Bottle Cap Preparation

Rudder Mount

#6 Screw

EPOXY

The purpose of this procedure is to secure the rudder mount to the bottle cap and seal the air vent hole with waterproof epoxy.

Safety

- Wear approved eye protection.

- When using epoxy, work in a well ventilated area, use gloves, and follow manufacturer's safety instructions.

- Epoxy can be messy - Use a disposable non-reactive surfaces for a mixing area such as a paper plate or scrap of cardboard.
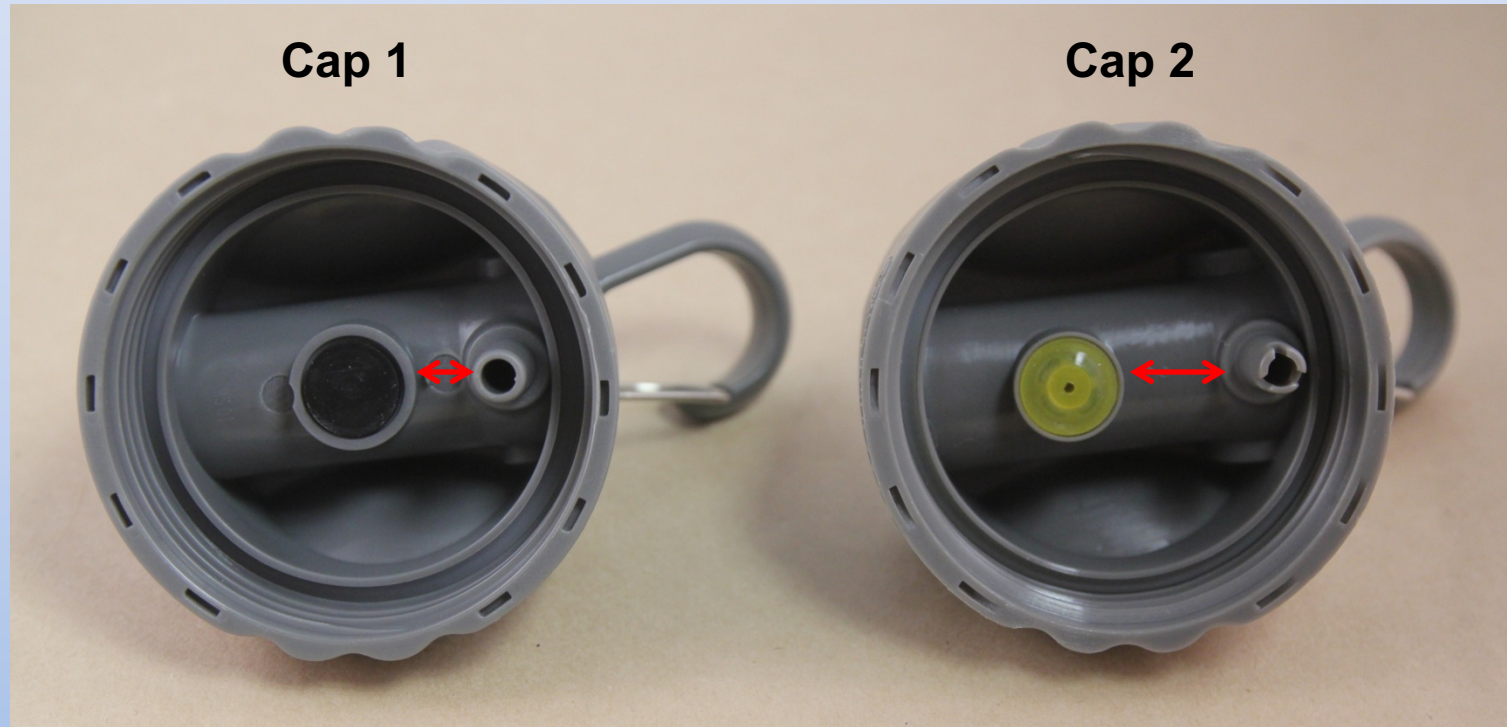
Things to Remember

- Squeeze all the contents (reagents) out of the epoxy packet and mix them thoroughly so that the epoxy will set hard.

- Bottles have multiple cap designs. (See slide 5 below.) The 3D printed rudder mount which fits on the back of the cap has a choice of screw holes to accommodate this. Find the hole that works for your cap.

Remove Cap, Mouthpiece, and Straws

Foam Mouthpiece

Bottle Cap

Plastic Straw

Remove the foam mouthpiece from the cap and save it for instructions 5b -Buoyancy Engine Assembly. Unscrew the cap and remove the plastic straws from inside the bottle.
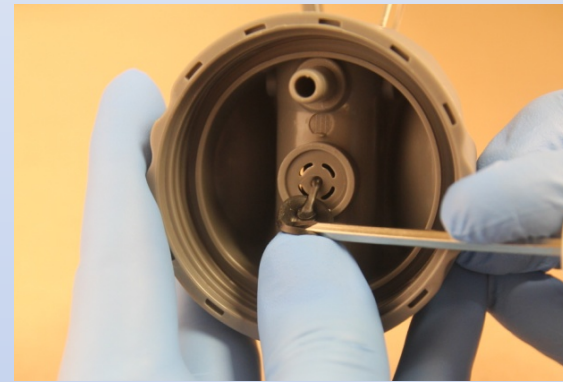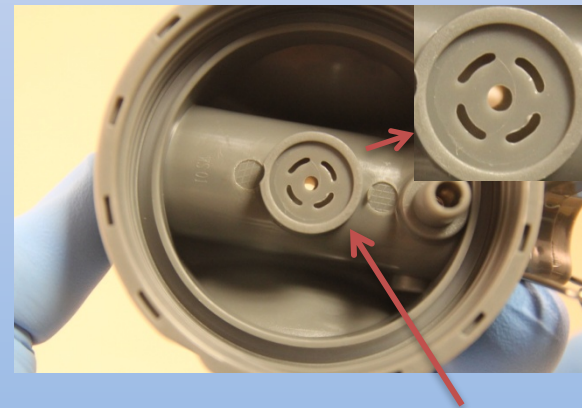
Two Models of Bottle Caps: 1 & 2

Cap 1   **Cap 2**

The RED arrows show the main difference between the two caps. If you have Cap 1 follow the instructions below. If you have Cap 2 start on page 13*.

*If your bottle cap doesn't match the above, see *Cap 3 Prep & BE Assembly* in the Old Build Instructions folder in BUILD INSTRUCTIONS.

Prepare **Cap 1** for Rudder Mount

Air Vent Flap

Use a flat-head screwdriver to remove the air vent flap from cap then flip the cap over.
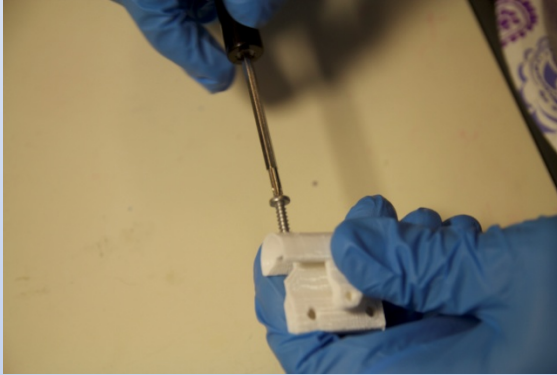

Test fit the rudder mount and align the appropriate screw hole in the rudder mount with the air vent hole in cap.
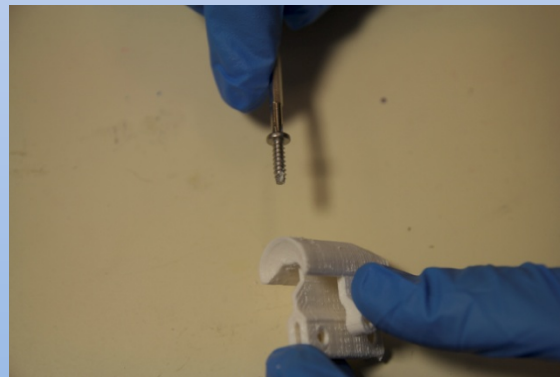
Mark Position of Rudder Mount

Use a felt-tipped marker to place witness marks on each half of the assemble so that upon reassemble the marks and therefore the screw holes will lined up. Remove the rudder mount.

Pre-Tap Rudder Mount with #6 Self-Tapping Screw

Use a self-tapping screw to cut threads into the selected rudder mount screw hole. Tap slowly – Remove and restart the screw at least twice to remove plastic cuttings.

Once the hole is threaded, remove the screw for later use.
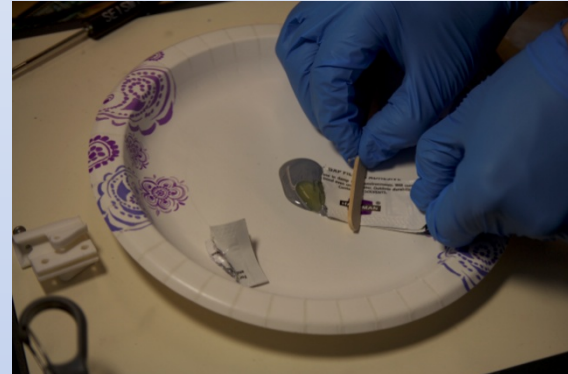
Prepare Waterproof Epoxy
Use Protective Gloves

Slide contents of the epoxy packet* to one side.

Tear open the opposite side.

*For large groups, an epoxy station using a bulk supply of waterproof epoxy (Loctite Marine Epoxy) is recommended.
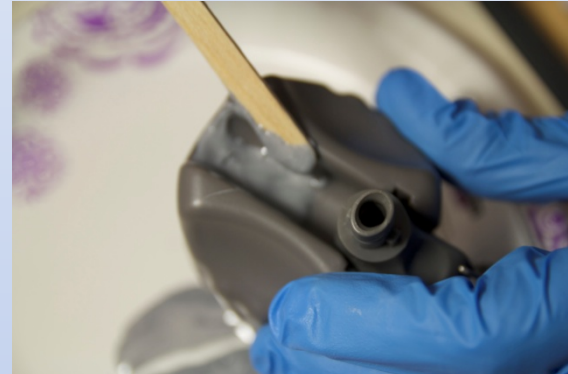
Mix Epoxy Reagents Thoroughly

Use a popsicle stick to squeeze **All REAGENTS** onto a disposable mixing surface.

Mix contents thoroughly to a solid grey color. Work steadily through the rest of these instructions before the epoxy sets-up.
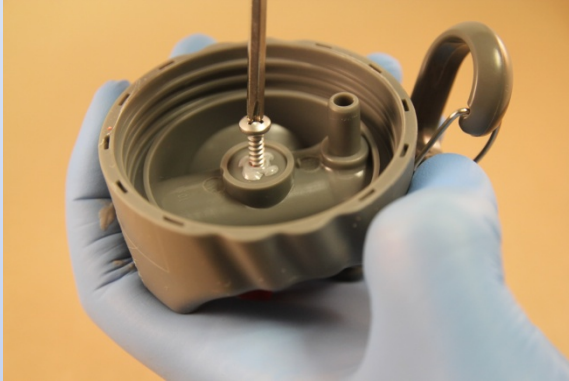
Apply Mixed Epoxy to Cap Channel

Use the popsicle stick to apply epoxy generously - Covering the entire rudder mount area, including the air vent hole.
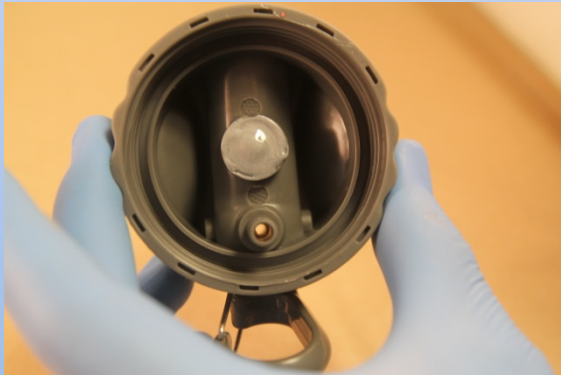

Slide the rudder mount into position. Use the witness marks made earlier to realign the rudder mount screw hole with the vent hole.
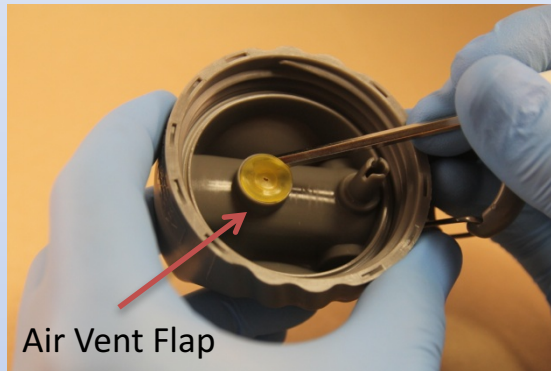
Secure the Rudder Mount

From the inside of the cap, tighten the rudder mount into position with a #6 screw.
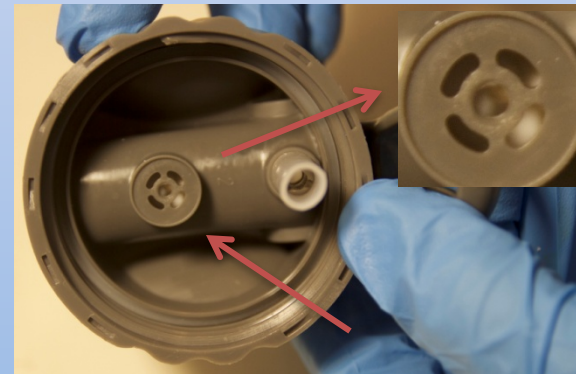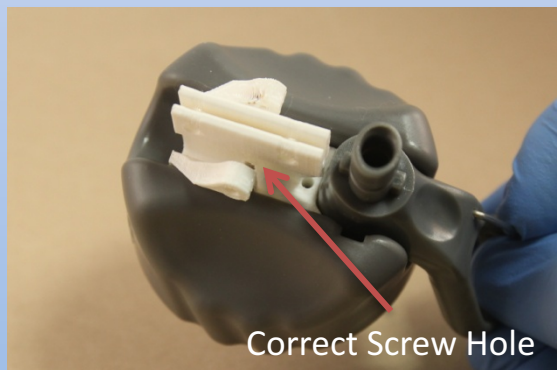

Apply extra epoxy on and around the screw head and around the rudder mount. Set cap aside overnight to dry. After it has dried see slide 19.
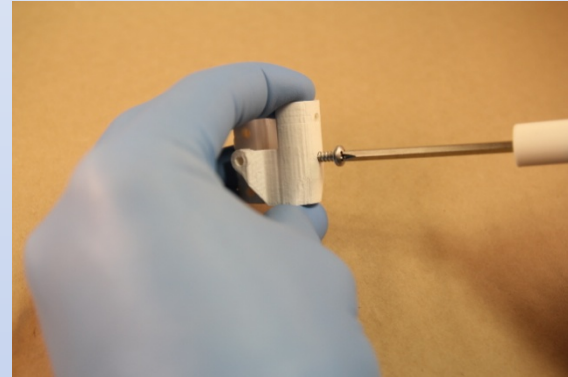
Prepare **Cap 2** for Rudder Mount

Air Vent Flap

Use a flat-head screwdriver to remove the air vent flap from cap then flip the cap over.

Correct Screw Hole

Slide the rudder mount down to the cap nozzle base. The rudder mount and cap vent holes should align. Remove the rudder mount.

Pre-Tap Rudder Mount with #6 Self-Tapping Screw

Use a self-tapping screw to cut threads into the selected rudder mount screw hole. Tap slowly – Remove and restart the screw at least twice to remove plastic cuttings.

Once the hole is threaded, remove the screw for later use.

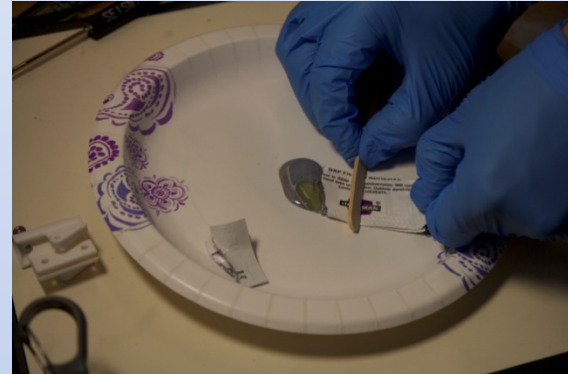# Prepare Waterproof Epoxy
Use Protective Gloves

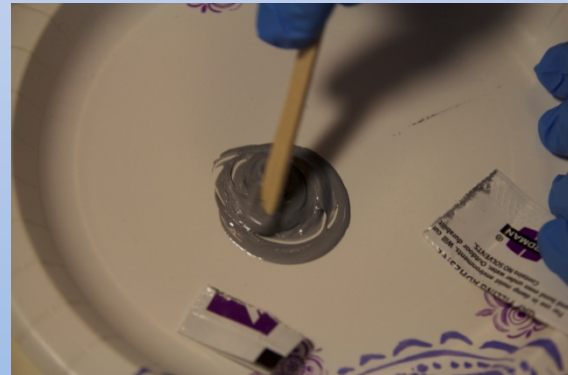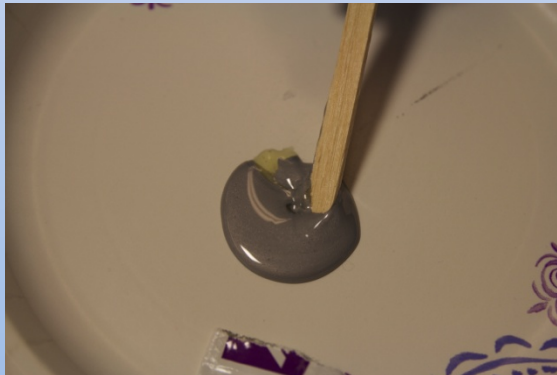Slide contents of the epoxy packet* to one side.

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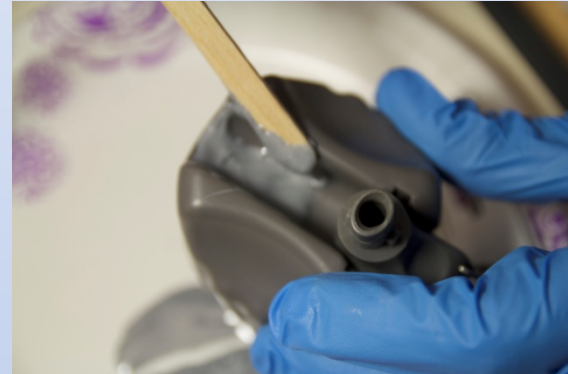# Mix Epoxy Reagents Thoroughly

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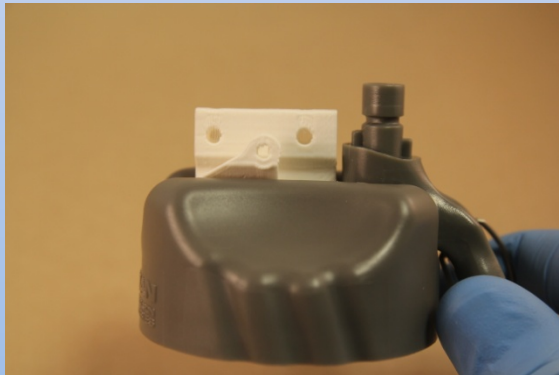

Mix contents thoroughly to a solid grey color. Work steadily through the rest of these instructions before the epoxy sets-up.
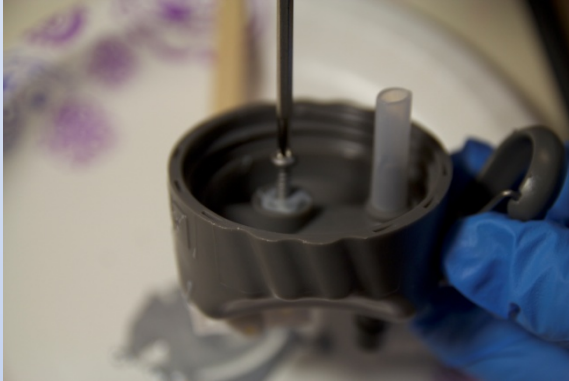
Apply Mixed Epoxy to Cap Channel

Use the popsicle stick to apply epoxy generously - Covering the entire rudder mount area, including the air vent hole.
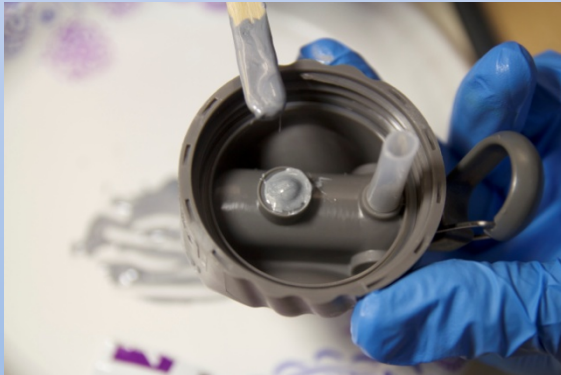

Slide the rudder mount into position. Although epoxy will obscure the view, the rudder mount screw hole should align with the vent hole.

Secure the Rudder Mount

From the inside of the cap, tighten the rudder mount into position with a #6 screw.
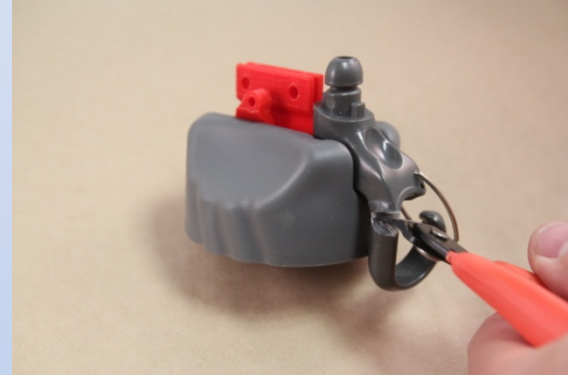

Apply extra epoxy on and around the screw head and around the rudder mount. Set cap aside overnight to dry. After it has dried see next slide.
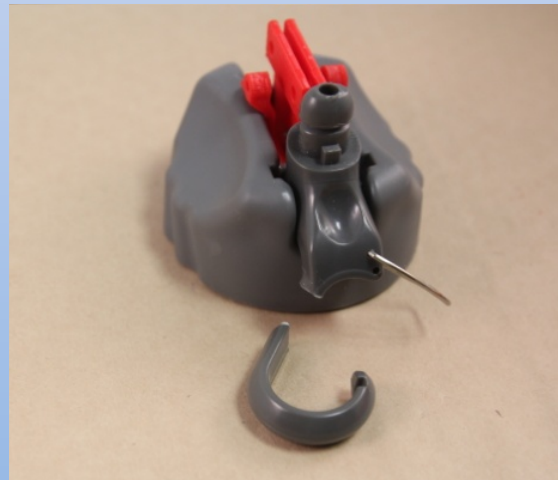
Remove J-Hook & Clip from Cap

The purpose of this procedure is remove the J-hook and wire clip from the bottle cap. This decreases drag and provides more space for ballasting. Safety goggles are a must for this operation.

Remove the Plastic J-Hook

Use flush cutters to cut plastic J-hook at its base and remove.

Remove the Wire Clip

Use needle-nose pliers to dislodge and detach the wire clip .

Discard wire clip and J-hook.