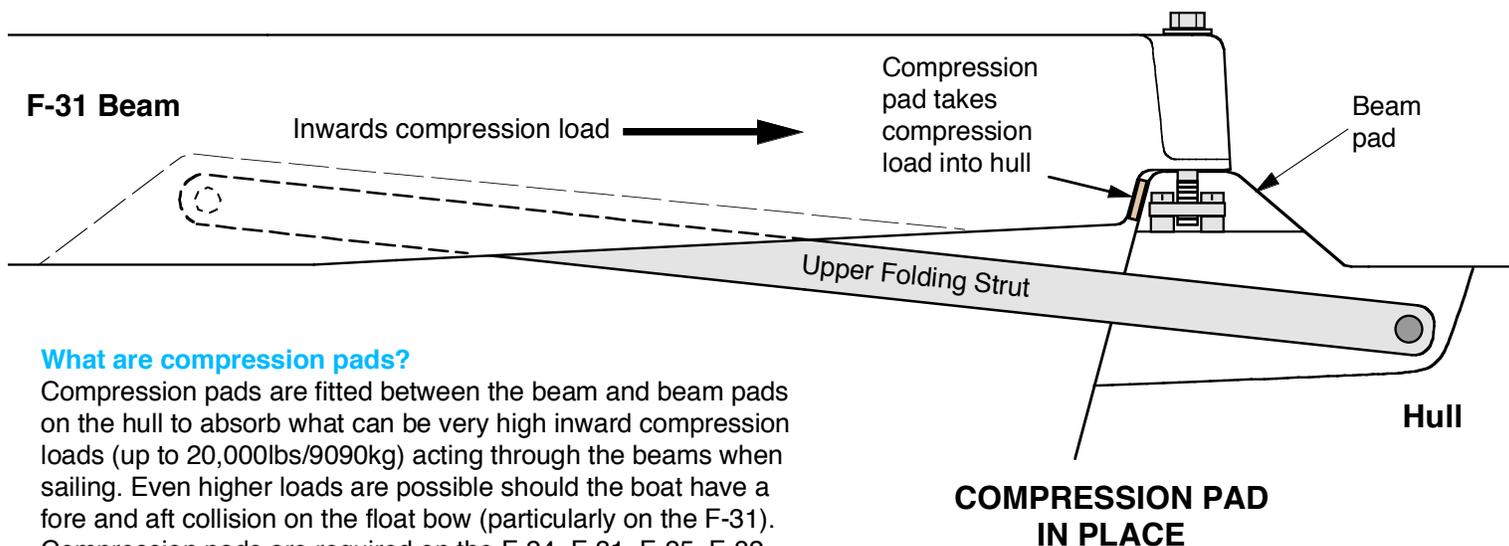


F-BOAT OWNERS BULLETIN

COMPRESSION PADS AND THEIR MAINTENANCE

December 31, 1999

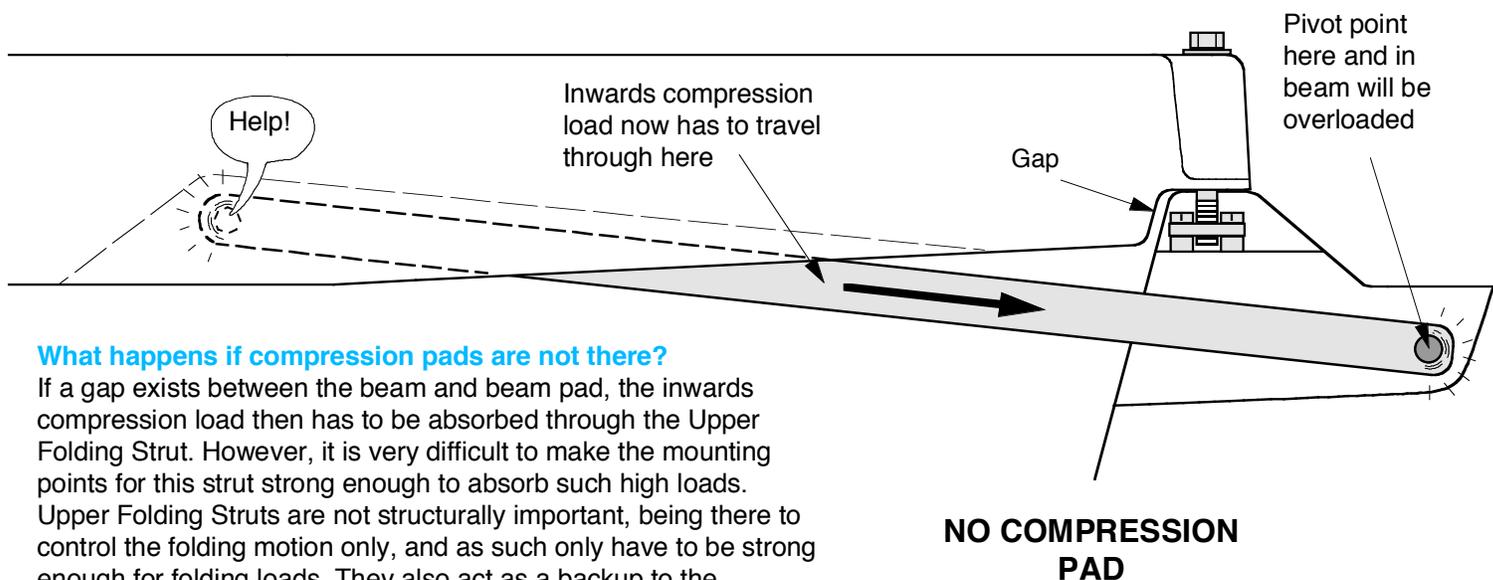


What are compression pads?

Compression pads are fitted between the beam and beam pads on the hull to absorb what can be very high inward compression loads (up to 20,000lbs/9090kg) acting through the beams when sailing. Even higher loads are possible should the boat have a fore and aft collision on the float bow (particularly on the F-31). Compression pads are required on the F-24, F-31, F-25, F-82, and F-9A. They are not structurally necessary on the F-27/F-28, their folding struts being stronger than required. However, their use can help improve overall boat stiffness.

Why are compression pads needed?

A boat built in a perfect environment would not need any compression pads as the beams could mate perfectly against the beam pads every time. However, a fiberglass production environment is not perfect, with fiberglass shrinking at different rates as it cures, and certain production tolerances are necessary during assembly. Thus every boat is slightly different and the final gap between the beams and beam pads can vary from zero up to 3/8" (9mm)



What happens if compression pads are not there?

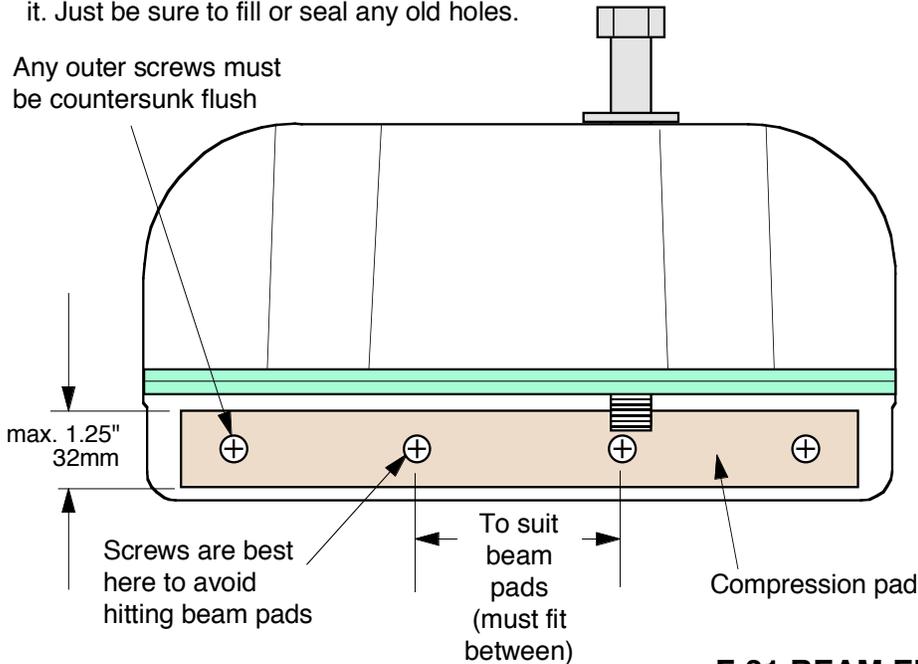
If a gap exists between the beam and beam pad, the inwards compression load then has to be absorbed through the Upper Folding Strut. However, it is very difficult to make the mounting points for this strut strong enough to absorb such high loads. Upper Folding Struts are not structurally important, being there to control the folding motion only, and as such only have to be strong enough for folding loads. They also act as a backup to the compression pads, but cannot take the full sailing loads for an extended period of time. A good sign that the compression pads need checking is a creaking noise from the inner beam end. Eventually the mounting points will start to fail, which can be an expensive repair. The boat can still sail safely with damaged U.F. Strut mounts, but folding may become slightly more difficult.

How are compression pads made and fitted?

Compression pads are usually made from a good engineering plastic, such as Acetal, Nylon or UHMW polyethylene. An aluminum or fiberglass strip/bar could also be used

Another method used by F-9A builders is to mold a pad in place from a high density epoxy mixture, for a perfect fit.

If very thin (less than 3/16"/4mm), pads may need to be glued on. Plastic can be hard to glue reliably and in this case a fiberglass strip may be best using an epoxy glue and pan head screws near the center. Drawing below shows a typical F-31/F-9A compression pad held in place by four #8 screws (3/4"/20mm to 1"/25mm long), though two near the center would be enough if combined with an adhesive. Should a screw hole be stripped then just drill a new one - the beam end is very tough/thick and it would take 30 or more screw holes to weaken it. Just be sure to fill or seal any old holes.



Pad/shim upper edge must not sit on corner radius

Packing shims can be used here to achieve a perfect fit.

Thickness will depend on boat.

Self tapping screw

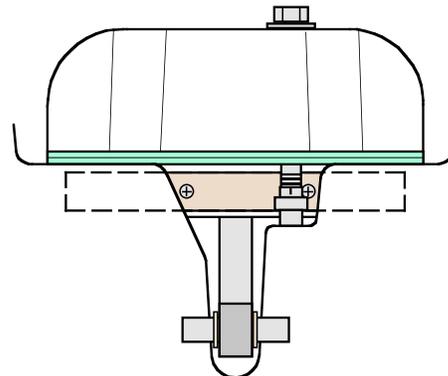
This detail diagram shows a self-tapping screw being driven into the beam end. The screw is shown at an angle, with its tip penetrating the material. The upper edge of the pad/shim is shown resting on the corner radius of the beam end. A note indicates that the thickness of the pad/shim will depend on the boat.

F-31 BEAM END WITH COMPRESSION PAD

(F-24 is similar)



Any shims must be full width (not washers)



BEAM END IN PLACE
(looking outwards)

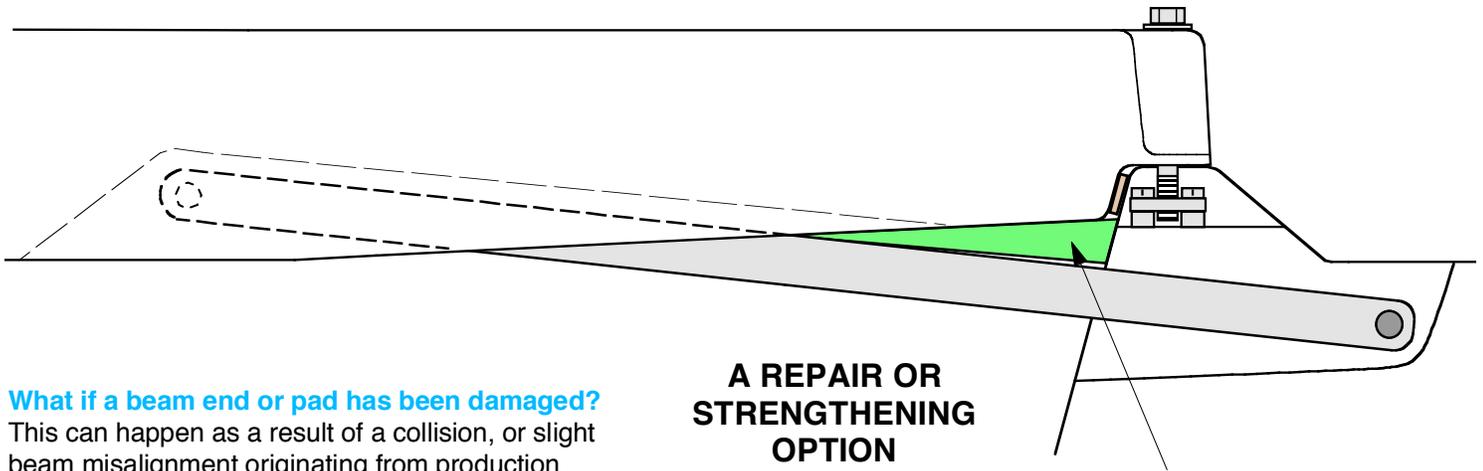
What is an acceptable gap?

Around 1/32" or just under 1mm. Too little and it may be hard to fully seat the beams down onto the pads. Too much, and the Upper Folding Struts can be overloaded. Gap is best checked just after the boat has been unfolded, and there is a light to moderate tension on the rig to hold up the float. If the floats are hanging free, such as on a trailer, they will pull the beams down and outward, taking up any slack in the folding system and opening up the gap. Slack is usually small but it is greatly magnified at the beam end, and will give a false reading for the compression pad thickness required.

A simple check when sailing is to rest your hand on the beam ends and feel if there is any in and out movement. If this feels excessive then the compression pad thickness needs to be increased. The ideal pad thickness is to prevent any movement, but not so thick to where it jams against the beam pad making it hard to fold

Shims make it easy to adjust thickness as required, and almost any good plastic could be used for this - even the side of a 1 gal plastic milk container may do. **Don't use washers**, as these do not have enough surface area.

ADDITIONAL USEFUL INFORMATION



What if a beam end or pad has been damaged?

This can happen as a result of a collision, or slight beam misalignment originating from production tolerances. Visible damage from a collision may include cracks in the beam end radiating out from the pad area, while a crushed or damaged compression pad along one side or corner may also indicate misalignment of the bearing area between the beam end and hull pads.

A damaged beam end can be repaired, and a separate repair procedure is available for this. A quick and easy fix is to fit additional hardwood compression blocks under the beam as shown to divert the compression load away from the damaged area.

Such blocks can also be used to eliminate any damaging point load on compression pads from beam misalignment. They do this by supplementing existing compression pads and increasing bearing area. Another way to cure misalignment problems is by molding compression pads in position for a perfect fit.

Two compression blocks are used per beam from a min. density 40lbs/cu ft. (680kg/cu.m) durable hardwood. Grain to run athwartships (along beam). Glass over blocks with two layers of an 8oz/270gm cloth & epoxy resin.

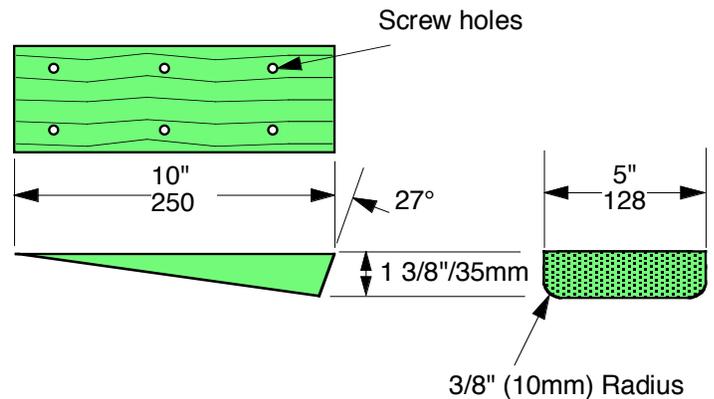
To fit, fully extend floats with shrouds being tensioned just enough to take weight of floats. Beam bolts are then tightened. Position hardwood blocks, flush with beam sides. Hold firmly & evenly against beam pads on hull. Drill six #10 (4mm) screw holes into beam bottom. Mark position.

Sand and de-wax gluing area thoroughly (important) and then screw & epoxy glue blocks in position, checking that they still bear evenly against beam pads. Any gaps along beam edges can be filled.

Finally, check beams fold normally - if compression blocks are bearing too tight against hull beam pads, they may have to be sanded back slightly.

A REPAIR OR STRENGTHENING OPTION

Additional hardwood compression blocks epoxy glued in place.



Hardwood Blocks

