

# PROPELLER INSTALLATION INSTRUCTIONS

**IMPORTANT:** This document guides our dealers, boatbuilders, and company service personnel in the proper installation or service of our products. If you have not been trained in the recommended servicing or installation procedures for these or similar Mercury Marine products, have the work performed by an authorized Mercury Marine dealer technician. Improper installation or servicing of the Mercury product could result in damage to the product or personal injury to those installing or operating the product.

**NOTE:** After completing installation, place these instructions with the product for the owner's future use.

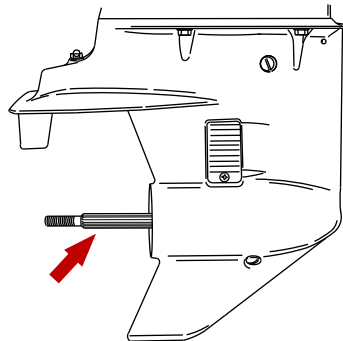
## Propeller Installation

### Lubricate the Propeller Shaft

#### ⚠ WARNING

Rotating propellers can cause serious injury or death. Never operate the boat out of the water with a propeller installed. Before installing or removing a propeller, place the drive unit in neutral and engage the lanyard stop switch to prevent the engine from starting. Place a block of wood between the propeller blade and the anti-ventilation plate.

To aid in future removal and corrosion resistance, apply one of the following lubricants to the propeller shaft before propeller installation.

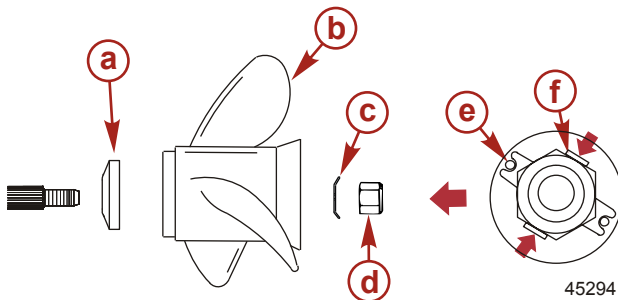


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Tube Ref No.	Description	Where Used	Part No.
94	Anti-Corrosion Grease	Propeller shaft splines	92-802867Q 1
95	2-4-C with Teflon	Propeller shaft splines	92-802859A 1
34	Special Lubricant 101	Propeller shaft splines	92-802865Q02

## Flo-Torq I Propellers

1. Install the propeller onto the shaft with the supplied components. If the components supplied with the propeller are different than what is shown, refer to the propeller installation instructions provided with your product or contact your dealer.
2. Place the locknut retainer over the raised pins and tighten the locknut to the specified torque.
3. Secure the locknut by bending the tabs up against the flats on the nut.



#### Flo-Torq I propeller

- a** - Forward thrust washer
- b** - Propeller
- c** - Locknut retainer
- d** - Locknut
- e** - Raised pins
- f** - Tabs bent against the locknut

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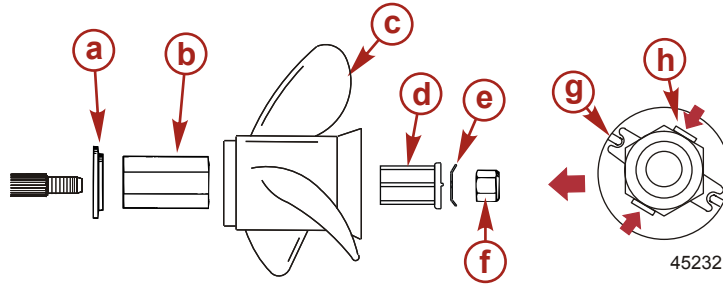
**PROPELLER INSTALLATION INSTRUCTIONS**

Description	Nm	lb-in.	lb-ft
6–15 hp locknut	11.3	100	
18–25 hp locknut	22.6		16.7
30–60 hp locknut	74.6		55

**Flo-Torq II Propellers**

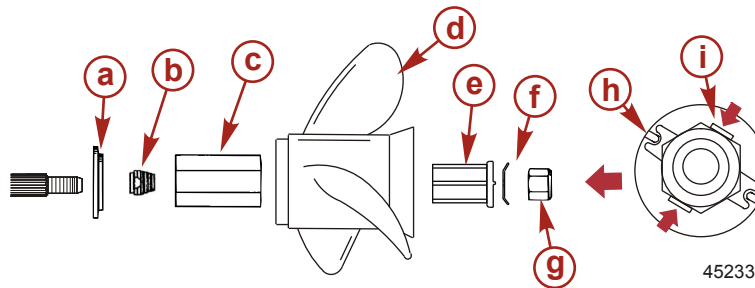
**Flo-Torq II Propellers Fastened with a Locknut**

1. Install the propeller onto the shaft with the supplied components. If the components supplied with the propeller are different than what is shown, refer to the propeller installation instructions provided with your product or contact your dealer.
2. Place the locknut retainer over the raised pins on the drive sleeve adapter and tighten the locknut to the specified torque.
3. Secure the locknut by bending the tabs up against the flats on the nut.



**Flo-Torq II propeller without a hub bushing**

- a - Forward thrust washer
- b - Drive sleeve
- c - Propeller
- d - Drive sleeve adapter
- e - Locknut retainer
- f - Locknut
- g - Raised pins
- h - Tabs bent against the locknut



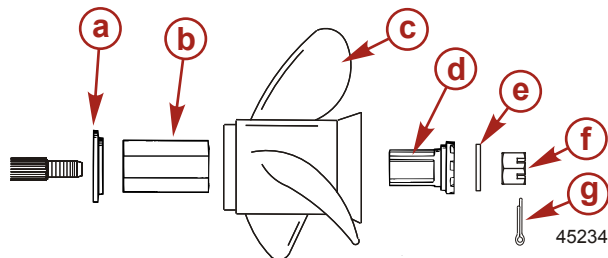
**Flo-Torq II propeller with a hub bushing**

- a - Forward thrust washer
- b - Hub bushing
- c - Drive sleeve
- d - Propeller
- e - Drive sleeve adapter
- f - Locknut retainer
- g - Locknut
- h - Raised pins
- i - Tabs bent against the locknut

Description	Nm	lb-in.	lb-ft
Locknut - propellers without a hub bushing	75		55
Locknut - propellers with a hub bushing	136		100

**Flo-Torq II Propellers Fastened with a Castle Nut and Cotter Pin**

1. Install the propeller onto the shaft with the supplied components, as shown. If the components supplied with the propeller are different than what is shown, refer to the propeller installation instructions provided with your product or contact your dealer.
2. Tighten the castle nut to the specified torque. Secure the castle nut to the shaft with a cotter pin.



**Flo-Torq II propeller fastened with a castle nut**

- a - Forward thrust washer
- b - Drive sleeve
- c - Propeller
- d - Drive sleeve adapter
- e - Washer
- f - Castle nut
- g - Cotter pin

**PROPELLER INSTALLATION INSTRUCTIONS**

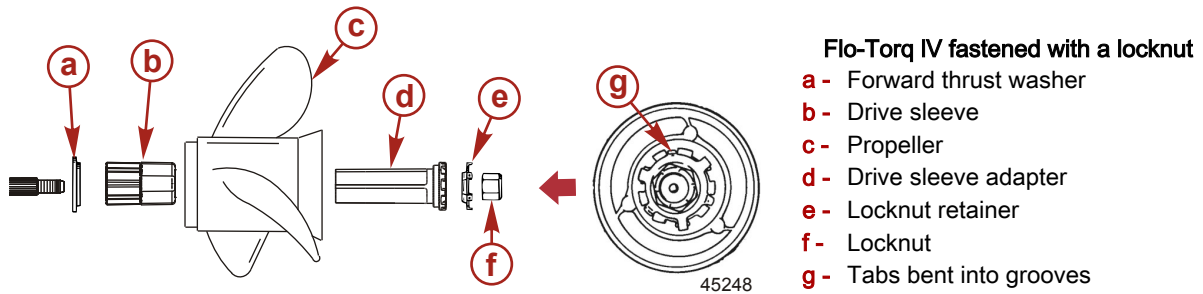
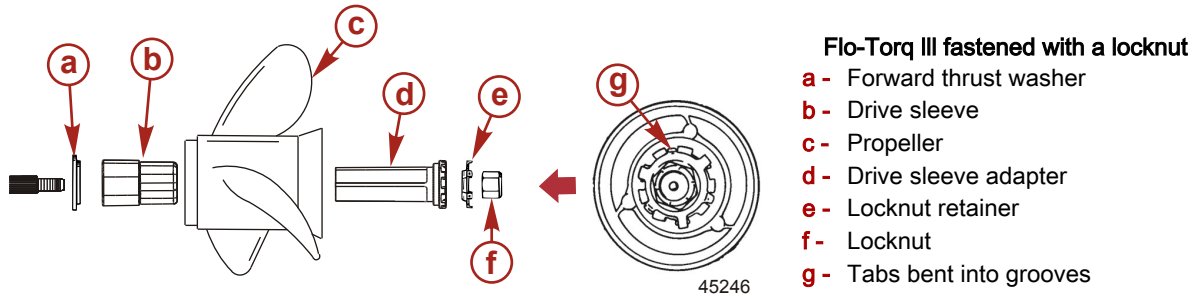
Description	Nm	lb-in.	lb-ft
Castle nut	75		55

**Flo-Torq III and Flo-Torq IV Propellers**

**NOTE:** The Flo-Torq III and IV propellers are designed to have a small amount of free play when installed. This free play allows the propeller to slide back and forth on the drive sleeve adapter (up to 3.17 mm [1/8 in.]) and rotate up to 10 degrees.

**Flo-Torq III and IV Propellers Fastened with a Locknut**

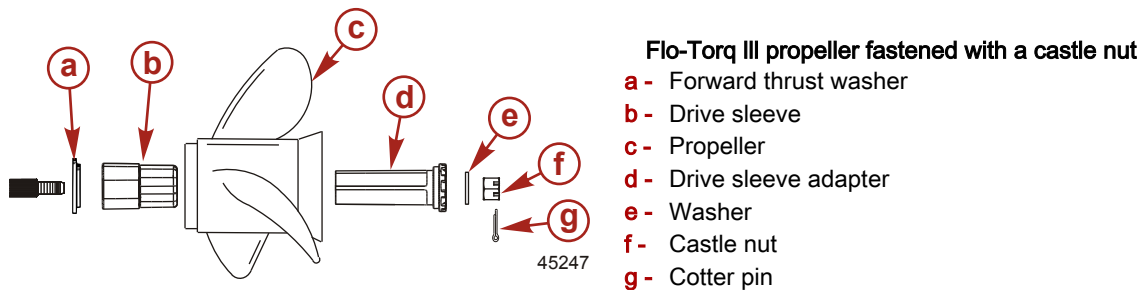
1. Install the propeller onto the shaft with the supplied components, as shown. If the components supplied with the propeller are different than what is shown, refer to the propeller installation instructions provided with your product or contact your dealer.
2. Tighten the locknut to the specified torque.
3. Secure the locknut by bending three of the tabs into the grooves in the drive sleeve adapter.



Description	Nm	lb-in.	lb-ft
Locknut	75		55

**Flo-Torq III Propellers Fastened with a Castle Nut and Cotter Pin**

1. Install the propeller onto the shaft with the supplied components, as shown. If the components supplied with the propeller are different than what is shown, refer to the propeller installation instructions provided with your product or contact your dealer.
2. Tighten the castle nut to the specified torque. Secure the castle nut to the shaft with a cotter pin.



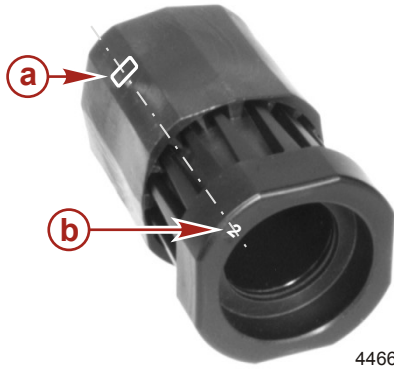
Description	Nm	lb-in.	lb-ft
Castle nut	75		55

## Flo-Torq Reflex Drive Hub Installation

### Drive Sleeve Alignment

#### Alignment Method 1

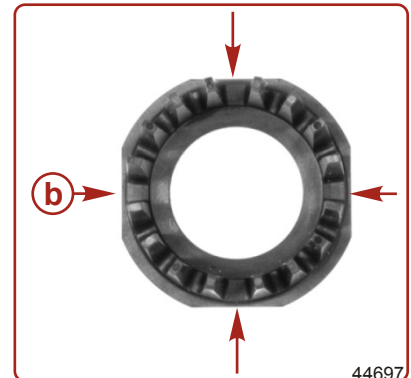
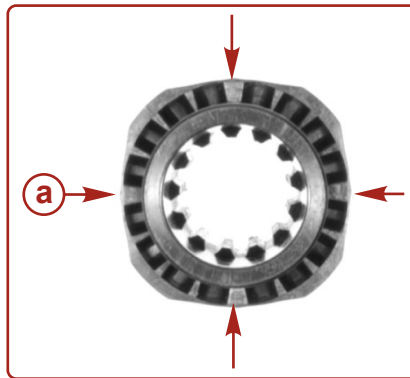
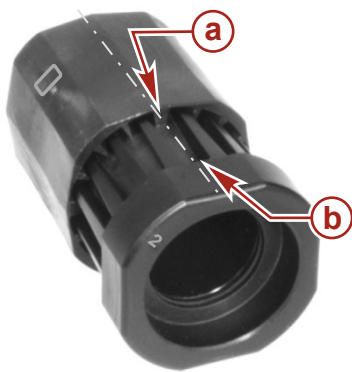
1. Align the identification number on the aft drive sleeve with the rectangular mark on the front drive sleeve.
2. Insert the aft drive sleeve into the front drive sleeve.



- a - Rectangular mark on the front drive sleeve
- b - Identification number on the aft drive sleeve (1 or 2)

#### Alignment Method 2

1. Align the fingers of the aft sleeve with the pockets of the front sleeve, as shown.
2. Insert the aft drive sleeve into the front drive sleeve.



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- a - Wide spacer on front drive sleeve
- b - Wide gap between fingers on the aft drive sleeve

### Installing the Drive Sleeve into the Propeller

1. Ensure there is no gap between the drive sleeve and the aft drive sleeve.



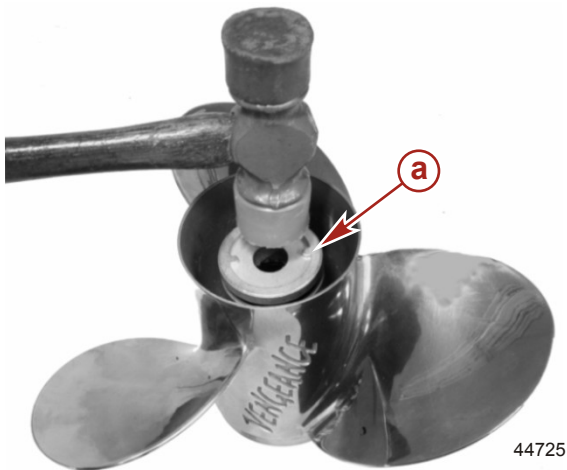
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## PROPELLER INSTALLATION INSTRUCTIONS

2. Insert the drive sleeve assembly onto the propeller and push the drive sleeve assembly onto the propeller.



3. Install the aft washer onto the drive sleeve assembly and lightly tap the drive sleeve assembly into the propeller. The aft washer will contact the propeller when the drive sleeve assembly is properly seated.

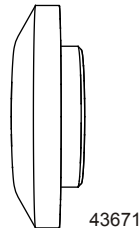


a - Aft washer

**IMPORTANT:** The Flo-Torq Reflex drive hub requires the use of the thrust washer that is included with the drive hub kit.

### Mercury Outboard Application

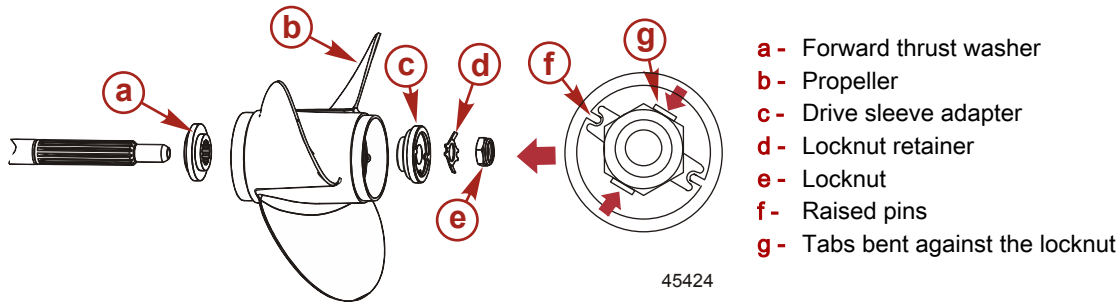
1. Install the forward thrust washer onto the propeller shaft.



2. Install the propeller onto the shaft with the supplied components, as shown. If the components supplied with the propeller are different than what is shown, refer to the propeller installation instructions provided with your product or contact your dealer.
3. Place the locknut retainer over the raised pins on the drive sleeve adapter and tighten the locknut to the specified torque.
4. Secure the locknut by bending the tabs up against the flats on the nut.

**PROPELLER INSTALLATION INSTRUCTIONS**

**IMPORTANT:** The Flo-Torq Reflex drive hub requires the use of the propeller nut included with the drive hub kit. The use of a propeller nut that was not included with the Flo-Torq Reflex drive hub kit will result with the nylon portion of the locknut not fully engaging the propeller shaft threads.



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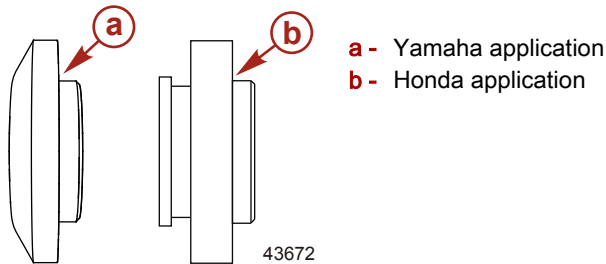
5. Rotate the propeller to verify interference or binding does not exist between the gear housing and the propeller.

Description	Nm	lb-in.	lb-ft
Nut	75		55

**NOTE:** A small amount of rotation play and forward aft play is normal.

**Honda and Yamaha Outboard Application**

1. Install the correct front thrust washer onto the propeller shaft.



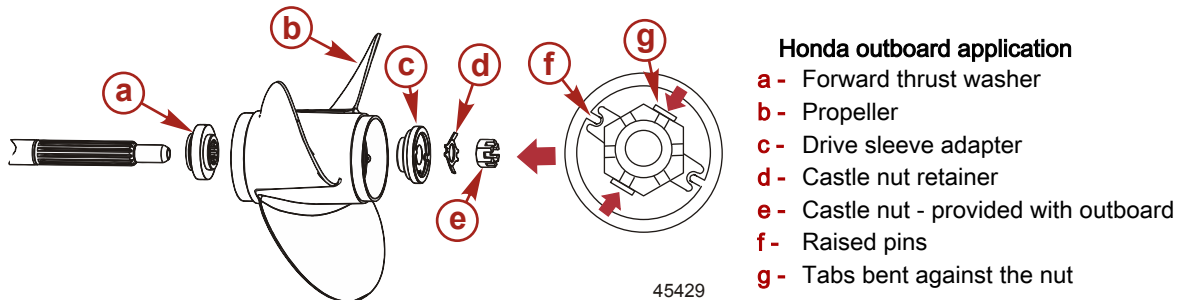
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2. Install the propeller onto the shaft with the components, as shown. Use the existing castle nut provided with the outboard. If the components supplied with the propeller are different than what is shown, refer to the propeller installation instructions provided with your product or contact your dealer.
3. Place the castle nut retainer over the raised pins on the drive sleeve adapter and tighten the castle nut to the specified torque.

**NOTE:** A cotter pin is not required to secure the castle nut. Bending the castle nut retainer tabs against the castle nut will secure the nut.

4. Secure the castle nut by bending the tabs on the castle nut retainer up against the flats on the nut.
5. Rotate the propeller to verify interference or binding does not exist between the gear housing and the propeller.

**NOTE:** A small amount of rotation play and forward aft play is normal.

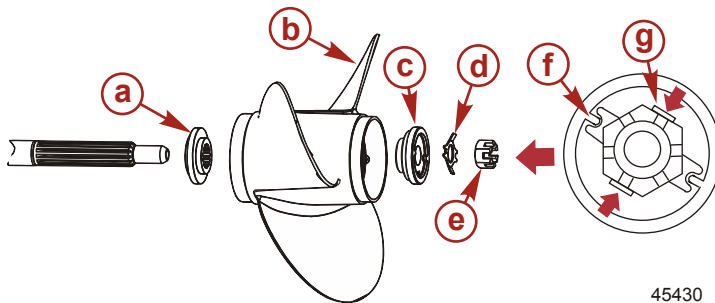


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**Honda outboard application**

- a - Forward thrust washer
- b - Propeller
- c - Drive sleeve adapter
- d - Castle nut retainer
- e - Castle nut - provided with outboard
- f - Raised pins
- g - Tabs bent against the nut

Description	Nm	lb-in.	lb-ft
Castle nut	75		55



**Yamaha outboard application**

- a** - Forward thrust washer
- b** - Propeller
- c** - Drive sleeve adapter
- d** - Castle nut retainer
- e** - Castle nut - provided with outboard
- f** - Raised pins
- g** - Tabs bent against the nut

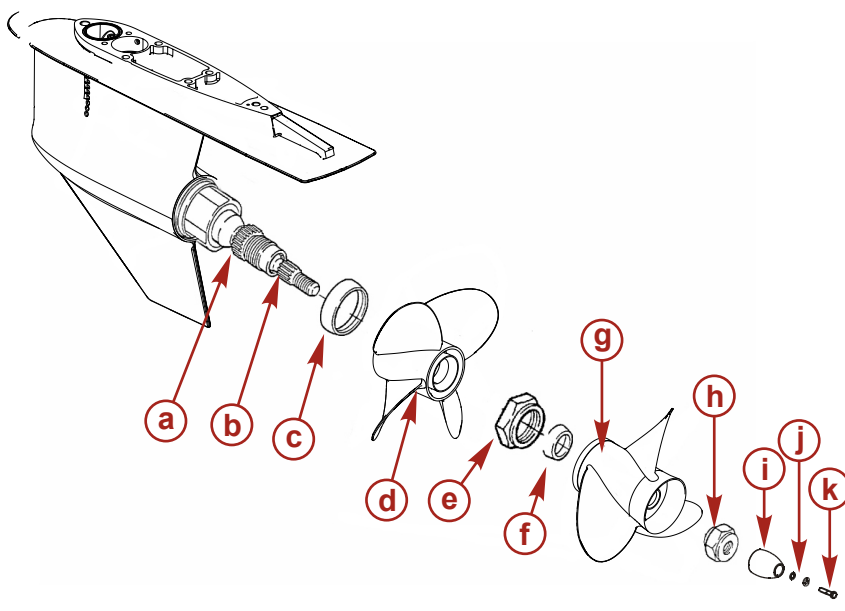
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Description	Nm	lb-in.	lb-ft
Castle nut	75		55

### Bravo Three Propeller Installation

**IMPORTANT:** Mercury Marine Bravo Three propellers are matched sets. Do not operate the drive without a front and rear propeller of the same pitch.

1. Apply a liberal amount of one of the following lubricants to the inner and outer propeller shafts.
2. Slide the forward thrust hub onto the outer propeller shaft with the tapered end of the hub facing aft.
3. Align the splines of the propeller with the splines on the shaft and slide the propeller into place on the outer shaft.
4. Secure it with the forward propeller nut and tighten to the specified torque.
5. Slide the aft thrust hub onto the inner propeller shaft with the tapered end of the hub facing aft.
6. Align the splines of the propeller with the splines on the shaft and slide the propeller into place on the inner shaft.
7. Secure it with the aft propeller nut and tighten to the specified torque.



- a** - Outer propeller shaft
- b** - Inner propeller shaft
- c** - Forward thrust hub
- d** - Forward propeller
- e** - Forward propeller nut
- f** - Aft thrust hub
- g** - Aft propeller
- h** - Aft propeller nut
- i** - Anode
- j** - Washers
- k** - Screw

43655

Tube Ref No.	Description	Where Used	Part No.
34	Special Lubricant 101	Propeller shaft splines	92-802865Q02
94	Anti-Corrosion Grease	Propeller shaft splines	92-802867Q 1
95	2-4-C with Teflon	Propeller shaft splines	92-802859A 1

Description	Nm	lb-in.	lb-ft
Forward propeller nut	136		100
Aft propeller nut	81		60



## PROPELLER INSTALLATION INSTRUCTIONS

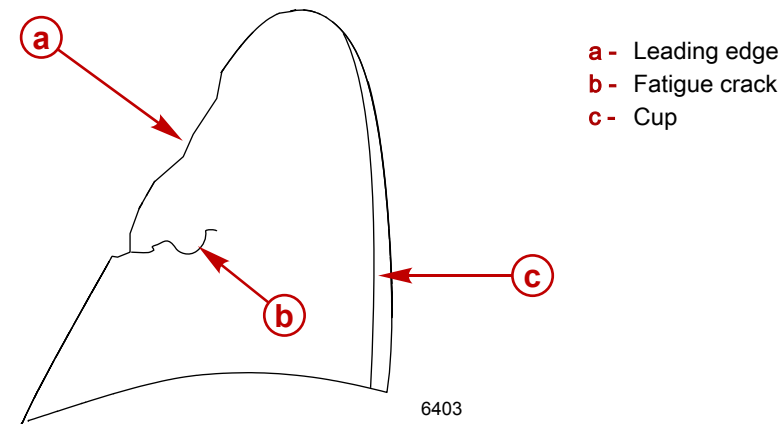
Description	Nm	lb-in.	lb-ft
Anode screw	27		20

**IMPORTANT:** Check the tightness of both propellers after 20 hours of operation. Tighten the propeller nuts if necessary. Do not operate the vessel with a loose propeller.

## Propeller Inspection and Maintenance

- Inspect the leading edge of the propeller frequently for nicks, gouges, and damage.
- Propellers with large, deep dents, gouges, or torn metal should be replaced or repaired.
- Mineral deposits on stainless steel propellers can be caused by an inoperative or missing MerCathode system.

**NOTE:** Mineral deposits can be removed with household cleaners such as vinegar or other cleaners that remove lime and mineral deposits.



## Propeller Basics

Consult the engine's **Owners, Operation and Maintenance Manual** for the recommended wide-open throttle (WOT) operating range of the engine.

Select a propeller that allows the engine to operate within the WOT RPM operating range.

**IMPORTANT:** Always perform WOT RPM tests with the boat in its normal configuration; i.e. fuel load, passenger load, equipment load, skiers, etc.

Use the following information to help select the proper propeller for the vessel:

- Adding 25 mm (1 in.) of propeller pitch will reduce the WOT RPM by 150 to 200 RPM.
- Subtracting 25 mm (1 in.) of propeller pitch will increase the WOT RPM by 150 to 200 RPM.
- Switching from a three blade to a four blade propeller with the same pitch generally reduces WOT RPM by 50 to 100 RPM.

## Performance Vent System

The performance vent system (PVS) was created to help our customers optimize Mercury propellers on their personal boat and unique boating conditions. PVS allows the boater to custom tune the venting of the propeller blades to dial in the perfect acceleration and cruising performance.

On acceleration, exhaust is drawn out of the vent hole located behind each propeller blade. When the next propeller blade strikes this aerated water, less force is required to push through the aerated water versus solid water. This allows the engine RPM to rise more rapidly. Once on plane speed is reached, water flowing over the vent holes seal the exhaust gas in the hub, allowing the propeller to again operate in solid nonaerated water. By varying the size of the exhaust vent hole, the rate at which the engine RPM rises can now be controlled.

Laser II, Trophy Plus, and Tempest Plus propellers are shipped with medium PVS vent plugs; and Mirage Plus, Offshore, Revolution 4, and HighFive propellers are shipped with solid PVS vent plugs offering all-around performance for most boating situations.

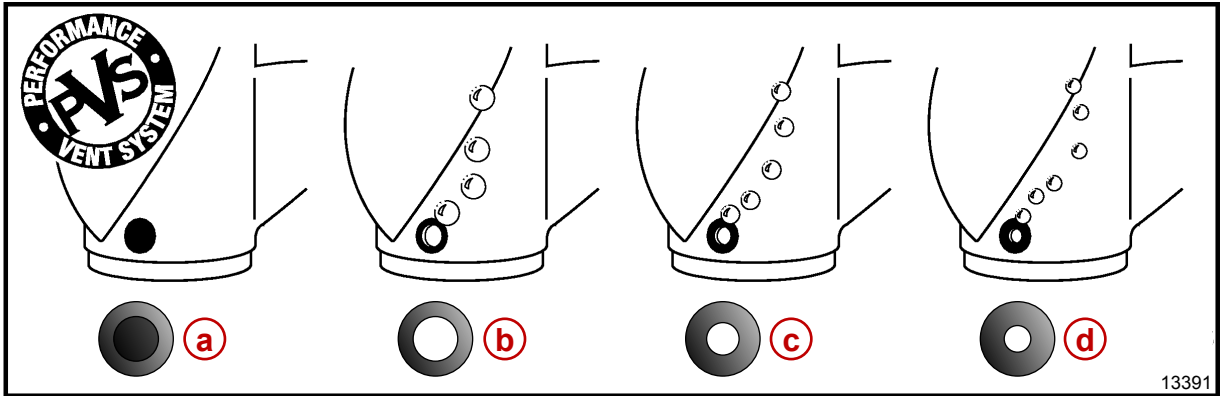
## Acceleration Problem/Solution

1. Slow/sluggish acceleration to plane (engine unable to push solid water away quickly).
  - **Solution:** Increase ventilation by using a plug with larger holes.
2. Over ventilation - the load on the propeller is significantly reduced by the mixing of exhaust into the water stream causing an engine overrevving condition before the vessel is on plane.



## PROPELLER INSTALLATION INSTRUCTIONS

- **Solution:** Decrease ventilation by using a plug with a smaller hole or use a solid plug.



- a** - Solid plug
- b** - Large - 12 mm (0.470 in.)
- c** - Medium - 9 mm (0.350 in.)
- d** - Small - 7 mm (0.280 in.)

**Products of Mercury Marine**  
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