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## Marine Engine Application Review

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# MARINE ENGINE APPLICATION REVIEW

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## PURPOSE

John Deere Engine Distributors are responsible for ensuring Marine Engine Application Reviews are performed. Distributors are to send completed Marine Engine Application Review Forms with support documentation to Sales Engineering, Deere Power Systems Group (DPSG).

Customer satisfaction is directly related to the proper engine application in the end product. It is important to obtain the best possible installation in all applications to ensure repeat sales, optimum product reputation, and reduced warranty claims. **Improper application or installation without a registered Application Review can result in denial of warranty.**

The best assurance we have to achieve a trouble-free installation is to follow application guidelines included in the John Deere Engine Application Manual, perform engine application tests, and complete the application information sections of the Marine Engine Application Review form. The visual checks and performance tests are designed for that purpose.

Deere cannot guarantee engines have been properly matched to give desired vessel performance. Vessel performance is impacted by characteristics of the entire propulsion system, including the engine, marine gear, propeller, hull shape, and geographic location.

### NOTE:

Marine application reviews should follow instructions contained in the Marine Engine Application Review Section of this manual. This review procedure does not include provisions for testing radiator-cooled installations. Reviews of marine applications that use a radiator-type cooling system should be submitted as an Industrial application.

## SEA TRIALS

A Sea Trial is part of the Marine Engine Application Review process. The review process (gathering of technical information for a marine application) begins during the first engine selection discussions with a customer. It concludes with a Sea Trial; the performance check of the completed installation. Information recorded earlier on the Marine Engine Application Review form is verified and completed, and the engine performance data is gathered.

This application review procedure is designed as a step-by-step process to be followed for each marine engine installed. Some information requested on the Marine Application Review Form may not be required, based on engine configuration, for every installation. Complete the sections as directed for each configuration.

## REGISTRATION NUMBERS

An application registration number will be assigned to current production and history applications submitted to DPSG. With the introduction of the SAMS electronic review system, the following application review status levels will be implemented:

**WIP (Work in process):** Pre-production reviews with incomplete application information. All electronic reviews start as WIP reviews.

**Open:** Current production application under review for which an application review memo has been issued. These applications have application issues that need to be addressed.

**Complete:** Current production applications for which submitted reviews verify the installation meets application guidelines.

**Rejected:** Current production applications that require resolution of critical application issues. A new WIP review must be submitted after critical issues have been addressed.

**History:** Engine applications that are no longer current production applications. "Rejected" applications will be given a "History" status when a new review is submitted.

While the file has a "WIP" or "Open" status, the distributor can modify all distributor-controlled data fields. All but one comment field will be locked for Complete, Rejected and History applications. Once locked, these fields cannot be re-opened.

# MARINE ENGINE APPLICATION REVIEW

## SECTION CONTENTS

These documents are provided to help marine dealers and distributors perform Engine Application Reviews:

### 1. Marine Engine Application Test Procedure

This procedure describes the engine application test required to complete system performance data sections included in the Marine Engine Application Review Form. Within these procedures, "Review Form" refers to the Marine Engine Application Review Form.

This section (AG-25), "Marine Engine Application Review," also itemizes equipment needed to complete application review tests. Section AG-07, "Engine Application Review Test Kit," lists the equipment used by Deere Power Systems Group, Service Support to perform application tests on John Deere Direct OEM applications. Some alternate equipment has been included. Distributors that currently have equivalent quality test equipment can continue to use this equipment for application tests.

### 2. Marine Engine Application Review Form

Individual Review Forms will not be stocked. Make copies as needed.

## APPLICATION REVIEW PROCEDURE (MARINE)

### 1. Engine Selection

Much of the information on Page 1 of the Marine Engine Application Review Form can be completed prior to reaching the vessel. This data is usually collected when sizing the engine. The data collected will define the engine and which options best fit customer needs and wants. Review this information during the sea trial and record missing information.

### Vessel

Make sure the recorded Operating Description defines the engine duty cycle. This combined with Annual Usage (Hours) determine the appropriate engine and Application Rating.

For propulsion, this is time at given engine speeds for a typical trip. For gen-sets and auxiliary applications, this is applied load with percent of time.

### Previous Engine and Gear

Customers often request assistance is sizing drive train components. When applicable record the previous engine and accompanying data. This information is often requested by drive train component suppliers.

### Engine

Record the engine and power rating selected. Record the engine serial number(s) and any options modified prior to customer delivery.

### Powered Components

Record all components (not installed at the factory) which are driven by the engine. Attach mass elastic data for gen-sets engines.

## 2. Support Systems Information

Upon engine delivery, review the installation requirements on Pages 2 and 3 for each engine support system with the customer. Record any kits provided with the engine in the appropriate area. Record any customer or clarifying comments in the Comments section on Page 3.

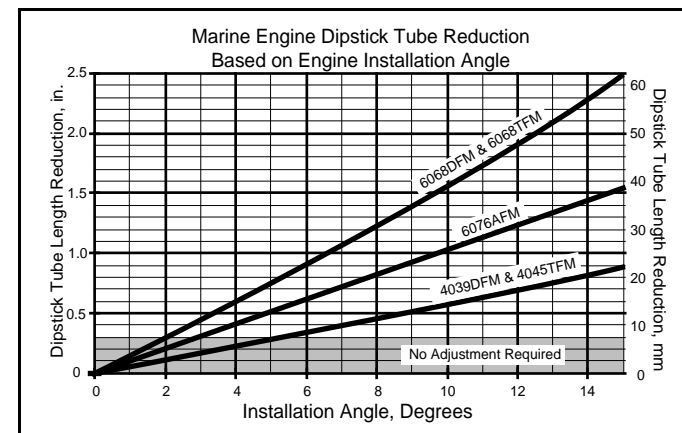


Figure AG-25 - 1

### Engine Mounting

- Measure the engine installation angle. Remark the dipstick as shown in Figure AG-25 - 1.
- Ensure all connections to the engine (excluding driveline) are flexible.

# MARINE ENGINE APPLICATION REVIEW

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## Engine Lubrication System

Record any components added to the vent line and any bypass oil filtration systems that have been added.

## Air Intake System

- Note the airflow path to the engine.
- Engine room ventilation fans should be exhaust fans which add to the air flow into the engine room created by the engine.

## Exhaust System

- Verify excessive force will not be applied to the engine, turbocharger or exhaust manifold.
- Review the outlet location to ensure exhaust will not re-circulate to the air intake.
- Make sure that rain and sea water cannot reach the engine through the exhaust.
- In wet exhaust systems, make sure sea water is injected into the exhaust system above the waterline.

## Fuel System

- Review the fuel connections to the engine to verify proper line sizes and appropriate fuel heights. Make sure the fuel tank inlet and return lines are properly spaced.
- Verify that the linkage to the fuel injection pump throttle lever allows full throttle travel.

## Electrical System

- Record components engaged during cranking, such as hydraulic pump(s), generator, etc.
- Verify that the engine is grounded to the vessel bonding strip.

## Cooling System

- Record the coolant medium used during test.
- Record requested information for any coolant recovery (overflow) or remote expansion tanks in use.

## 3. Sea Trial

Information from the instrumented engine is recorded during a sea trial. The best time to conduct a sea trial is when the boat is launched.

Before traveling to the vessel, make sure your test kit contains the instrumentation and tools required to install the instrumentation and take the test values specified. (See “Sea Trial Performance Data Acquisition.”)

### Instrument the Engine

Before the sea trial test, review the installation to confirm proper engine oil and coolant levels. Install instrumentation required for the test. (See Figure AG-25 - 2, Test Instrumentation.) All lines of data are to be used with these exceptions:

- Low idle can be excluded for gen-set (constant speed) applications.
- Data descriptions preceded by (KC) are only required on keel cooled engines.
- Data descriptions preceded by (HEX) are only required on heat exchanger cooled engines.
- Boost pressure  $\text{Ⓢ}$  is only required on turbocharged engines.
- WTB  $\text{Ⓢ}$  is only calculated when blocked open thermostats are used during the sea trial.

### Sea Trial Performance Data Acquisition

3.1 For heat exchanger cooled engines, make sure the sea cock is open before starting the engine.

3.2 Measure engine speeds listed at the top of the Review Form, Page 4.

Measure the engine cranking speed with the starter engaged and fuel shut off.

3.3 The method of loading the engine (and payload on board for propulsion applications) is to be recorded at the bottom on the Review Form, Page 4.

Record load changes with the time (rpm for propulsion applications) in rows A through D on the Review Form, Page 4. The start and fully loaded times must be included.

# MARINE ENGINE APPLICATION REVIEW

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## 3.4 Select Engine Loading Method

Propulsion engine tests should be conducted under maximum load conditions for the engine. The appropriate tests for the type of boat operation should be performed. Do not conduct any test which may damage the boat. Three kinds of propulsion tests can be used:

Free-run test - The vessel should be tested fully loaded and at maximum free-run speed.

Push/pull test - The vessel should be tested at full throttle with the marine gear engaged.

Bollard test - The vessel should be tested at full throttle conditions stationary in the water.

Generator sets should be run under maximum steady-state electrical load anticipated with the vessel stationary at the dock. Auxiliary Engines should be tested at vessel speeds which match the minimum vessel speed under which the engine would typically be fully loaded.

- 3.5 Run the engine under maximum engine load conditions until coolant and engine room temperatures stabilize, recording temperature readings and engine speed every 5-10 minutes.
- 3.6 Record pressure values and instrument panel readings after temperatures have stabilized. Also record the maximum loaded engine rpm reached at the top of the Review Form, Page 4.
- 3.7 Criteria for acceptable application test data is listed on the bottom of Page 3 and on the Engine Performance Curve, Sheet 2. When the measured value does not meet the application criteria, the installation should be modified to bring those conditions within specified limits. The modifications are to be recorded on the Review Form, Page 5, Recommendations.
- If modifications are required, only those tests required to ensure the corrective action will bring performance within the specified test limits need to be repeated.

- Water To Boil (WTB) is calculated when blocked open thermostats are used (for cooling systems being qualified for all operating conditions and tested under bollard conditions) to determine the highest sea water temperature in which the vessel can operate before the engine will overheat. The equations used to calculate this value are at the bottom of the Review Form, Page 3.

## 4. Take Photographs

A series of photographs is required documenting the installation. Take two shots of the following (one for your files and one to be sent to DPSG):

Overall views of the vessel  
Left side view of engine  
Right side view of engine  
Back of engine  
Front of engine  
Exhaust Outlet

Take additional photographs of areas about which you have questions, or that you want to document for future reference.

## 5. Complete Visual Inspection

Review the information on the Review Form, Pages 1 to 3 (ENGINE SELECTION and ENGINE SUPPORT SYSTEMS INFORMATION sections). Verify information previously recorded is accurate. Complete any information not previously recorded. This can be completed while running test data or while the engine is cooling down prior to removal of test instrumentation. Record any customer or clarifying comments in the Comments section on Page 3. Record any installation modifications needed on Page 5, Recommendations.

# MARINE ENGINE APPLICATION REVIEW

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## 6. Complete Serviceability Checklist

With the vessel representative:

Complete the Serviceability Checklist. Discuss any items considered, "poor." Record in the Recommendations section any changes that will be made to address the items with poor serviceability.

Use the Operators Manual to review coolant and oil requirements and service intervals.

## 7. Sea Trial Recommendations

With the owner, review the Sea Trial and Serviceability recommendations recorded on Page 5. After agreement with recommendations is reached, have the owner sign Page 5.

## 8. Remove Instrumentation

- Keel cooled applications tested with blocked open thermostats - Let the engine cool and install operating thermostats.
- After all tests are complete, remove instrumentation and return the engine to its original condition.
- Replenish any coolant lost, ensuring engine coolant level is acceptable. Make sure coolant meets Operators Manual specifications. Run the engine and check for leaks.

## 9. REGISTRATION

### Dealers:

Develop the film and send the installation photographs (see Step 4, "Take Photographs.") with the completed Marine Engine Application Review Form to your Engine Distributor for their review.

### Engine Distributors:

Check the review to ensure the form is properly completed and all corrective action needed to meet application guidelines have been addressed. Submit the review, pictures and any support documentation to Sales Engineering, Deere Power Systems Group.

DPSG will respond by memo to fully completed reviews. It is the distributor's responsibility to share the information in this memo with the boat builder or boat owner with whom the review was conducted.

## MARINE APPLICATION TEST KIT

### INSTRUMENTATION HARDWARE

The Sea Trial test kit should include the "Test Instrumentation" hardware listed below, or equivalent, along with the hand tools, special equipment, and miscellaneous parts listed below.

For test port sizes and locations, consult "Test Port Locations and Instrumentation" table and Figure AG-25 - 3, "Test Port Locations."

Sources for Instrumentation Hardware and Special Equipment are listed in the "Engine Application Review Test Kit" section (AG-05).

# MARINE ENGINE APPLICATION REVIEW

## TEST INSTRUMENTATION - - Figure AG-25 - 2



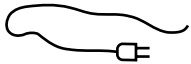
### Pressure/Vacuum Gages

- 1- ±10 psi gage
- 1- 20-50" H<sub>2</sub>O vacuum gage
- 1- 60-80" H<sub>2</sub>O gage
- 1- 15 psi gage
- 1- 30 psi gage
- 1- 60 psi gage

Equip gages with desired fittings for 1/8" OD pressure sensing lines



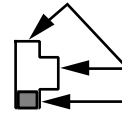
- 5- pieces 4" K-type thermocouple probes to 1/8" NPT-M thread



- 4- pieces K-wire temperature sensors



- 6- pressure sensing lines, 1/8" OD & 6-10' long



- 3- pieces T-fittings, 1/8" NPT-F and 1/8" NPT-M



### Adapter Fittings:

- 6- 1/8" NPT-M to 1/8" OD Hose
- 4- 1/4" NPT-M to 1/8" NPT-F
- 2- 3/8" NPT-M to 1/8" NPT-F
- 1- 1/2" NPT-M to 1/8" NPT-F



- 1- copper line 12-18" long, 1/8" NPT-M to 1/8" OD hose fitting

### HAND TOOLS

QTY	DESCRIPTION
1	3" straight screwdriver
1	8" adjustable open-end wrench
1	Small wire cutter
1	Clipboard
1	Flashlight
1	Tape Measure (10 ft or 12 ft)
1	Set of open/box-end wrenches (3/8" to 1")
1	Set of hex-head wrenches
1	3/16" square drive

### SPECIAL EQUIPMENT

QTY	DESCRIPTION
1	Carrying case
1	Digital thermometer, hand-held, battery-operated
1	Minimum 10-channel selector switch, K-wire compatible
1	Hand-held tachometer
1	Angle gage or 8" carpenter's level and 8" rafter square
1	Camera with film

**MISCELLANEOUS PARTS** -- Nylon ties (24); Duct tape; Teflon tape

# MARINE ENGINE APPLICATION REVIEW

## TEST PORT LOCATIONS AND INSTRUMENTATION - - Table AG-25 - 1

① - Temperature Measurement Ports; ❶ - Pressure Measurement Ports

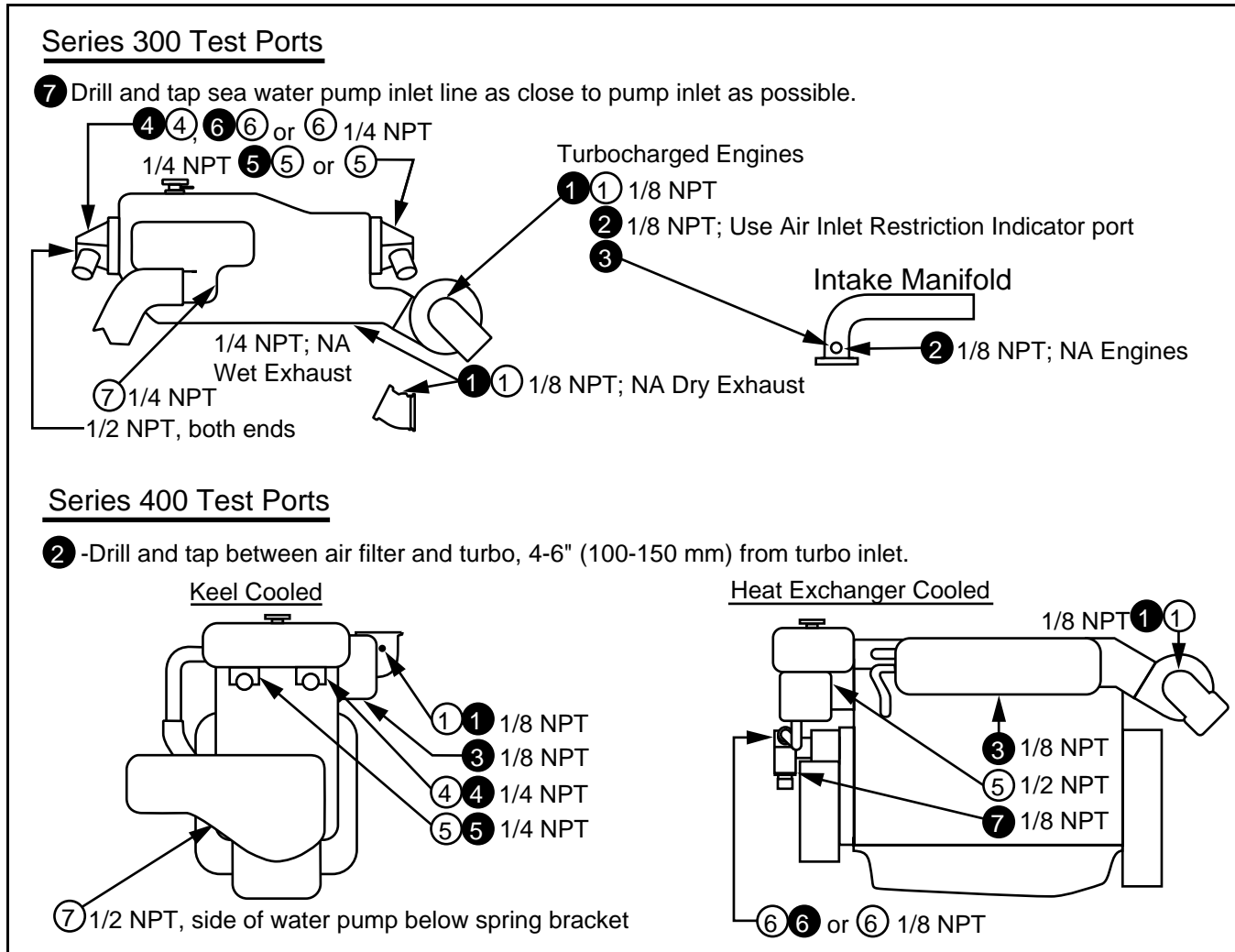
Port	Measurement	When Required	Instrumentation (See Figure AG-25 - 2 for hardware.)
<b>All Engine Cooling Systems</b>			
	Installation Angle	All applications	Angle gage or level with protractor
	Engine RPM values	All applications	Photo-tach & reflective tape on damper
	Knots	All applications	Instrument panel or estimated
① ❶	Exhaust	All applications	T-fitting in NPT port to thermocouple probe & copper tubing to sensing line to 60-80" water (15-20 kPa) pressure gage
②	Air intake temperature	All applications	Thermocouple wires at air filter
❷	Air intake pressure	Appl. w/o Deere air filter, or has remote-mounted air filter	At inlet restriction NPT port, 20-50" water (10-15 kPa) vacuum gage
③	Ambient air temperature	All applications	Thermocouple wires outside engine room
❸	Intake manifold pressure	Turbocharged engine	NPT port to 30 or 60 psi (200 or 400 kPa) gage (based on engine boost)
⑧	Engine coolant temp.	All applications	Instrument panel gage
❸	Engine oil pressure	All applications	Instrument panel gage
<b>Keel Cooled Engine</b>			
④ ❹	Coolant-out of Engine	Keel-cooled	T-fitting in NPT port to thermocouple probe & 15 psi (100 kPa) gage
⑤ ❺	Coolant return to Engine	Keel-cooled	T-fitting in NPT port to thermocouple probe & 10-15 psi (65-100 kPa) gage
⑥	Sea water temperature	Keel-cooled	Thermocouple wires or probe in sea water overboard
⑦	Coolant-in temperature	Keel-cooled	NPT port to thermocouple probe or Thermocouple wires in water pump inlet line
<b>Heat Exchanger Cooled Engine</b>			
⑤	Sea water return (out of engine)	Heat exchanger cooled	NPT port to thermocouple probe or Thermocouple wires in sea water return line.
⑥	Sea water pump outlet	Heat exchanger cooled, wet exhaust system and no gear oil cooler	NPT port to thermocouple probe or Thermocouple wires in sea water inlet line or Thermocouple wires or probe in sea water overboard
⑥ ❻	Sea water pump outlet	Heat exchanger cooled, either gear oil cooler or dry exhaust	T-fitting in NPT port to thermocouple probe & 15 psi (100 kPa) gage
❷	Sea water inlet restriction	Heat exchanger cooled	NPT port to 15-30" Hg (7-15 psi, 50-100 kPa) vacuum gage

Temperature instrumentation range is 0°F to 250°F (-20°C to 120°C) at all locations except exhaust, which is 0°F to 1200°F (-20 °C to 650°C).

# MARINE ENGINE APPLICATION REVIEW

## TEST PORT LOCATIONS - - Figure AG-25 - 3

① - Temperature Measurement Ports; ❶ - Pressure Measurement Ports



# JOHN DEERE MARINE ENGINE APPLICATION REVIEW FORM (English)

## Part 1 (Engine, Option and Accessory Selection)

### General Details

**Engine Serial No.** \_\_\_\_\_ **Appl. Reg. No.** \_\_\_\_\_  
**Distributor:** \_\_\_\_\_ **Account No.:** \_\_\_\_\_ **OEM/Dealer:** \_\_\_\_\_ **Account No.:** \_\_\_\_\_  
**Company Name:** \_\_\_\_\_ **Company Name:** \_\_\_\_\_  
**Street Address:** \_\_\_\_\_ **Street Address:** \_\_\_\_\_  
**City, State, Zip Code:** \_\_\_\_\_ **City, State, Zip Code:** \_\_\_\_\_

	<u>Reviewed By</u>	<u>Title</u>	
Dist. Representative	_____	_____	Signatures On File <input type="checkbox"/> Yes <input type="checkbox"/> No
OEM Representative	_____	_____	
DPSG Representative	_____	_____	
Customer	_____	City, State _____	

### Vessel Information

**Vessel Name** \_\_\_\_\_ **Home Port** \_\_\_\_\_  
**Required Certifications** \_\_\_\_\_  
**Hull Make & Model** \_\_\_\_\_ **Hull Material** \_\_\_\_\_

Length	Beam	Draft	Weight	Max Prop Dia.	Design Hull Speed	Rated Power
ft	ft	ft	lbs	in.	Knot	hp
%Time @ Cruising Speed _____		% _____	Cruising Engine Speed _____	rpm _____	Annual Usage _____	Hours _____
% Time @ Full Throttle _____		% _____			Operating Range _____	Miles _____

Operating Description \_\_\_\_\_

<u>Application Rating</u>	<u>Hull Type</u>	<u>Type of Vessel</u>
<input type="checkbox"/> M1 <input type="checkbox"/> M4 <input type="checkbox"/> M2 <input type="checkbox"/> Gen-Set <input type="checkbox"/> M3 <input type="checkbox"/> Auxiliary	<input type="checkbox"/> Planing <input type="checkbox"/> Trawler <input type="checkbox"/> Semi-Disp. <input type="checkbox"/> Tug or Barge <input type="checkbox"/> Displacement <input type="checkbox"/> Other _____	<input type="checkbox"/> Work Boat <input type="checkbox"/> Fishing Boat <input type="checkbox"/> Crew Boat <input type="checkbox"/> Sport Fishing Boat <input type="checkbox"/> Supply Boat <input type="checkbox"/> Other _____

### Previous Engine and Gear

**Engine Make & Model** \_\_\_\_\_ **Rated Power** \_\_\_\_\_ **hp** **Rated Speed** \_\_\_\_\_ **rpm**  
**Marine Gear Make & Model** \_\_\_\_\_ **Gear Ratio** \_\_\_\_\_ **:1**  
**Propeller Diameter** \_\_\_\_\_ **in.** **Pitch** \_\_\_\_\_ **in.** **# Blades** \_\_\_\_\_ **Max. Boat Speed** \_\_\_\_\_ **Knot**

### Engine

**Engine Model** \_\_\_\_\_ **Base code** \_\_\_\_\_ **Instrumentated Engine** \_\_\_\_\_ **Engine Serial Number(s)** \_\_\_\_\_  
**Engine Rated Power** \_\_\_\_\_ **hp** **Other Engine(s)** \_\_\_\_\_  
**Option Codes Modified** \_\_\_\_\_

### Powered Components

Component Desc., Make & Model	Engaged @ Cranking (Y/N)	Max Power Required	Drive Type	Drive Location
_____	_____	_____ hp	_____	_____
_____	_____	_____ hp	_____	_____
_____	_____	_____ hp	_____	_____
_____	_____	_____ hp	_____	_____
_____	_____	_____ hp	_____	_____

**Propeller Diameter** \_\_\_\_\_ **in.** **Pitch** \_\_\_\_\_ **in.** **# Blades** \_\_\_\_\_ **Gear Ratio** \_\_\_\_\_ **:1**  
**Generator Efficiency** \_\_\_\_\_ **%** **Gen-Set Rating** \_\_\_\_\_ **kW** **Mass Elastic Data Attached**  Yes  No

# JOHN DEERE MARINE ENGINE APPLICATION REVIEW FORM (English)

## Part 2 (Engine Support System Information)

### Engine Mounting

Support System Connections Flexible  Yes  No  
Type of Mounting  Solid  Isolated  
Dipstick Remarked  Yes  No

Installation Angle \_\_\_\_\_ °  
Front Mounting Description \_\_\_\_\_  
Rear Mounting Description \_\_\_\_\_

### Air Intake System

Engine Room Open or Closed  Open  Closed  
Engine Room Exhaust Fan  Yes  No  
Filter Element(s)  Dual  Single  
Engine Room Vent Area \_\_\_\_\_ in<sup>2</sup>

Air Filter Make & Model \_\_\_\_\_  
Intake Piping Length \_\_\_\_\_ in. Diameter \_\_\_\_\_ in. Material \_\_\_\_\_  
Intake Piping Elbows \_\_\_\_\_

### Exhaust System

<u>Dry Exhaust</u>		<u>Wet Exhaust</u>	
Dry Exhaust Flex	<input type="checkbox"/> Yes <input type="checkbox"/> No	Positive Wet Exhaust Slope	<input type="checkbox"/> Yes <input type="checkbox"/> No
Adequate Flex	<input type="checkbox"/> Yes <input type="checkbox"/> No	Engine Exhaust Outlet above Waterline	<input type="checkbox"/> Yes <input type="checkbox"/> No
Flex Location Isolates Engine	<input type="checkbox"/> Yes <input type="checkbox"/> No		
Exhaust Piping Wrapped	<input type="checkbox"/> Yes <input type="checkbox"/> No		

Exhaust Muffler Make & Model \_\_\_\_\_  
Exhaust Piping Length \_\_\_\_\_ in. Diameter \_\_\_\_\_ in. Material \_\_\_\_\_  
Exhaust Piping Elbows \_\_\_\_\_  
Water Exclusion Method \_\_\_\_\_

### Fuel System

Verify Fuel Injection Pump Seals Not Broken   
Fuel Tank Material \_\_\_\_\_  
Fuel Tank Connections: \_\_\_\_\_  
Water Separator  Yes  No  
Water-in-Fuel Alarm  Yes  No  
Vertical distance of tank bottom to transfer pump \_\_\_\_\_ in.  
Vertical distance of tank top to transfer pump \_\_\_\_\_ in.  
Horizontal distance between tank outlet and return lines \_\_\_\_\_ in.

Fuel Inlet Line Diameter \_\_\_\_\_ in. Length \_\_\_\_\_ ft. Material \_\_\_\_\_  
Fuel Return Line Diameter \_\_\_\_\_ in. Length \_\_\_\_\_ ft. Material \_\_\_\_\_

### Lube System

Blow-by Oil Separator Make & Model \_\_\_\_\_  
By-Pass Oil Filter Orifice Size \_\_\_\_\_ in. Filter Make & Model \_\_\_\_\_

# JOHN DEERE MARINE ENGINE APPLICATION REVIEW FORM (English)

## Part 2 (Engine Support System Information)

### Electrical System

Number of Batteries          -          Volt      Engine Grounded to Bonding Strip    Yes    No  
 Positive Cable Length          in. Size      SAE Cold Cranking Amps @ 0 °F (-18 °C)          amps  
 Negative Cable Length          in. Size  
 Instrument Panel(s):      Deere    Yes    No      Coolant Temperature Gage & Alarm    Yes    No  
    Can hear alarms on bridge    Yes    No      Oil Pressure Gage & Alarm    Yes    No  
    Hour Meter    Yes    No  
    Alarmed Functions Cause Engine Shutdown    Yes    No

### Cooling System

#### Gear Oil Cooler Location

Keel Cooler Outlet Line      Engine Coolant made up of Antifreeze,  
 Keel Cooler Return Line      Coolant Additive, & Soft or Distilled Water    Yes    No  
 Sea Water Return Line      Coolant System Protected From Debris    Yes    No  
 Sea Water Pump Inlet Line      Radiator Cap In Use    Yes    No  
 Other \_\_\_\_\_      Sea Water Discharged Above Waterline    Yes    No  
    Sea Strainer Installed    Yes    No  
    Seacock Installed    Yes    No

	Length	Diameter	Material	# Elbows & Description
Sea Water Inlet Line or Keel Cooler Outlet Line	<u>        </u> in.	<u>        </u> in.		
Sea Water Return Line or Keel Cooler Return Line	<u>        </u> in.	<u>        </u> in.		
Keel Cooler	<u>        </u> ft.	<u>        </u> in.		
Keel Cooler Description				# Paths
Coolant Recovery Bottle Volume	<u>        </u> qt.		Height Relative To Top Tank	<u>        </u> in. <input type="checkbox"/> Above <input type="checkbox"/> Below
Remote Pressure Tank Volume	<u>        </u> qt.		Coolant Height Above Top Tank	<u>        </u> in.
Pressure Tank Outlet Line Size			Minimum Slope	<u>        </u> °      Vent Line Size <u>        </u>
Heater Connection Line Size			Locations	<u>        </u>

### General Comments

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

#### Acceptable Test Limits

- ② -③ < 30 °F, 17 °C
- ④ - ⑤ < 6 psi, 41 kPa
- ① < 30 in H<sub>2</sub>O, 7.5 kPa
- ② < 12 in H<sub>2</sub>O, 3 kPa
- ⑥ < 10 psi, 69 kPa
- ⑦ < 8.8 in Hg, 30 kPa

#### Keel Cooler, Operational Thermostats

$$[3 \times (④ - ⑦) < ④ - ⑤ \text{ AND } ④ - ⑤ < 3 \text{ psi, } 21 \text{ kPa}]$$

$$\text{OR } ④ - ⑥ < 125 \text{ °F, } 70 \text{ °C}$$

#### Keel Cooler, Blocked Open Thermostats (WTB)

$$⑨ = 212 - ④ \text{ °F} + ⑥ \text{ °F} + T \text{ °F} \geq 85 \text{ °F}$$

$$⑨ = 100 - ④ \text{ °C} + ⑥ \text{ °C} + T \text{ °C} \geq 30 \text{ °C}$$

$$T = 6 \text{ °F (3 °C) for water, } 0 \text{ ° for 50/50 mix}$$

# JOHN DEERE MARINE ENGINE APPLICATION REVIEW FORM (English)

## Part 3 (Sea Trial Data Acquisition)

### Sea Trial Data

Date _____	Cranking _____ rpm
Test Site _____	Low Idle _____ rpm
Altitude _____ ft	Starting Time _____
Hour Meter Reading _____ Hours	Fast Idle _____ rpm
	Finish Time _____
	Full Load _____ rpm

Sea water flow overboard looks OK  Blocked open thermostats  WP = Water Pump

Operational thermostats  KC = Keel Cooled Engine Test

Engine Instrumented  Port  Starboard HEx = Heat Exchanger Cooled Engine Test

### Loading Information

Apply max. engine load until temperatures stabilize.

Payload on Board \_\_\_\_\_

Time of load changed	New Load & Loading Method (Amps, Engine rpm, full throttle against bank, full throttle free run, etc.)
A.	_____
B.	_____
C.	_____
D.	_____

Test Run	Units	1	2	3	4	5	6	7	8
Time readings taken									
Engine speed, port	rpm								
Engine speed, starboard	rpm								
Vessel Speed	Knots								
<b>Temperatures</b>	<b>Probe/Wire #</b>								
Exhaust	① °F								
Air Intake	② °F								
Ambient Air	③ °F								
(KC) Coolant out of Eng.	④ °F								
(KC) Coolant return to Eng.	⑤ °F								
(HEx) Sea water return	⑤ °F								
Sea Water	⑥ °F								
(KC) Coolant into Eng. WP	⑦ °F								
WTB (calculated)	⑨ °F								
<b>Pressures</b>	<b>Gage</b>								
Exhaust Restriction	① in H <sub>2</sub> O								
Air Intake Restriction	② in H <sub>2</sub> O								
Intake Manifold Boost	③ psi								
(KC) Coolant out of Engine	④ psi								
(KC) Coolant return to Engine	⑤ psi								
(HEx) Sea water pump outlet	⑥ psi								
(HEx) Sea water pump inlet	⑦ psi								
<b>Instrument Panel Readings</b>									
Engine coolant, port	⑧ °F								
Engine oil, port	⑧ psi								
Engine coolant, starboard	⑧ °F								
Engine oil, starboard	⑧ psi								



# JOHN DEERE MARINE ENGINE APPLICATION REVIEW FORM (Metric)

## Part 1 (Engine, Option and Accessory Selection)

### General Details

**Engine Serial No.** \_\_\_\_\_ **Appl. Reg. No.** \_\_\_\_\_  
**Distributor:** \_\_\_\_\_ **AccountNo.:** \_\_\_\_\_ **OEM/Dealer:** \_\_\_\_\_ **AccountNo.:** \_\_\_\_\_  
**Company Name:** \_\_\_\_\_ **Company Name:** \_\_\_\_\_  
**Street Address:** \_\_\_\_\_ **Street Address:** \_\_\_\_\_  
**City, State, Zip Code:** \_\_\_\_\_ **City, State, Zip Code:** \_\_\_\_\_

	<u>Reviewed By</u>	<u>Title</u>	
Dist. Representative	_____	_____	Signatures On File <input type="checkbox"/> Yes <input type="checkbox"/> No
OEM Representative	_____	_____	
DPSG Representative	_____	_____	
Customer	_____	City, State _____	

### Vessel Information

**Vessel Name** \_\_\_\_\_ **Home Port** \_\_\_\_\_  
**Required Certifications** \_\_\_\_\_  
**Hull Make & Model** \_\_\_\_\_ **Hull Material** \_\_\_\_\_

Length	Beam	Draft	Weight	Max Prop Dia.	Design Hull Speed	Rated Power
M	M	M	kg	mm	Knot	kW
%Time @ Cruising Speed		%	Cruising Engine Speed		Annual Usage	
		%	rpm		Operating Range	
					Hours	
% Time @ Full Throttle		%			Miles	

Operating Description \_\_\_\_\_

<u>Application Rating</u>	<u>Hull Type</u>	<u>Type of Vessel</u>
<input type="checkbox"/> M1 <input type="checkbox"/> M4 <input type="checkbox"/> M2 <input type="checkbox"/> Gen-Set <input type="checkbox"/> M3 <input type="checkbox"/> Auxiliary	<input type="checkbox"/> Planing <input type="checkbox"/> Trawler <input type="checkbox"/> Semi-Disp. <input type="checkbox"/> Tug or Barge <input type="checkbox"/> Displacement <input type="checkbox"/> Other _____	<input type="checkbox"/> Work Boat <input type="checkbox"/> Fishing Boat <input type="checkbox"/> Crew Boat <input type="checkbox"/> Sport Fishing Boat <input type="checkbox"/> Supply Boat <input type="checkbox"/> Other _____

### Previous Engine and Gear

**Engine Make & Model** \_\_\_\_\_ **Rated Power** \_\_\_\_\_ **kW**   **Rated Speed** \_\_\_\_\_ **rpm**  
**Marine Gear Make & Model** \_\_\_\_\_ **Gear Ratio** \_\_\_\_\_ **:1**  
**Propeller Diameter** \_\_\_\_\_ **mm**   **Pitch** \_\_\_\_\_ **mm**   **# Blades** \_\_\_\_\_   **Max. Boat Speed** \_\_\_\_\_ **Knot**

### Engine

**Engine Model** \_\_\_\_\_ **Base code** \_\_\_\_\_ **Instrumentated Engine** \_\_\_\_\_  
**Engine Rated Power** \_\_\_\_\_ **kW**   **Other Engine(s)** \_\_\_\_\_  
**Option Codes Modified** \_\_\_\_\_

### Powered Components

Component Desc., Make & Model	Engaged @ Cranking (Y/N)	Max Power Required	Drive Type	Drive Location
_____	_____	kW	_____	_____
_____	_____	kW	_____	_____
_____	_____	kW	_____	_____
_____	_____	kW	_____	_____
_____	_____	kW	_____	_____

**Propeller Diameter** \_\_\_\_\_ **mm**   **Pitch** \_\_\_\_\_ **mm**   **# Blades** \_\_\_\_\_   **Gear Ratio** \_\_\_\_\_ **:1**  
**Generator Efficiency** \_\_\_\_\_ **%**   **Gen-Set Rating** \_\_\_\_\_ **kW**   **Mass Elastic Data Attached**    Yes  No

# JOHN DEERE MARINE ENGINE APPLICATION REVIEW FORM (Metric)

## Part 2 (Engine Support System Information)

### Engine Mounting

Support System Connections Flexible  Yes  No  
Type of Mounting  Solid  Isolated  
Dipstick Remarked  Yes  No

Installation Angle \_\_\_\_\_ °  
Front Mounting Description \_\_\_\_\_  
Rear Mounting Description \_\_\_\_\_

### Air Intake System

Engine Room Open or Closed  Open  Closed  
Engine Room Exhaust Fan  Yes  No  
Filter Element(s)  Dual  Single  
Engine Room Vent Area \_\_\_\_\_ cm<sup>2</sup>

Air Filter Make & Model \_\_\_\_\_  
Intake Piping Length \_\_\_\_\_ mm Diameter \_\_\_\_\_ mm Material \_\_\_\_\_  
Intake Piping Elbows \_\_\_\_\_

### Exhaust System

<u>Dry Exhaust</u>		<u>Wet Exhaust</u>	
Dry Exhaust Flex	<input type="checkbox"/> Yes <input type="checkbox"/> No	Positive Wet Exhaust Slope	<input type="checkbox"/> Yes <input type="checkbox"/> No
Adequate Flex	<input type="checkbox"/> Yes <input type="checkbox"/> No	Engine Exhaust Outlet above Waterline	<input type="checkbox"/> Yes <input type="checkbox"/> No
Flex Location Isolates Engine	<input type="checkbox"/> Yes <input type="checkbox"/> No		
Exhaust Piping Wrapped	<input type="checkbox"/> Yes <input type="checkbox"/> No		

Exhaust Muffler Make & Model \_\_\_\_\_  
Exhaust Piping Length \_\_\_\_\_ mm Diameter \_\_\_\_\_ mm Material \_\_\_\_\_  
Exhaust Piping Elbows \_\_\_\_\_  
Water Exclusion Method \_\_\_\_\_

### Fuel System

Verify Fuel Injection Pump Seals Not Broken   
Fuel Tank Material \_\_\_\_\_  
Fuel Tank Connections: \_\_\_\_\_  
Water Separator  Yes  No  
Water-in-Fuel Alarm  Yes  No  
Vertical distance of tank bottom to transfer pump \_\_\_\_\_ mm  
Vertical distance of tank top to transfer pump \_\_\_\_\_ mm  
Horizontal distance between tank outlet and return lines \_\_\_\_\_ mm

Fuel Inlet Line Diameter \_\_\_\_\_ mm Length \_\_\_\_\_ M Material \_\_\_\_\_  
Fuel Return Line Diameter \_\_\_\_\_ mm Length \_\_\_\_\_ M Material \_\_\_\_\_

### Lube System

Blow-by Oil Separator Make & Model \_\_\_\_\_  
By-Pass Oil Filter Orifice Size \_\_\_\_\_ mm Filter Make & Model \_\_\_\_\_

# JOHN DEERE MARINE ENGINE APPLICATION REVIEW FORM (Metric)

## Part 2 (Engine Support System Information)

### Electrical System

Number of Batteries          -          Volt      Engine Grounded to Bonding Strip    Yes    No  
 Positive Cable Length          mm Size      SAE Cold Cranking Amps @ 0 °F (-18 °C)          amps  
 Negative Cable Length          mm Size  
 Instrument Panel(s):      Deere    Yes    No      Coolant Temperature Gage & Alarm    Yes    No  
    Can hear alarms on bridge    Yes    No      Oil Pressure Gage & Alarm    Yes    No  
    Hour Meter    Yes    No  
    Alarmed Functions Cause Engine Shutdown    Yes    No

### Cooling System

#### Gear Oil Cooler Location

Keel Cooler Outlet Line      Engine Coolant made up of Antifreeze,  
 Keel Cooler Return Line      Coolant Additive, & Soft or Distilled Water    Yes    No  
 Sea Water Return Line      Coolant System Protected From Debris    Yes    No  
 Sea Water Pump Inlet Line      Radiator Cap In Use    Yes    No  
 Other \_\_\_\_\_      Sea Water Discharged Above Waterline    Yes    No  
    Sea Strainer Installed    Yes    No  
    Seacock Installed    Yes    No

	Length	Diameter	Material	# Elbows & Description
Sea Water Inlet Line or Keel Cooler Outlet Line	mm	mm		
Sea Water Return Line or Keel Cooler Return Line	mm	mm		
Keel Cooler	M	mm		
Keel Cooler Description				# Paths
Coolant Recovery Bottle Volume	L		Height Relative To Top Tank	mm <input type="checkbox"/> Above <input type="checkbox"/> Below
Remote Pressure Tank Volume	L		Coolant Height Above Top Tank	mm
Pressure Tank Outlet Line Size			Minimum Slope	°      Vent Line Size _____
Heater Connection Line Size			Locations	_____

### General Comments

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

#### Acceptable Test Limits

- ② - ③ < 30 °F, 17 °C
- ④ - ⑤ < 6 psi, 41 kPa
- ① < 30 in H<sub>2</sub>O, 7.5 kPa
- ② < 12 in H<sub>2</sub>O, 3 kPa
- ⑥ < 10 psi, 69 kPa
- ⑦ < 8.8 in Hg, 30 kPa

#### Keel Cooler, Operational Thermostats

$$[3 \times (④ - ⑦) < ④ - ⑤ \text{ AND } ④ - ⑤ < 3 \text{ psi, } 21 \text{ kPa}]$$

$$\text{OR } ④ - ⑥ < 125 \text{ °F, } 70 \text{ °C}$$

#### Keel Cooler, Blocked Open Thermostats (WTB)

$$⑨ = 212 - ④ \text{ °F} + ⑥ \text{ °F} + T \text{ °F} \geq 85 \text{ °F}$$

$$⑨ = 100 - ④ \text{ °C} + ⑥ \text{ °C} + T \text{ °C} \geq 30 \text{ °C}$$

$$T = 6 \text{ °F (3 °C) for water, } 0 \text{ ° for 50/50 mix}$$

# JOHN DEERE MARINE ENGINE APPLICATION REVIEW FORM (Metric)

## Part 3 (Sea Trial Data Acquisition)

### Sea Trial Data

Date _____	Cranking _____ rpm
Test Site _____	Low Idle _____ rpm
Altitude _____ M	Starting Time _____
Hour Meter Reading _____ Hours	Fast Idle _____ rpm
	Finish Time _____
	Full Load _____ rpm

Sea water flow overboard looks OK  Blocked open thermostats  WP = Water Pump

Operational thermostats  KC = Keel Cooled Engine Test

Engine Instrumented  Port  Starboard HEx = Heat Exchanger Cooled Engine Test

### Loading Information

Apply max. engine load until temperatures stabilize.

Payload on Board \_\_\_\_\_

Time of load changed	New Load & Loading Method (Amps, Engine rpm, full throttle against bank, full throttle free run, etc.)
A.	_____
B.	_____
C.	_____
D.	_____

Test Run		Units	1	2	3	4	5	6	7	8
Time readings taken										
Engine speed, port		rpm								
Engine speed, starboard		rpm								
Vessel Speed		Knots								
<b>Temperatures</b>		Probe/Wire #								
Exhaust	①	°C								
Air Intake	②	°C								
Ambient Air	③	°C								
(KC) Coolant out of Eng.	④	°C								
(KC) Coolant return to Eng.	⑤	°C								
(HEx) Sea water return	⑤	°C								
Sea Water	⑥	°C								
(KC) Coolant into Eng. WP	⑦	°C								
WTB (calculated)	⑨	°C								
<b>Pressures</b>		Gage								
Exhaust Restriction	①	kPa								
Air Intake Restriction	②	kPa								
Intake Manifold Boost	③	kPa								
(KC) Coolant out of Engine	④	kPa								
(KC) Coolant return to Engine	⑤	kPa								
(HEx) Sea water pump outlet	⑥	kPa								
(HEx) Sea water pump inlet	⑦	kPa								
<b>Instrument Panel Readings</b>										
Engine coolant, port	⑧	°C								
Engine oil, port	⑧	kPa								
Engine coolant, starboard	⑧	°C								
Engine oil, starboard	⑧	kPa								

