

# Marine Applications

Diesel Engine Ratings



**JOHN DEERE**



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DEALERS

## Nothing Runs Like A Deere™

John Deere PowerTech™ engines are as powerful and dependable in the water as they are on the land. Our marine propulsion, generator, and auxiliary engines share the same reputation for performance and reliability that their agricultural and industrial counterparts have enjoyed for decades. They are built for long life, reliable performance, fuel efficiency, quiet operation, ease of access to major parts, and simplified integration. But don't just take our word for it. Find out why John Deere is the powerful and reliable choice.



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# Meeting regulations around the world

John Deere marine engines comply with international, European, and United States emissions standards for regulated vessels. John Deere meets Environmental Protection Agency (EPA) Marine Tier 3 emissions regulations for vessels flagged in the United States.

Select generator drive engine ratings meet European Union (EU) Stage V requirements for inland waterway applications and China Stage II marine emissions standards for vessels that are registered in China and operate in Chinese territorial waters.

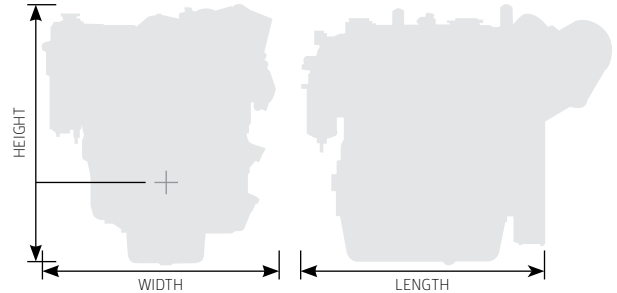
John Deere also offers engines for the non-regulated regions throughout the world.

## Marine classification societies

John Deere provides a full line of marine engines designed to meet the requirements of the various marine classification societies.



# Dimensions and weights



Engine dimensions and weights listed in this guide use the following variables:

**Length** mm (in) = length to rear face of flywheel housing

**Width** mm (in) = maximum width minus width of elbow

**Height** mm (in) = crank centerline to top plus crank centerline to bottom

**Weight** kg (lb) = with oil, no coolant – includes engine, flywheel, and electronics

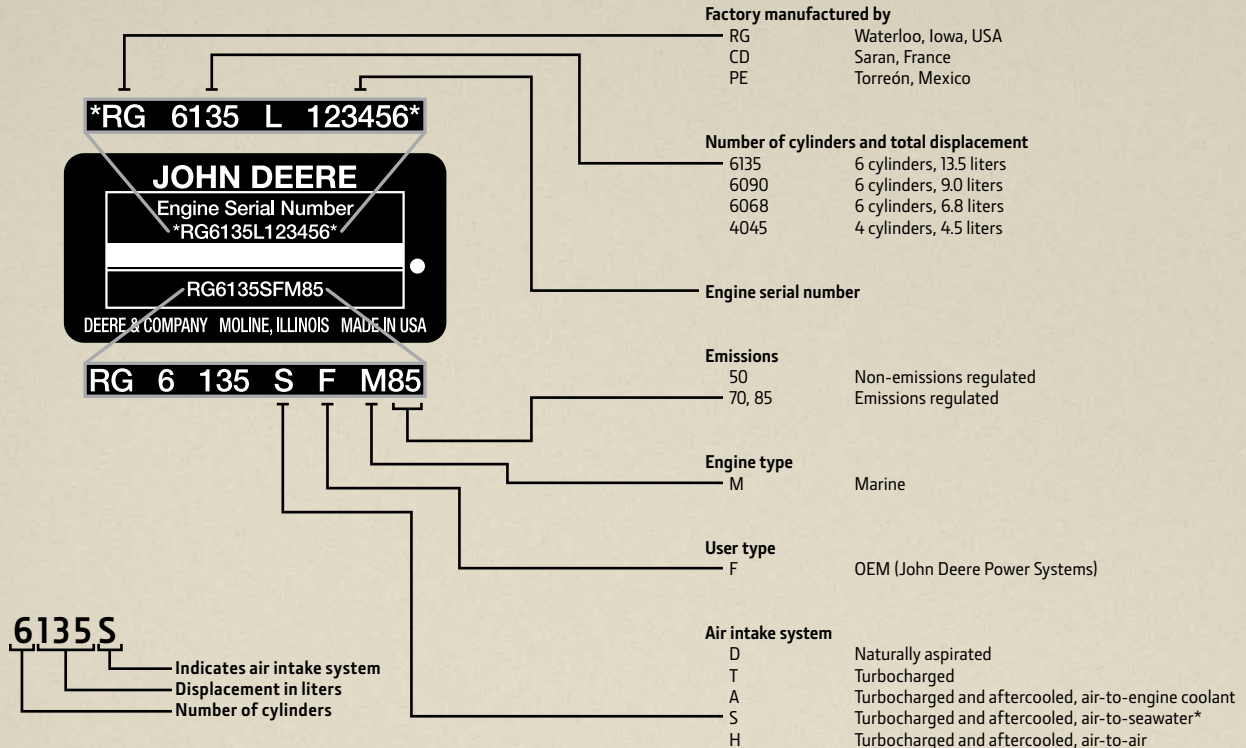
*Dimensions may vary according to options selected. Contact your distributor for more information. All specifications are at rated speed and power with standard options unless otherwise noted.*



# Engine identification

## Model designation key

A John Deere marine engine model designated as 6135SFM85 is a 6-cylinder, 13.5-liter turbocharged and aftercooled, air-to-seawater engine that is emissions regulated.



*\*S engines can be modified to be turbocharged and aftercooled, air-to-engine coolant, in dual-circuit keel-cooled applications. Contact your John Deere engine distributor.*

# Marine propulsion

## M and H ratings

Ratings are based on the ISO 8665/SAE J1225 standard power rating and the ISO 3046/SAE J1995 crankshaft power rating. The M and H rating definitions are provided as a guide to help in the selection of the engine that best fits the application requirements. It is recommended to consult a John Deere marine dealer or engine distributor to verify the optimal rating for the specific application.

M and H rating	Typical load factor	Typical annual usage	Typical full power operation
<b>M1</b>	> 65%	Unrestricted	Uninterrupted
<b>M2</b>	≤ 65%	3,000 – 5,000 hr	16 of each 24 hr
<b>M3</b>	≤ 50%	2,000 – 4,000 hr	4 of each 12 hr
<b>M4</b>	≤ 40%	1,000 – 3,000 hr	1 of each 12 hr
<b>M5</b>	≤ 35%	Up to 1,000 hr	0.5 of each 8 hr
<b>H</b>	≤ 70%	Unrestricted	Uninterrupted

**M1**

The M1 rating is for marine propulsion applications that may operate up to 24 hours per day at uninterrupted full power and have load factors\* greater than 65 percent.

**Possible applications:** Line haul tugs and towboats, fish and shrimp trawlers/draggers, and displacement hull fishing boats.

**M2**

The M2 rating is for marine propulsion applications that typically operate 3,000 – 5,000 hours per year and have load factors\* up to 65 percent. This rating is for applications that are in continuous use and use full power for no more than 16 hours of each 24 hours of operation. The remaining time of operation is at or below cruising<sup>1</sup> speed.

**Possible applications:** Short-range tugs and towboats, long-range ferryboats, large passenger vessels, and offshore displacement hull fishing boats.

**M3**

The M3 rating is for marine propulsion applications that typically operate 2,000 – 4,000 hours per year and have load factors\* up to 50 percent. This rating is for applications that use full power for no more than four hours out of each 12 hours of operation. The remaining time of operation is at or below cruising<sup>1</sup> speed.

**Possible applications:** Coastal fishing boats, offshore crew boats, research boats, short-range ferryboats, and dinner cruise boats.

**M4**

The M4 rating is for marine propulsion applications that typically operate 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 one hour out of each 12 hours of operation. The remaining time of operation is at or below cruising<sup>1</sup> speed.

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

**M5**

The M5 rating is for marine recreational propulsion and certification for light-duty commercial Tier 3 applications that typically operate up to 1,000 hours per year and have load factors\* below 35 percent. This rating is for applications that use full power for no more than 30 minutes out of each eight hours. The remaining time of operation is at or below cruising<sup>1</sup> speed.

**Possible applications:** Recreational boats, tactical military vessels, and rescue boats.

**H**

The H rating is for hybrid vessels that require a variable-speed generator drive engine to develop electrical power for any combination of electric propulsion, energy storage, hotel load, and auxiliary electric loads. The engine is designed for load factors up to 70 percent.

**Possible applications:** Recreational and commercial vessels.

*The parameters shown above (typical load factor, typical annual usage, and typical full power operation) consider common applications and are not restrictions, but are guidelines. It is important that an estimated load factor calculation is performed to best approximate how the engine will be used. Please contact your local John Deere dealer to assist in determining the best rating for your application.*

*\*Load factor is the actual fuel burned over a period of time divided by the full-power fuel consumption for the same period of time. For example, if an engine burns 160 liters of fuel during an eight-hour run, and the full-power fuel consumption is 60 liters per hour, the load factor is 160 liters / (60 liters per hour x 8 hours) = 33.3 percent.*

*<sup>1</sup>Cruising is any operating time where the engine speed is at least 200 rpm less than the maximum attainable engine speed.*



# PowerTech

## 4.5L marine engines

- Keel-cooled or heat exchanger configurations
- Naturally aspirated, turbocharged non-aftercooled, or turbocharged with air-to-seawater or air-to-coolant aftercooling
- Feature constant power to 400 rpm below rated speed
- Excellent choice for launches, work boats, trawler yachts, and patrol craft



Engine model	Emissions			Rated power		Rated speed	Rated fuel consumption	
	IMO	EPA	RCD	kW	hp	rpm	L/hr	gal/hr
<b>IMO exempt and non-certified engines</b>								
<b>4045DFM70</b>								
M2	EX	-	-	60	80	2500	17.5	4.6
<b>4045TFM50</b>								
M2*	EX	-	-	90	120	2400	22.7	6.0
M3*	EX	-	-	101	135	2500	26.3	6.9
M4	EX	-	-	112	150	2600	29.7	7.8
<b>IMO and EPA compliant engines</b>								
<b>4045TFM85</b>								
M1 <sup>1</sup>	EX	Tier 3	RCD 2	75	100	2400	21.4	5.7
M2 <sup>1</sup>	EX	Tier 3	RCD 2	93	125	2500	29	8
<b>4045AFM85</b>								
M1 <sup>1</sup>	Tier 2	Tier 3	RCD 2	119	160	2300	33.2	8.8
M2 <sup>1</sup>	Tier 2	Tier 3	RCD 2	134	180	2400	37	10
M3	Tier 2	Tier 3	RCD 2	149	200	2500	44	12
M4	Tier 2	Tier 3	RCD 2	168	225	2600	49	13
<b>4045SFM85</b>								
M4	Tier 2	Tier 3	RCD 2	205	275	2600	54	14
M5	Tier 2	Tier 3	RCD 2	235	315	2800	62	16

EX = MARPOL Annex VI exempt

<sup>1</sup>Meets China Stage II.

\*Not available in all countries.

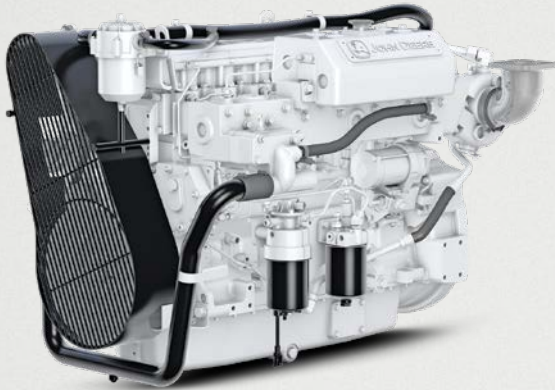
Engine model	Length to rear of block		Width		Height		Weight, dry	
	mm	in	mm	in	mm	in	kg	lb
4045DFM70 <sup>1</sup>	756	30	703 – 731	28 – 29	901	35	437	963
4045TFM50	748	29	703	28	912	36	462	1017
4045TFM85 <sup>1</sup>	739	29	692 – 703	27 – 28	912	36	507	1117
4045AFM85 <sup>1</sup>	752	30	692 – 771	27 – 30	964	38	578	1274
4045SFM85	762	30	820	32	922	36	558	1230

<sup>1</sup>Engine configuration may vary.

# PowerTech

## 6.8L marine engines

- Keel-cooled or heat exchanger configurations
- Turbocharged non-aftercooled, or turbocharged with air-to-seawater or air-to-coolant aftercooling
- Excellent choice for recreational boats, launches, work boats, trawler yachts, and patrol craft



Engine model	Emissions			Rated power		Rated speed	Rated fuel consumption	
	IMO	EPA	RCD	kW	hp	rpm	L/hr	gal/hr
<b>IMO exempt and non-certified engines</b>								
<b>6068TFM50</b>								
M1	EX	-	-	115	154	2300	29.6	7.8
M2	-	-	-	130	175	2400	34.7	9.2
M3	-	-	-	149	200	2500	38.8	10.3
M4	-	-	-	168	225	2600	44.3	11.7
<b>IMO and EPA compliant engines</b>								
<b>6068AFM85</b>								
M1	Tier 2	Tier 3	RCD 2	172	230	2300	50.9	13.4
M2	Tier 2	Tier 3	RCD 2	198	265	2400	58.0	15.0
M3	Tier 2	Tier 3	RCD 2	224	300	2500	65.0	17.0
M4	Tier 2	Tier 3	RCD 2	246	330	2600	71.0	19.0
<b>6068SFM85</b>								
M1	Tier 2	Tier 3	RCD 2	186	249	2400	51.0	13.0
M2	Tier 2	Tier 3	RCD 2	209	280	2500	57.0	15.0
M3	Tier 2	Tier 3	RCD 2	239	321	2600	63.0	17.0
M4	Tier 2	Tier 3	RCD 2	265	355	2700	69.0	18.0
M5	Tier 2	Tier 3	RCD 2	298	400	2800	81.0	21.0

EX = MARPOL Annex VI exempt

Engine model	Length to rear of block		Width		Height		Weight, dry	
	mm	in	mm	in	mm	in	kg	lb
6068TFM50	1004	40	712	28	881	35	730	1609
6068AFM85 <sup>1</sup>	1034	41	806 – 865	32 – 34	935	37	787	1735
6068SFM85	1034	41	872	34	931	37	763	1682

<sup>1</sup>Engine configuration may vary.



# PowerTech

## 9.0L marine engines

- Keel-cooled or heat exchanger configurations
- Turbocharged with air-to-seawater or air-to-coolant aftercooling
- 4-valve cylinder head
- Electronically controlled HPCR fuel system
- Front or side service
- Excellent choice for patrol craft, launches, work boats, fishing boats, trawler yachts, and sportfishing boats

See your John Deere engine distributor for options to combine the high power density of our 6090SFM marine engines in dual-circuit keel-cooled applications.



Engine model	Emissions			Rated power		Rated speed	Rated fuel consumption	
	IMO	EPA	RCD	kW	hp	rpm	L/hr	gal/hr
<b>IMO and EPA compliant engines</b>								
<b>6090AFM85</b>								
M1	Tier 2	Tier 3	RCD 2	213	285	2100	64.6	17.1
M2	Tier 2	Tier 3	RCD 2	242	325	2200	71.0	19.0
M3	Tier 2	Tier 3	RCD 2	280	375	2300	81.0	21.0
M4	Tier 2	Tier 3	RCD 2	317	425	2400	91.0	24.0
<b>6090SFM85</b>								
M1	Tier 2	Tier 3	RCD 2	242	325	2100	65.4	17.3
M2	Tier 2	Tier 3	RCD 2	280	375	2200	78.0	21.0
M3	Tier 2	Tier 3	RCD 2	317	425	2300	87.0	23.0
M4	Tier 2	Tier 3	RCD 2	373	500	2400	107.0	28.0
M5	Tier 2	Tier 3	RCD 2	410	550	2500	116.0	31.0
H	Tier 2	Tier 3	-	242	325	2000	63.2	16.7

EX = MARPOL Annex VI exempt

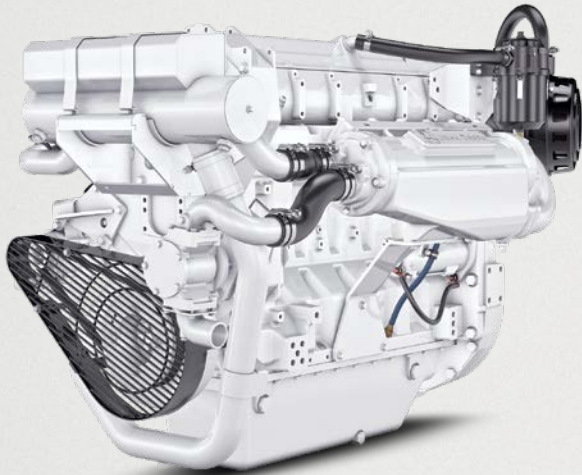
Engine model	Length to rear of block		Width		Height		Weight, dry	
	mm	in	mm	in	mm	in	kg	lb
6090AFM85	1297	51	938	37	983	39	1055	2325
6090SFM85	1297	51	938	37	983	39	1056	2327

# PowerTech

## 13.5L marine engines

- Keel-cooled or heat exchanger configurations
- Turbocharged with air-to-seawater or air-to-coolant aftercooling
- 4-valve cylinder head
- Feature constant power to 400 rpm below rated speed
- Excellent choice for patrol craft, launches, work boats, fishing boats, trawler yachts, and sportfishing boats

See your John Deere engine distributor for options to combine the high power density of our 6135SFM marine engines in dual-circuit keel-cooled applications.



Engine model	Emissions			Rated power		Rated speed	Rated fuel consumption	
	IMO	EPA	RCD	kW	hp	rpm	L/hr	gal/hr
<b>IMO and EPA compliant engines</b>								
<b>6135AFM85</b>								
M1	Tier 2	Tier 3	RCD 2	272	365	1800	76.7	20.3
M2	Tier 2	Tier 3	RCD 2	317	425	1900	86.0	23.0
M3	Tier 2	Tier 3	RCD 2	373	500	2000	102.0	27.0
M4	Tier 2	Tier 3	RCD 2	429	575	2100	119.0	31.0
<b>6135SFM85</b>								
M1	Tier 2	Tier 3	RCD 2	317	425	1800	79.5	21.0
M2	Tier 2	Tier 3	RCD 2	373	500	1900	94.0	25.0
M3	Tier 2	Tier 3	RCD 2	429	575	2000	111.0	29.0
M4	Tier 2	Tier 3	RCD 2	485	650	2100	124.0	33.0
M5	Tier 2	Tier 3	RCD 2	559	750	2200	146.0	39.0

Engine model	Length to rear of block		Width		Height		Weight, dry	
	mm	in	mm	in	mm	in	kg	lb
6135AFM85	1316	52	990	39	1182	47	1410	3108
6135SFM85	1335	53	990	39	1176	46	1426	3143

# Marine generator drive and constant-speed auxiliary engine ratings

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.

This rating is used for applications that require constant speed in auxiliary applications.



## Conversions

### Generator drive rating (kWe)

[Engine power - Fan power loss] x Generator efficiency

Note:

*DFM, TFM, AFM, and SFM generator drive ratings do not have fan power loss.*

### Power factor (PF)

kWe & kVA = Real power / Apparent power

PF constant = 0.80

### Formulas

Standby power = Prime power x 110% Overload capacity

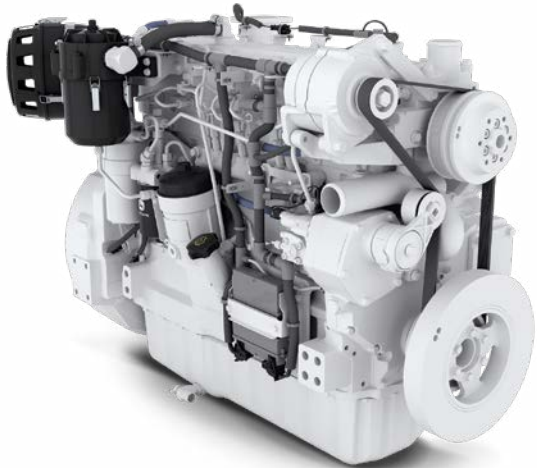
kVA rating = kWe rating / 0.80

*Estimated electrical power is calculated from the typical generator efficiency and fan power percentages shown. Applications may vary.*

\* Load factor is the actual fuel burned over a period of time divided by the full-power fuel consumption for the same period of time. For example, if an engine burns 160 liters of fuel during an eight-hour run, and the full-power fuel consumption is 60 liters per hour, the load factor is 160 liters / (60 liters per hour x 8 hours) = 33.3 percent.

# PowerTech™ marine generator and constant-speed auxiliary engines

- Quiet, smooth operation
- Trusted provider of generator drive engines worldwide
- Available in 1500 rpm for 50 Hz and 1800 rpm for 60 Hz configurations
- This rating capable of a 10 percent overload capability and conforms to ISO 8528 prime power



Engine model	Emissions		Prime power ratings			
	IMO	EPA	kW	hp	kVA	kWe
<b>1500 rpm/50 Hz</b>						
<b>IMO exempt and non-certified engines</b>						
4045DFM70	EX	-	40	54	45	36
4045TFM50	EX	-	57	76	64	51
6068TFM50	EX	-	89	119	102	82
6068AFM85*	EX	-	117	157	133	106
<b>IMO and EPA compliant engines</b>						
4045TFM85*†	EX	Tier 3	61	82	69	55
4045AFM85*†	EX	Tier 3	89	120	102	82
6068AFM85†	EX	Tier 3	129	173	146	117
6068AFM85†	Tier 2	-	139	187	160	125
6068SFM85	Tier 2	-	168	226	188	150
6090AFM85	Tier 2	-	195	261	219	175
6090SFM85	Tier 2	-	222	297	250	200
6135AFM85	Tier 2	-	278	373	313	250
6135SFM85	Tier 2	-	334	447	375	300
<b>1800 rpm/60 Hz</b>						
<b>IMO exempt and non-certified engines</b>						
4045DFM70	EX	-	46	62	50	40
4045TFM50	EX	-	71	95	80	64
6068TFM50	EX	-	115	154	124	99
<b>IMO and EPA compliant engines</b>						
4045TFM85	EX	Tier 3	74	99	81	65
4045TF285	Tier 2	Tier 3	71	95	74	60
4045AFM85	Tier 2	Tier 3	110	148	124	99
4045HF285	Tier 2	Tier 3	117	157	123	99
6068AFM85	EX	Tier 3	129	173	146	117
6068AFM85	Tier 2	Tier 3	166	223	188	150
6068SFM85	Tier 2	Tier 3	195	262	218	175
6090AFM85	Tier 2	Tier 3	222	297	250	200
6090HFM85	-	Tier 3	238	319	249	200
6090SFM85	Tier 2	Tier 3	278	373	313	250
6135AFM85	Tier 2	Tier 3	334	447	375	300
6135HFM85	-	Tier 3	416	558	436	350
6135SFM85	Tier 2	Tier 3	416	558	469	375

EX = MARPOL Annex VI exempt

\*Meets Marine EU Stage V.

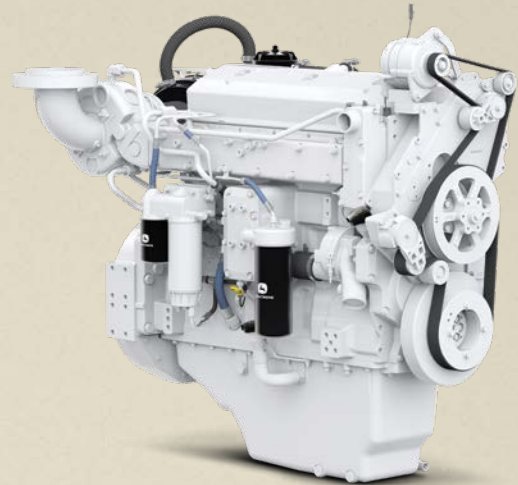
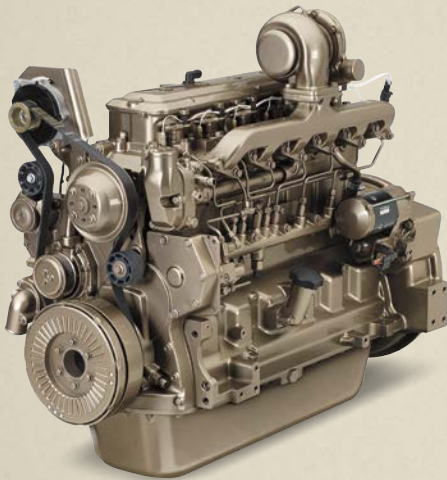
†Meets China Stage II.

# PowerTech™ variable-speed auxiliary engines

John Deere PowerTech radiator-cooled, dry-exhaust manifold engines (TF and HF models) are compliant with EPA Marine Tier 3 emissions regulations\* and engineered to run vessel auxiliaries such as pumps, winches, deck cranes, and hydraulics. We also offer a choice of options and accessories.

John Deere PowerTech radiator-cooled, wet-exhaust manifold marine engines (HFM models) are rated to provide dependable auxiliary power for oceangoing vessels and other applications that require type approval for marine classification societies.

Engine model	Emissions		Rated power		Rated speed
	IMO	EPA	kW	hp	rpm
<b>IMO and EPA compliant engines</b>					
4045TF285	Tier 2	Tier 3	74	99	2200
6068HF485	Tier 2	Tier 3	187	251	2200
6090HFM85	-	Tier 3	242	325	2000
6090HF485	Tier 2	Tier 3	280	375	2200
6135HFM85	-	Tier 3	373	500	2000
6135HF485	Tier 2	Tier 3	448	600	2100



# A lifetime of support

## *You can rely on us*

With installation assistance, standard and extended warranties, and an extensive worldwide parts and service network, John Deere provides ongoing support for the life of your engine.

Find your closest John Deere engine distributor or dealer at **DealerLocator.Deere.com**. Ask them about the parts you need, or visit **PartsCatalog.Deere.com**.

## *John Deere PowerAssist™ app*

Retrieve serial-specific information for your John Deere engine. Just scan or enter your John Deere engine serial number to access option codes, manuals, part numbers, ECU information, and much more. Download this free app today!

## *Warranty support when you need it*

Every John Deere marine engine comes with a solid 2-year/2,000-hour standard warranty. Register your engine and enable your John Deere dealer to respond should you need a warrantable repair.\* Register the warranty for your engine at **JohnDeere.com/OEMWarranty**. Extended warranty plans are also available to further protect components and accessories installed by John Deere and our engine distributors.

*\*See specific OEM product warranty language for applicable terms and conditions. Refer to the John Deere new marine engine warranty for complete warranty coverage details.*





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