236553

Figure 1.1. Components

ACRONYMS LIST

| Acronyms | Description |
|----------|---|
| CI | Cast Iron |
| S | Structural |
| NS | Non Structural |
| PCP | Peak Cylinder Pressure |
| FGT | Fixed Geometry Turbocharger (no WG) |
| WG | Waste Gate Turbocharger |
| eWG | Electrical WG |
| epWG | Electropneumatic WG |
| VGT | Variable Geometry Turbocharger |
| eVGT | Electrical VGT |
| TST | Two Stage Turbo (serial sequential) |
| 2stTC | Two Stage Turbo (sequential) |
| DAVNT | Dual Axis Variable Nozzle Turbine |
| VFT | Variable Flow Turbine |
| NA | Natural Aspirated |
| TC | Turbocharged |
| TCA | Turbocharged, Charge Air Cooled |
| ISC | Interstage Cooling |
| CAC | Charge Air Cooler |
| DOC | Diesel Oxidation Catalyst |
| DPF | Diesel Particulate Filter |
| CCDPF | Close-Coupled DPF |
| UFDPF | Under-Floor DPF |
| SCR | Selective Catalytic Reduction catalyst |
| CUC | Clean Up Catalyst for ammonia (same as ASC) |
| ASC | Ammonia Slip Catalyst (same as CUC) |
| EGR | Exhaust Gas Recirculation |
| iEGR | Internal EGR |
| EEGR | External EGR |

| Acronyms | Description |
|----------|---|
| ECEGR | External Cooled EGR |
| OHV | Over-head Valves |
| SOHC | Single Over-head Camshaft |
| DOHC | Double Over-head Camshaft |
| BSFC | Brake Specific Fuel Consumption |
| Ag | Agricultural |
| CE | Construction Equipment |
| VE | Bosch Distributor Mechanical Pump |
| XPI | Extra high pressure injection (Scania, Cummins) |
| CCV | Crankcase Ventilation |
| DI | Direct Injection |
| IDI | Indirect Injection |
| FIE | Fuel Injection System |
| CRS | Common Rail System |
| CRSN | Common Rail System NKW (Commercial vehicles) |
| LWR | Laser Welded Rail |
| LDCV | Light Duty Commercial Vehicles |
| LD | Light Duty |
| MD | Medium Duty |
| HD | Heavy Duty |
| DOHC | Double (or Dual) Overhead Camshaft |
| SOHC | Single Overhead Camshaft |
| HLA | Hydraulic Lash Adjusters |
| PTO | Power Take-off |
| THM | Thermal Management |
| SAPS | Sulphated Ash, Phosphorus, Sulphur |
| LH | Left Hand Side |
| RH | Right Hand Side |
| DCS | Drawing Coordinate System |

Engine accessories and Options available on Option List.
All data is subject to change without notice.

UPDATING

| Revision | Description | Date |
|----------|----------------------|------------|
| 1.0 | New document release | 29/09/2017 |

