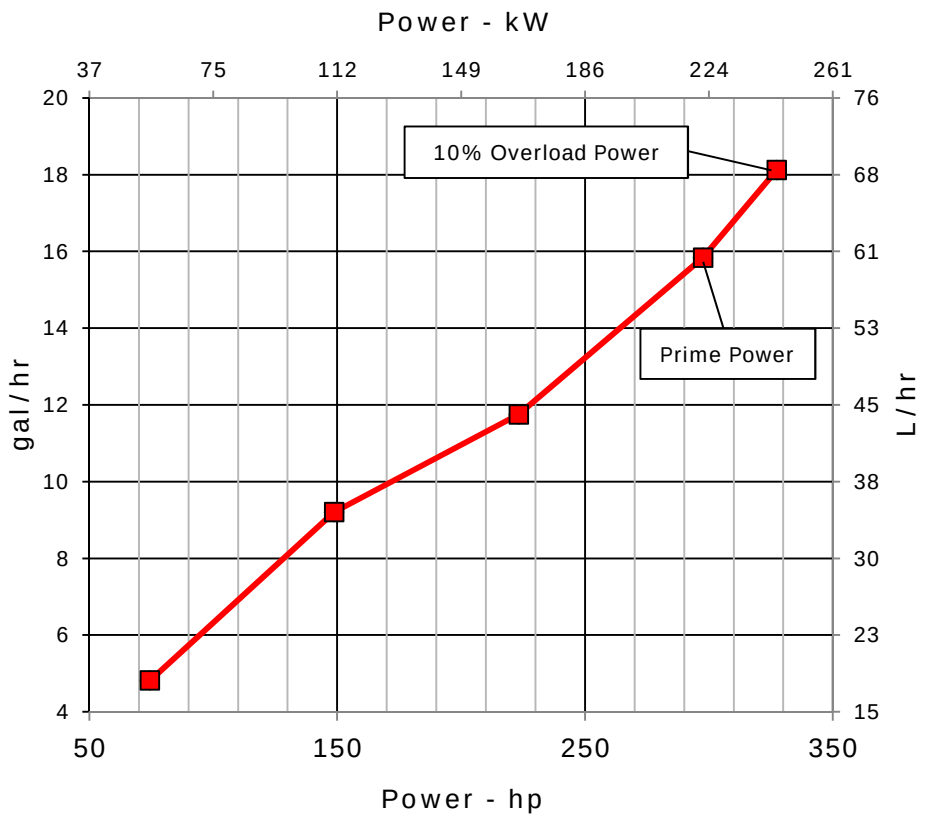
ENGINE PERFORMANCE CURVE

Rating: 60 Hz - 298hp (222kW) @ 1800 RPM
Application: Marine

PowerTech™ 9.0L Engine
Model: 6090AFM85

Generator Efficiency (%)	Power Factor	Calculated Gen-Set Rating kW	Calculated Gen-Set Rating kVA	Prime Power hp (kW)	10% Overload Power hp (kW)
88-92	0.8	195-204	244-255	298 (222)	327 (244)



REFERENCE CONDITIONS

Air Intake Restriction.....12 in.H_2O (3 kPa)
Exhaust Back Pressure..... 30 in.H_2O (7.5 kPa)

Rated speed and power
Gross power guaranteed within ±5% at SAE J1995 and ISO 3046
J1995 and ISO 3046 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.

Notes:

Constant Speed Auxiliary – The marine Generator engine rating is the power available under normal varying electrical load factors for an unlimited number of hours per year in commercial applications. This rating incorporates a 10 percent overload capability, and conforms to ISO 8528 prime power. Average load over a 24-hour period shall not exceed 67 percent of the prime rating, of which no more than two hours are between 100 percent and 110 percent of the prime rating.

Possible applications: This rating is use for applications that require constant speed operation in power generation or auxiliary applications such as generators and hydraulic pumps.

Designed/Calibrated to meet:	Certified by:
• EPA Commercial Marine Tier 3 • IMO MARPOL Annex VI Compliant	Adam Powell
Ref: Engine Emission Label	9-Mar-14

Performance Curve: 6090AFM85_E

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

Engine Installation Criteria

General Data

Model	6090AFM85			
Number of Cylinders	6			
Bore	118	mm	4.65	in
Stroke	136	mm	5.35	in
Displacement	9	L	549	in^3
Compression Ratio	16.3:1			
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	Engine coolant			
Engine Crankcase Vent System	Closed			

Cooling System*

Engine Coolant Heat Rejection**	245	kW	13945	BTU/min
Max. Pressure Drop Across Keel Cooler	40	kPa	6	psi
Coolant Flow	334	L/min	88.2	gal/min
Seawater Flow (heat exchanged)	352	L/min	93	gal/min
Thermostat Start to Open	68	°C	155	°F
Thermostat Fully Open	83	°C	182	°F
Engine Coolant Capacity, HE	30	L	7.9	gal
Engine Coolant Capacity, KC	26	L	6.9	gal
Min. Coolant Fill Rate	12	L/min	3.2	gal/min
Min. Pressure Cap	110.3	kPa	16	psi
Min. Pump Inlet Pressure	30	kPa	4.4	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	100-110	°C	212-230	°F
Absolute Max Top Tank Temperature	110	°C	230	°F
Recommended Fuel Cooler	13	kW	762	BTU/min
Engine Radiated Heat	30	kW	1712	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	1293	mm	50.9	in
Length maximum	1714	mm	67.5	in
Width maximum	938	mm	36.9	in
Height, crank centerline to top	665	mm	26.2	in
Height, crank centerline to bottom	319	mm	12.6	in
Weight, with oil, no coolant (includes engine, flywheel housing, flywheel, and electronics)	1055	kg	2325	lb
Center of Gravity Location, X-axis From Rear Face of Block	408	mm	16.1	in
Center of Gravity Location, Y-axis Right of Crankshaft	38	mm	1.5	in
Center of Gravity Location, Z-axis Above Crankshaft	200	mm	7.87	in
Max. Allowable Static Bending Moment At Rear Face of Flywheel Housing with 5-G Load	814	Nm	600	lb-ft
Thrust Bearing Load Limit, Forward Continuous	8.6	kN	1933	lbf
Thrust Bearing Load Limit, Forward Intermittent	13	kN	2923	lbf
Thrust Bearing Load Limit, Rearward Continuous	4	kN	899	lbf
Thrust Bearing Load Limit, Rearward Intermittent	6	kN	1349	lbf

Electrical System

Min. Recommended Battery Capacity, 12V @32 °F (0 °C)	1100	amps
Min. Recommended Battery Capacity, 24V @32 °F (0 °C)	750	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	0.0012	ohms
Max. Allowable Start Circuit Resistance, 24V	0.002	ohms
Recommended Starter Cable, 12V 100"	#00	
Recommended Starter Cable, 24V 100"	#2	
Recommended Starter Cable, 12V 200"	#0000 or 2#00	
Recommended Starter Cable, 24V 200"	#0	
Electrical Component Maximum Temperature Limit	125 °C	257 °F

Performance Curve: 6090AFM85_E

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

Engine Installation Criteria

Fuel System

ECU Description			L14	
Fuel Injection Pump			Denso HP4	
Governor Type			Electronic	
Volumetric Fuel Consumption, Prime	59.9	L/hr	15.8	gal/hr
Mass Fuel Consumption, Prime	50.9	kg/hr	112	lb/hr
Total Fuel Volumetric Flow	240	L/hr	63.4	gal/hr
Total Fuel Mass Flow	204	kg/hr	450	lb/hr
Max. Fuel Inlet Restriction*	20	kPa	80	in.H2O
Max. Fuel Inlet Pressure	20	kPa	80	in.H2O
Max Fuel Return Pressure	20	kPa	80	in.H2O
Max. Fuel Height Above Transfer Pump	2.4	m	7.9	ft
Max. Leak-off Return Height	2.4	m	7.9	ft
Max. Fuel Inlet Height Above Fuel Tank Supply	2.4	m	7.9	ft
Normal Operation Fuel Temperature	40	°C	104	°F
Max. Fuel Inlet Temperature	100	°C	212	°F
Min. Recommended Fuel Line Inside Diameter	8.34	mm	0.33	in
Min. Recommended Fuel Line Size			6	(-) AN
Primary Fuel Filter			10	mic
Secondary Fuel Filter			2	mic

Lubrication System

Oil Pressure at 1800 RPM**	280	kPa	41	psi
Max. Crankcase Pressure	2	kPa	8	$in.H_2O$
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

* With clean filters

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

*** With 1932 option

Air Intake System

Engine Air Flow	19.6	m^3/min	692	ft^3/min
Intake Manifold Pressure	196	kPa	28.4	psi
Manifold Air Temperature	89	°C	192	°F
Maximum Manifold Air Temperature	130	°C	266	°F
Max. Allowable Temperature Rise, Ambient Air to Engine Inlet	17	°C	30	°F
Max. Air Intake Restriction, Clean Air Cleaner	3	kPa	12	$in.H_2O$
Max. Air Intake Restriction, Dirty Air Cleaner	6.25	kPa	25	$in.H_2O$
Min. Ventilation Area	0.121	m^2	187	in^2

Performance Data

Prime Power	222	kW	297	hp
10% Overload Power	244	kW	327	hp
Rated Speed		1800	RPM	
Low Idle Speed		1000	RPM	
Prime Torque	1177	Nm	868	lb-ft
BMEP, Prime	1643	kPa	238	psi
Rated Pferdestärke, Prime (metric hp)		302	ps	
Front Drive Capacity, Intermittent	955	Nm	704	lb-ft
Front Drive Capacity, Continuous	955	Nm	704	lb-ft
Software and Label Convertible to 50 Hz?		NO		

Exhaust System

Exhaust Flow	49	m^3/min	1713	ft^3/min
Exhaust Flow @ gas STP	18.91	m^3/min	668	ft^3/min
Exhaust Temperature	493	°C	919.4	°F
Max. Allowable Exhaust Restriction	7.5	kPa	30	$in.H_2O$
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	114.3	mm	4.5	in
Min. Exhaust Pipe Diameter, Wet	127.0	mm	5.0	in

Performance Curve: 6090AFM85_E

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

Engine Performance Data Table

Engine Power	Crank Power		Crank Torque		Fuel Consumption		BSFC
	kW	hp	Nm	lb-ft	L/hr	gal/hr	g/kW-hr
25%	55	74	294	217	18.2	4.8	279
50%	111	149	589	434	34.8	9.2	267
75%	166	223	883	651	44.5	11.7	227
100%	222	298	1177	868	59.9	15.8	230
110%	244	327	1295	955	68.6	18.1	239

Performance Curve: 6090AFM85_E

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