



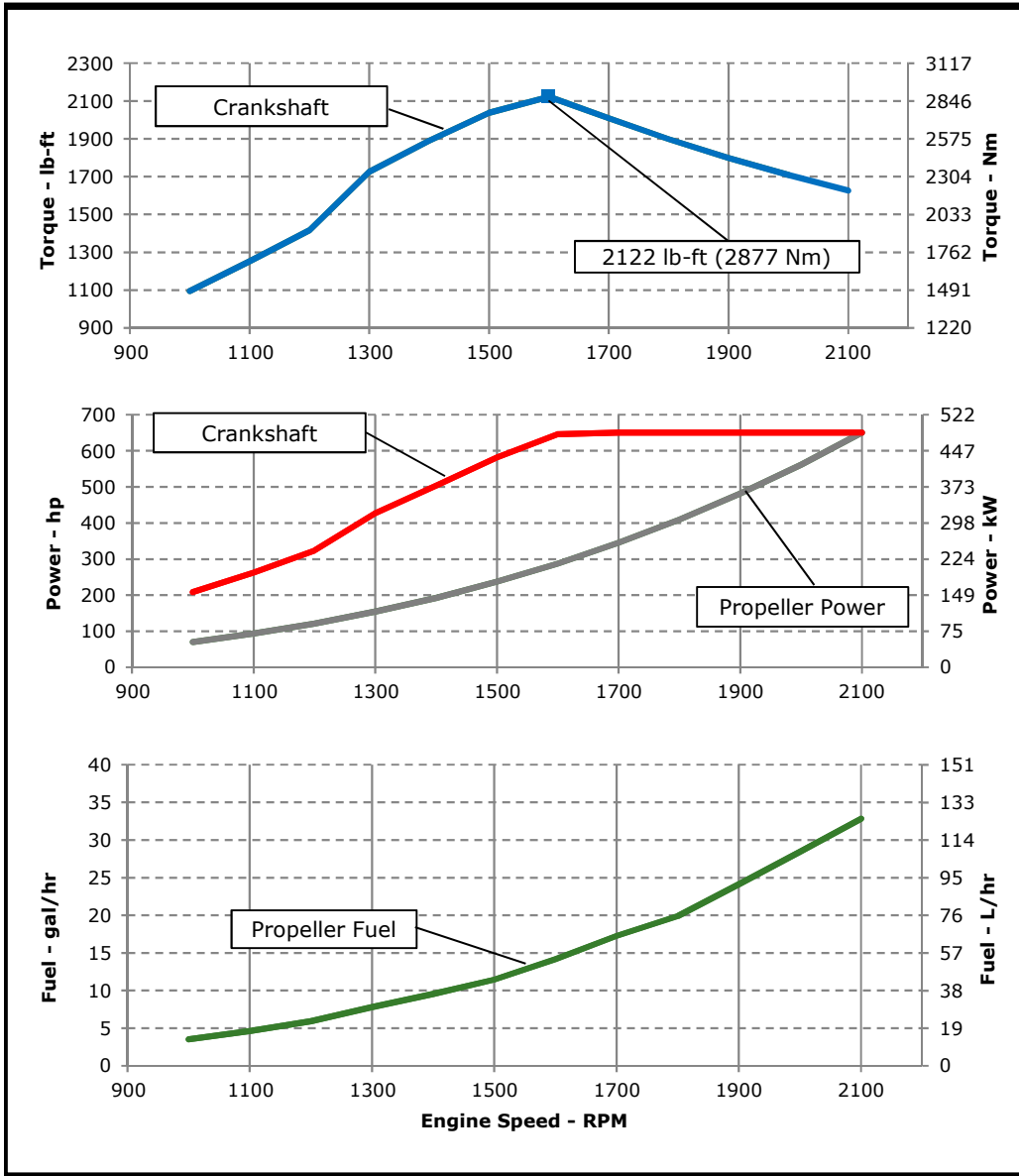
JOHN DEERE

ENGINE PERFORMANCE CURVE

Rating: **M4 - 650hp (485kW) @ 2100 RPM**
 Application: **Marine**

PowerTech™ 13.5L Engine

Model: 6135SFM85



REFERENCE CONDITIONS

Air Intake Restriction.....12 in.H₂O (3 kPa)
 Exhaust Back Pressure..... 30 in.H₂O (7.5 kPa)

Rated speed and power
 Gross power guaranteed within ±5% at ISO 8665/SAE J1228 and ISO 3046/SAE J1995
 Test conditions:
 77 °F (25 °C) air inlet temperature
 29.31 in.Hg (99 kPa) barometric pressure
 104 °F (40 °C) fuel inlet temperature
 0.853 fuel specific gravity @ 60 °F (15.5 °C)

Ambient air temperature is defined to be the temperature of ambient air close to operating vessel that is not influenced in any manner by operating characteristics of the vessel (free field temp).

Conversion factors: Power: kW = hp x 0.746
 Fuel: 1 gal = 7.1 lb, 1 L = 0.85 kg
 Torque: N·m = lb·ft x 1.356

All values from currently available data. Subject to manufacturing and measurement variations and to change without notice.
 Actual performance is subject to application and operation conditions outside of John Deere control.

All pressures shown in gauge pressure

Notes:

M4: The M4 rating is for marine propulsion applications that typically operate between 1,000-3,000 hours per year and have load factors below 40 percent. This rating is for applications that use full power no more than 1 hour out of each 12 hours of operation. The remaining time of operation is at or below cruising speed.

Possible applications: Inshore crew boats, charter fishing boats, pilot boats, dive boats, and planning hull commercial fishing boats.

| | |
|--|----------------------|
| Designed/Calibrated to meet: | Certified by: |
| <ul style="list-style-type: none"> EPA Marine Tier 3 Commercial (40 CFR 1042) IMO Tier II Compliant (MARPOL Annex VI) EU Stage IIIa Inland Waterways (NRMM 97/68/EC, as amended) Recreational Craft Directive 2 (2013/53/EU) | Keith D. Johnson |
| Ref: Engine Emission Label | 9-Jun-20 |

Performance Curve: 6135SFM85_D

All values at rated speed, power, and standard conditions, per SAE J1995 unless otherwise noted.

Engine Installation Criteria

General Data

| | | | |
|-------------------------------------|------------------------------|------|-----------------|
| Model | 6135SFM85 | | |
| Number of Cylinders | 6 | | |
| Bore | 132 mm | 5.20 | in |
| Stroke | 165 mm | 6.50 | in |
| Displacement | 13.5 L | 824 | in ³ |
| Compression Ratio | 16.0:1 | | |
| Valves per Cylinder, Intake/Exhaust | 2/2 | | |
| Combustion System | Direct injection | | |
| Firing Order | 1-5-3-6-2-4 | | |
| Engine Type | In line, 4 Cycle | | |
| Aspiration | Turbocharged and Aftercooled | | |
| Aftercooling System | Seawater cooled | | |
| Engine Crankcase Vent System | Closed | | |

Cooling System*

| | | |
|---|------------|---------------|
| Jacket Water Heat Rejection** | 307 kW | 17474 BTU/min |
| Aftercooler Heat Rejection | 143 kW | 8140 BTU/min |
| Coolant Flow | 277 L/min | 73 gal/min |
| Min. Coolant Pump Inlet Pressure | 30.3 kPa | 4.4 psi |
| Thermostat Start to Open | 82 °C | 180 °F |
| Thermostat Fully Open | 92 °C | 197 °F |
| Engine Coolant Capacity, HE | 38 L | 10 gal |
| Min. Coolant Fill Rate | 12 L/min | 3.2 gal/min |
| Min. Pressure Cap | 110.3 kPa | 16 psi |
| Max. External Coolant Restriction | 40 kPa | 5.8 psi |
| Normal Operation Max Top Tank Temperature | 100 °C | 212 °F |
| ≤ 5% of Total Operating Time Top Tank Temperature | 100-105 °C | 212-230 °F |
| Absolute Max Top Tank Temperature | 105 °C | 221 °F |
| Return Fuel Heat Rejection | 2 kW | 89 BTU/min |
| Engine Radiated Heat | 31 kW | 1776 BTU/min |

* The cooling system should be capable of typical at ambient up to the maximum conditions in which the vessel will operate.

Typical operation is defined as the average load sustainable in the vessel over 10 min.

** Reference 32 °C Sea Water Temperature

Physical Data

| | | |
|---|---------|-----------|
| Length to rear face of block | 1335 mm | 52.6 in |
| Length to rear face of flywheel housing (SAE #1) | 1444 mm | 56.8 in |
| Length maximum | 1818 mm | 71.6 in |
| Width maximum | 1063 mm | 41.9 in |
| Height, crank centerline to top | 812 mm | 32.0 in |
| Height, crank centerline to bottom | 364 mm | 14.3 in |
| Weight, with oil, no coolant (includes engine, flywheel housing, flywheel, and electronics) | 1426 kg | 3143 lb |
| Center of Gravity Location, X-axis From Rear Face of Block | 476 mm | 18.7 in |
| Center of Gravity Location, Y-axis Right of Crankshaft | -9 mm | -0.4 in |
| Center of Gravity Location, Z-axis Above Crankshaft | 250 mm | 9.8 in |
| Max. Allowable Static Bending Moment At Rear Face of Flywheel Housing (for installations up to 5-G) | 814 Nm | 600 lb-ft |
| Thrust Bearing Load Limit, Forward Continuous | 5.4 kN | 1214 lbf |
| Thrust Bearing Load Limit, Forward Intermittent | 8.1 kN | 1821 lbf |
| Thrust Bearing Load Limit, Rearward Continuous | 2.5 kN | 562 lbf |
| Thrust Bearing Load Limit, Rearward Intermittent | 4 kN | 899 lbf |

Electrical System

| | |
|--|---------------|
| Min. Recommended Battery Capacity, 12V @32 °F (0 °C) | 1900 amps |
| Min. Recommended Battery Capacity, 24V @32 °F (0 °C) | 925 amps |
| Starter Rolling Current, 12V @32 °F (0 °C) | 920 amps |
| Starter Rolling Current, 24V @32 °F (0 °C) | 600 amps |
| Min. Voltage at ECU during Cranking, 12V | 6 volts |
| Min. Voltage at ECU during Cranking, 24V | 10 volts |
| Max. Allowable Start Circuit Resistance, 12V | 0.002 ohms |
| Max. Allowable Start Circuit Resistance, 24V | 0.0012 ohms |
| Electrical Component Maximum Temperature Limit | 125 °C 257 °F |
| Maximum ECU Temperature | 105 °C 221 °F |

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Engine Installation Criteria

Fuel System

| | | | | |
|--|------------|-------|------|--------|
| ECU Description | L15 | | | |
| Fuel Injection Pump | EUI | | | |
| Governor Type | Electronic | | | |
| Volumetric Fuel Consumption | 124 | L/hr | 32.8 | gal/hr |
| Mass Fuel Consumption | 106 | kg/hr | 233 | lb/hr |
| Total Fuel Volumetric Flow | 201 | L/hr | 53.1 | gal/hr |
| Total Fuel Mass Flow | 170 | kg/hr | 375 | lb/hr |
| Max. Fuel Inlet Restriction* | 30 | kPa | 120 | in.H2O |
| Max. Fuel Inlet Pressure | 24 | kPa | 96 | in.H2O |
| Max Fuel Return Pressure | 35 | kPa | 141 | in.H2O |
| Normal Operation Fuel Temperature | 40 | °C | 104 | °F |
| Max. Fuel Inlet Temperature | 100 | °C | 212 | °F |
| Min. Recommended Fuel Line Inside Diameter | 6.79 | mm | 0.27 | in |
| Min. Recommended Fuel Line Size | 5 (-) AN | | | |
| Primary Fuel Filter | 10 mic | | | |
| Secondary Fuel Filter | 2 mic | | | |

Lubrication System

| | | | | |
|---|--------|-----|----|--------|
| Oil Pressure at Rated Speed | 280 | kPa | 41 | psi |
| Oil Pressure at Low Idle (600rpm)** | 120 | kPa | 17 | psi |
| Max. Crankcase Pressure | 2 | kPa | 8 | in.H2O |
| Maximum Installed Angle, Front Down | 0 deg | | | |
| Maximum Installed Angle, Front Up | 12 deg | | | |
| Engine Angularity Limits Any Direction, Continuous*** | 20 deg | | | |
| Engine Angularity Limits Any Direction, Intermittent*** | 30 deg | | | |

Seawater Pump System

| | | | | |
|------------------------|-----|-------|-----|---------|
| Seawater Pump Flow | 407 | L/min | 107 | gal/min |
| Max. Suction Lift | 3 | m | 9.8 | ft |
| Max. Outlet Pressure | 140 | kPa | 20 | psi |
| Max. Inlet Restriction | 30 | kPa | 4 | psi |

* With clean filters

** With John Deere Plus-50 II™ 15w-40, not applicable with break in oil.

*** With 1904 option

Air Intake System

| | | | | |
|--|-------|---------------------|------|----------------------|
| Engine Air Flow | 40.9 | m ³ /min | 1444 | ft ³ /min |
| Intake Manifold Pressure | 250.9 | kPa | 36.4 | psi |
| Manifold Air Temperature | 61 | °C | 142 | °F |
| Maximum Manifold Air Temperature | 87 | °C | 189 | °F |
| Max. Allowable Temperature Rise, Ambient | 17 | °C | 30 | °F |
| Air to Engine Inlet | | | | |
| Max. Air Intake Restriction, Clean Air Cleaner | 3 | kPa | 12 | in.H2O |
| Max. Air Intake Restriction, Dirty Air Cleaner | 6.25 | kPa | 25 | in.H2O |
| Min. Ventilation Area | 0.252 | m ² | 390 | in ² |

Performance Data

| | | | | |
|------------------------------------|----------|-----|------|-------|
| Rated Power | 485 | kW | 650 | hp |
| Rated Speed | 2100 RPM | | | |
| Peak Torque Speed | 1600 RPM | | | |
| Low Idle Speed | 600 RPM | | | |
| Rated Torque | 2205 | Nm | 1627 | ft-lb |
| Peak Torque | 2877 | Nm | 2122 | ft-lb |
| BMEP, Rated | 2053 | kPa | 298 | psi |
| Rated Pferdestärke (metric hp) | 659 ps | | | |
| Front Drive Capacity, Intermittent | 542 | Nm | 400 | lb-ft |
| Front Drive Capacity, Continuous | 542 | Nm | 400 | lb-ft |

Exhaust System

| | | | | |
|--|-------|---------------------|------|----------------------|
| Exhaust Flow | 89 | m ³ /min | 3143 | ft ³ /min |
| Exhaust Flow @ gas STP | 39.1 | m ³ /min | 1381 | ft ³ /min |
| Exhaust Temperature | 411 | °C | 772 | °F |
| Max. Allowable Exhaust Restriction | 7.5 | kPa | 30 | in.H2O |
| Max. Shear on Turbocharger Exhaust Outlet | 11 | kg | 24.3 | lb |
| Max. Bending Moment on Turbocharger Exhaust Outlet | 7 | Nm | 15.4 | lb-ft |
| Min. Exhaust Pipe Diameter, Dry | 152.4 | mm | 6.0 | in |
| Min. Exhaust Pipe Diameter, Wet | 203.2 | mm | 8.0 | in |

Performance Curve: 6135SFM85_D

All values at rated speed, power, and standard conditions, per SAE J1995 unless otherwise noted.

Engine Installation Criteria

Engine Performance Data Table

| Engine Speed | Crank Power | | Crank Torque | | * Prop Power | | * Prop Fuel | | * Prop BSFC |
|--------------|-------------|-----|--------------|------|--------------|-----|-------------|------|-------------|
| | RPM | kW | hp | Nm | lb-ft | kW | hp | L/hr | gal/hr |
| 2100 | 485 | 650 | 2205 | 1626 | 485 | 650 | 124 | 33 | 218 |
| 2000 | 485 | 650 | 2316 | 1708 | 419 | 562 | 108 | 28 | 219 |
| 1900 | 485 | 651 | 2438 | 1798 | 359 | 482 | 91 | 24 | 216 |
| 1800 | 485 | 650 | 2573 | 1898 | 305 | 409 | 75 | 20 | 210 |
| 1700 | 485 | 650 | 2724 | 2009 | 257 | 345 | 65 | 17 | 216 |
| 1600 | 482 | 646 | 2877 | 2122 | 214 | 288 | 54 | 14 | 213 |
| 1500 | 434 | 582 | 2763 | 2038 | 177 | 237 | 43 | 11 | 208 |
| 1400 | 375 | 504 | 2561 | 1889 | 144 | 193 | 36 | 10 | 214 |
| 1300 | 318 | 427 | 2339 | 1725 | 115 | 154 | 30 | 8 | 218 |
| 1200 | 241 | 324 | 1920 | 1416 | 90 | 121 | 22 | 6 | 211 |
| 1100 | 196 | 262 | 1699 | 1253 | 70 | 93 | 17 | 5 | 213 |
| 1000 | 155 | 208 | 1485 | 1095 | 52 | 70 | 13 | 4 | 217 |

* Theoretical 3.0 exponent propeller curve , measured at flywheel

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