

## March 2018 Newsletter



Due to Steve's travel schedule, the Photo Essay will be a month off. Please look for its return in April.

### Ask Steve

**Steve,**

I have a question based on your article Water Heater Primer. I completely agree that an anti-scald mixing valve should be installed at the water heater. However, all of the anti-scald mixing valves I can find information on specify a minimum water pressure requirement of 30psi. My boat and I am sure many others use a small pump that only provides about 20psi pressure according to their specifications. Do you know of a suitable anti-scald mixing valve that will operate at 20psi water pressure? Thank you for taking the time to read this.

Roy Stephen

**Roy:**

It's important to draw a distinction between anti-scald valves and mixing or tempering valves. The latter are, I believe, what you are referring to, they are used on water heaters to lower the temperature of water supplied by water heaters, thereby extending the hot water supply, by allowing the water in the water heater to be maintained at a higher temperature. They can also be used to lower the temperature of the water supplied by the water heater when that water is being heated by engine coolant. Tempering valves cannot be considered anti-scald protection because their reaction time is too slow.

While it's far from a guarantee, in spite of their published pressure ratings, I've never encountered a problem with a mixing valve not operating because water pressure was too low. Having said that, if you are unable to locate a tempering valve with a lower pressure rating, you might try it with your existing pump. If it doesn't work then I can see no other alternative other than installing a higher pressure pump, or adjusting its pressure switch (some pumps use an adjustable switch).

**Dear Steve,**

I have been searching for a better way to align marine drive trains. Something better than the old feeler gauge method.

We service sail and powerboats up to approx. 80'.

Presently we have a 49' Grand banks with vibration issues and thought this might be an opportunity to purchase a laser alignment set up.

Do you know who sells such a tool for boats in the size category we service? Or do you know of a yard that has fabricated a tool for this purpose?

Appreciate your help.

Sincerely,

Jay Knobbe

**Jay:**

I'm afraid I know of no off the shelf laser shaft alignment product. When I first began doing laser alignments, nearly twenty years ago, there was such a product, however, it's no longer available. Since I've written about this procedure many yards have asked me about this, and I've directed them to generic laser alignment tools, which they've adapted for shaft work by making clear plastic cylinders, which are inserted into cutless bearings and shaft couplings, to be used as targets, along with a holder for the laser to be placed, again, in the cutless bearing facing forward, or coupling facing aft. The parts must of course be precision machined, however, using plastic that isn't difficult. I suspect you can purchase all the necessary parts from [www.mcmastercarr.com](http://www.mcmastercarr.com).

**Hi Steve,**

We're building a 38' E-glass/composite sportfisher and wanted to know about galvanic corrosion hazards between aluminum and stainless steels. For example, fabricated aluminum tanks or aluminum mounting brackets that may be in direct contact with stainless fasteners, or otherwise have contact with other stainless mounting components.

Thank you again for your very informative e-zine.

Tony Dean

**Tony:**

While aluminum and stainless steel are not necessarily "friendly" to each other, from a galvanic corrosion perspective, they are considered compatible, particularly if the interface area isn't exposed to water. Aluminum tanks and stainless fasteners aren't much of an issue if they remain relatively dry. If, however, they are routinely submerged in bilge water (a problem for any aluminum tank regardless of the presence of stainless steel), that would be a problem. When stainless steel and aluminum must be in contact with each other, insulating them with a polyurethane bedding compound will often stave off most if not all corrosion problems. The goal is to exclude moisture or free water from the interface area, often a bedding compound does this more effectively than a non-metallic insulating shim.

**Steve:**

I have previously attended one of your lectures and have certainly benefited from reading your articles and newsletters. We have a 48 foot Kadey Krogen which we had made in 2011 and every year we spend about 6 months aboard in the winter time cruising the Bahamas. The boat has really been a pleasure to own and we have had very few unexpected difficulties. However we do have one area that is an annoyance and it is the use of aluminum with stainless steel fasteners in some of the components and walking many marinas it appears that it is a very common problem. Perhaps in some of the components such as the Diamond Seaglaze doors, or the Steelhead davit stainless fasteners are necessary (perhaps) for strength in some locations. In other areas such as aluminum vents etc. I don't see that there should be any great need for an extra strong stainless screw. I think that the airplane industry uses a lot of aluminum in their construction and would imagine that corrosion is an even a more dreaded thing in that situation. I'm also of the

belief that static electrical charge is an ongoing issue with airplanes. When you board an airplane and look at the door frames they certainly utilize bolts and screws in fastening them to the airframe which is also painted and they never show any corrosion or the typical bubbling of paint that we have to put up with on our boats and I believe that they also use the same kind of paint.

So I guess my question is if the airplane industry has solved this problem could the boating industry not have a look at what they do? Perhaps there are airplane grade aluminum fasteners etc. that could be utilized in boat construction where aluminum is involved. I can't see where a couple of hundred specialized aluminum fasteners could be such a price that they would be extremely material in the pricing of boats. I have gone through all of the areas on board our boat that I mentioned and removed all of the fasteners that I could and made sure that there was ample Teff Gel used when I refastened them That certainly seems to have helped but it doesn't solve the problem. Do you think that there is a type or grade of fastener that I might purchase to replace the stainless steel ones after repainting and touching up the paint so that it is not a continuous problem?

Thank you,

Perry Stickle

**Perry:**

You've posed an excellent question on a subject about which I'm passionate, paint, aluminum and their interaction. While there is some degree of galvanic incompatibility, and thereby galvanic corrosion, between stainless steel and aluminum (because aluminum resides in a very ignoble location on the galvanic series, it will interact with virtually any metal, not just stainless steel, when exposed to an electrolyte), the issue surrounding paint failure on aluminum is more a case of poultice corrosion. That is, areas where fasteners, and their holes, penetrate paint, breaching its otherwise contiguous coating, allow water to migrate into, and become trapped between the paint and aluminum substrate. Poultice corrosion sets in when the aluminum is exposed to this stagnant, oxygen depleted water, which in turn creates aluminum hydroxide, which in turn creates the unsightly paint blisters associated with this phenomenon. The fact that the fastener is stainless steel plays only a small part, and I strongly suspect it would change very little if aluminum fasteners were used. I also suspect this is less of an issue in the aviation industry because of the engineering that goes into fuselage design, all sharp edges are rounded (sharp edges promote paint failure), rivets are faired smooth and then they and the aluminum skin are painted. Additionally, aircraft are inspected for this issue regularly and repairs carried out as soon as paint failure becomes evident. This article covers aluminum corrosion issues:

<http://stevedmarineconsulting.com/wp-content/uploads/2014/03/Aluminum-Corrosion-Cruising-World-May-2017.pdf>.

The real key to preventing paint failure on aluminum substrates is ample bedding. Each time a fastener is screwed into, or hardware installed over, a painted aluminum structure, it fractures the paint, even if only microscopically. Each fracture becomes one of the aforementioned water ingress locations. If, however, fasteners and hardware are thoroughly bedded in polyurethane sealant, the fractures are sealed, and the incidence of paint failure is diminished dramatically. For more on this subject, see

<http://stevedmarineconsulting.com/paint-and-aluminum-how-to-ensure-a-good-mix-2/>.