

Gunwale (Canoe Rails) Repair Guide

Aluminum Gunwale Repair

As a lightweight option on our composite hulls, Mad River Canoe offers black powder-coated aluminum gunwales. A low-maintenance alternative to the traditional ash, aluminum gunwales save approximately 3-5 pounds per canoe.

When ordering replacement vinyl gunwale be sure to request the correct length - order rails longer than your canoe.

Canoes are measured straight down the keel line. Gunwales take a bit more circuitous route getting from end to end. Aluminum rails come in three sizes, 15', 16' & 17'.

Place orders for replacement gunwales through your authorized Mad River [dealer](#).

Specify your model of canoe and hull material when ordering gunwales to ensure compatibility.

Replacement aluminum gunwales are available for all current models of composite Mad River Canoes, with the exception of the Winooski and Missisquoi models. If you are uncertain of which model canoe you own, provide the serial number as an alternative. Serial numbers are located on the right side of the stern, just below the gunwale. It will either be engraved on a small brass plaque, or stamped directly into the hull. If it is difficult to read, try making a rubbing with a pencil and a small piece of paper. In the event that the model name is unknown and the serial number is completely unreadable, measure your canoe from stem to stem and width at center and we will approximate as best we can.

Unlike wood gunwales, aluminum gunwales require only two rails per canoe.

Aluminum gunwales are a "unibody" one- piece construction that incorporates inwale and outwale into one piece.

It is recommended that you order replacement rails pre-bent to fit your particular canoe.

Straight aluminum rails cannot be bent "onto" a canoe hull but must be pre-bent on a jig before installation. If you want to install aluminum gunwales on an older model Mad River canoe, you will need to come up with some kind of bending jig. A canoe hull is not strong enough to provide enough resistance to bend an aluminum rail in place as you go. Straight rails are available if necessary. Please specify.

If you are replacing ash gunwales with aluminum, your canoe will require different seat hangers or trusses and will require appropriate decks.

These components are available from your authorized Mad River Canoe [dealer](#).

Replacement rivets are required for both replacement and new installations.

If you are removing existing gunwales the rivets will be destroyed in the process. The "average" installation requires 70+/- 5/32" diameter Buttonhead aluminum rivets with aluminum mandrels with grip range of 3/16" to 1/4". Rivets are available in packages of 80 from Mad River Canoe via your authorized [dealer](#).

Black plastic caps will be needed to cover seat, carry handle, yoke and thwart mounting hardware.

These will range in quantity for 14 to 18, depending on outfitting for your particular boat. Each seat will require 4 caps, each carry handle 2, each thwart 2, each yoke 4. If you are replacing original aluminum rails it is likely that the existing caps can be reused. If you are replacing a different gunwale system, these caps can be ordered from your authorized Mad River Canoe [dealer](#).

Due to their length, aluminum gunwales cannot be shipped via UPS.

One alternative is to ship by common carrier (via truck) but this is expensive (approximately .00 - 0.00). Gunwales shipped via common carrier will be sent freight collect (payment due on receipt). The best alternative is to arrange shipment of gunwales to accompany a shipment of boats to your local dealer. If this can be arranged, there is no freight charge for the gunwales.

TOOLS & MATERIALS REQUIRED

Variable Speed Reversible Drill	20' Tape Measure
5/32"; 13/64"; 25/64" Drill Bits	Wax or Grease Pencil, or non-permanent marker
Pop Rivet Gun	4 Quick-Grip, spring or Bar clamps
Buttonhead aluminum rivets with aluminum mandrels (5/32" diameter); grip range: 3/16" to 1/4"; Hole diameter .160 to .164	Prick or Center Punch
Rubber Mallet	Duct tape

Procedure:

1. Mark location of all seats, thwarts, etc. on inside of hull with grease pencil or washable marker. Once original rails are removed, the proper locations for these fittings will be lost if not noted.
2. Run tape measure around hull just below existing rails. Mark center point on each side of hull just below rails. These will serve as centering marks for replacement gunwales.

3. Remove all seats, thwarts, yokes, etc. from canoe. Mark side to side reference on seats thwarts, yokes, etc. so that reinstallation will be consistent with original. Label and attach all hardware so that it can be reused in original position.
4. Remove old gunwales.
 - 4a. If you are replacing ash gunwales, simply remove all screws in the gunwales and the decks.
 - 4b. If you are replacing aluminum gunwales, tape existing gunwales in place by applying duct tape in strips from outside of hull, over gunwale, to inside of hull. Position tape so that it does not cover any rivets. Taping the gunwale will keep the gunwale in position as the rivets are removed and prevent the gunwale slipping or springing free and scratching hull or striking someone. Drill out the existing rivets with a 5/32" bit. Drill from the inside of hull, centering drill on head of rivet. You will need to continue all the way through the rail and hull. The rivet should then slip out easily. First drill through the rivets which attach the decks at either end of the canoe, and then drill out the rivets which attach the gunwales.
5. Once all the screws have been removed, or all the rivets have been drilled out, carefully separate the gunwales and decks from the hull and set them aside.
6. Clean exposed hull surfaces with GB-60 or a good household cleaner.
7. Set replacement gunwales on the ground next to your canoe hull. The replacement gunwales should be pre-bent, and cut at either end at an angle to fit new decks. If you are working with straight gunwales, now is the time to use your bending jig to pre-bend the gunwales to fit your canoe.
8. Using tape measure, locate and mark the center point of the replacement gunwales with grease pencil. This mark will line up with the center point you have marked on either side of the hull once the rail has been slid onto the hull.
9. Position one rail over side of hull, aligning center marks. Push rail down onto hull. Do not attempt to start at one end and push/slide rail down hull towards other end. This will scratch and possibly crack hull laminate. It is easier to start at one end and push rail down onto hull working towards opposite end. Looking down hull, make sure that edge of hull does not cross to outside of gunwale. If this happens and you are pushing rail down you can cut hull laminate. Having a second person assist you in this process is a big help. Thump rail down gently with palm of hand. Do not use mallet at this time to seat gunwale. Check periodically to be sure center points are aligned. If you need to move the rail backwards or forwards to line up the center marks, gently tap the end of the rail with a rubber mallet until the marks line up.
10. Once gunwale is in place over hull go back down length of gunwale tamping gently with mallet to fully seat gunwale over hull. Clamp rail to hull at approximately $\frac{1}{4}$ and $\frac{3}{4}$ of the length of the rail with 2 clamps to secure in position.
11. Repeat process with second rail on other side of hull. Make sure rail ends are even, tapping end of rail with mallet to align, if necessary after removing clamps. Reinstall clamps after ends are aligned.
12. Drill holes through cut end of each rail with 5/32" bit, within $\frac{3}{4}$ " of the each end. Holes should be drilled from the outside of the rail. Place rivets through each hole after each is drilled. Once you have drilled all four go back and secure rivets with rivet gun. Slide rivet gun over rivet stud to point where head of gun is flush with head of rivet. This is most easily accomplished by making

sure handles of rivet gun are fully released. Squeeze handles together to snap rivet. It may be necessary to squeeze more than once to get rivet to pop. If one pull doesn't do it, release handles and slide gun forward until head of gun and head of rivet are again in contact and then squeeze handle. Keep rivet gun aligned level with rivet. Do not attempt to "help" the process by bending or "torqueing" the rivet gun. This can result in rivet stud being jammed in rivet gun.

13. Starting from stern end of each rail (end of canoe with serial number on right side), measure and mark locations of rivet holes on flat flange of inside of rails with grease pencil. The first rivet holes should be located 6 ½" from the end of each rail, and the second rivet holes should be located 7 5/8" from the first measured hole. Each successive rivet hole should be located 6 ½" from the previous one. Continue measuring and marking rivet hole locations until you reach the bow end of the rails. Do not be concerned if the distance between the two rivet holes nearest the bow is different from all previous distances.

14. Step back and "eyeball" each gunwale to make sure it is "fair" and follows sheer line of hull. Gently tap down any high spots or rises in gunwales.

15. Drill holes at all marked locations with a 5/32" drill bit. Holes should be drilled from the inside of rail, and should penetrate inside of rail and hull, but should not protrude through outside of rail. The rivets should be visible only on the inside of hull/gunwale. Measuring width of gunwale and wrap tape at corresponding length of drill bit will help prevent accidentally drilling through the outside of the gunwale.

16. Place rivets in all drilled holes and secure with rivet gun.

17. Mark locations of seats, thwarts, yokes on top of rails. The marks should be located on the inner half of the rail, such that a hole drilled straight down would penetrate the upper and lower half of the rail without contacting the hull itself. Position prick punch on mark and tamp with hammer to indent top of rail. The dent will help stabilize drill position and keep bit from slipping.

18. Using the 13/64" bit, drill straight down through the rail at all marked locations. This should include holes for the bolt hangers for the carry handles (two holes per each handle); seats (four holes per seat); thwarts (two holes per thwart), if applicable; and yoke (four holes total).

19. Changing to the 25/64" bit, enlarge all the holes you have just drilled, through the top of the rail only. This will allow the heads of the bolts which the seats, thwarts, and yokes hang from to pass through. The hole through the bottom of the rail should remain at the 13/64" size. To be sure to drill through top of rail only, wrap some tape around drill bit approximately 1/4" from tip and insert drill bit only until it contacts tape.

20. Hang seats, thwarts, yokes, etc. from rails, and tighten all hardware. NOTE: If you are replacing ash gunwales with aluminum, you will need kerfed trusses, and/or seat hangers, in order to accommodate the lip of the gunwale. Tighten hardware fully.

21. Insert black plastic caps into the holes used to hang seats, thwarts, etc. in the top of the gunwales.

22. Slide decks over cut ends of rails. Using 5/32" bit, drill holes for rivets through lower lip of deck and through hull. Each side of the deck should get two holes, one in each end. Place rivets through holes (four total), and pop with rivet gun.

Care and maintenance of aluminum gunwales

Aluminum gunwales are basically care free. Over time and use, the black powder coating can be abraded, revealing the natural silver color of aluminum. This is a cosmetic issue only, the function and durability of the gunwale is not affected. If you want to restore the black finish, lightly sand area with fine grit sandpaper and paint with a flat black enamel. Multiple light coats will be longer lasting than one heavy coat. Please note this will not be a permanent "repair" and will likely need periodic repainting.