



Technical Pull-Out

Q&A FOR YOUR CATALINA THAT'S BEEN FACTORY APPROVED FOR ACCURACY

Catalina 470 National Association



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Little Things That Can Bother and Bite

Our vessels are a complex system of systems. Catalina, through good design principles and choice of components, has managed to make this complexity reasonably reliable and trouble free. In this Tech Note, I want to call attention to two components that silently do their job out of our view without problems for long periods of time: anti-siphon loops and hose clamps. These simple components serve us well and long but they can fail and cause bother and, occasionally, a serious bite.

Anti-siphon loops

Our vessels have many through hull connections where there is a potential to establish a siphon effect that can potentially flood and sink a boat. To prevent this, anti-siphon loops (aka vacuum breaks) are installed and are located on the pressure side of the pump. For intake, the arrangement is: through-hull valve – pump – anti-siphon loop – boat-system component (head, raw-water cooling system, etc.). For discharge, it is: boat-system component – pump – anti-siphon loop – through-hull valve.

These important devices consist of an inverted U-tube that has a threaded nipple at the apex. A cap on this nipple has a central hole and retains a rubber duck-bill valve. When liquid is pumped toward the loop, the duck-bill is compressed closed and the liquid flows through the U-tube and out. When pumping action is

stopped, liquid is pulled by gravity down both sides of the U-tube creating a vacuum at the apex and air is pulled in through the duck-bill breaking the vacuum and preventing siphoning of seawater into the boat. If you listen carefully under quiet conditions, you will hear the siphon "break". To be effective, the anti-siphon loops must be mounted high enough so that they will be above the water line when the vessel is heeled.

The duck-bills can become obstructed by buildup of mineral deposits or waste to the point where they cannot open. When this happens they cannot break a vacuum and prevent the formation of a siphon. Vessels have been sunk due to failure of the duck-bill valve to open properly. Thus, it is important to periodically inspect the duck-bill valves in each anti-siphon loop and clean or replace them as necessary. A selection of each of

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the different sizes of rubber duck-bills should be carried as spares. A list of the locations of the anti-siphon loops and a record of their inspection and maintenance should be maintained for the vessel.

Here is a rundown of the standard anti-siphon-loops on a Catalina 470 (other anti-siphon loops may have been added during installation of after-market equipment):

Vessel Area: Forward head compartment.

Location: Behind the access panel at aft end of the portside cabinet.

Purpose: Overboard waste discharge line.

Purpose: Sea water intake line for forward head flush.

Purpose: Sea water intake line for generator cooling system. (Location may vary with after-market generator installations.)

Vessel Area: Galley

Location: Sink cabinet, inboard inside upper stern corner.

Purpose: Grey water pump discharge line.

Vessel Area: Nav Station.

Location: On hull behind upper (AC) electrical panel.

Purpose: Rear head direct-discharge line.

Vessel Area: Engine Compartment

Location: Port side on bulkhead of galley cabinet. (Note: on early production C470s, the anti-siphon loop was mounted behind the bulkhead and is reached from the access panel at in master stateroom aft of the engine – a challenge.)

Purpose: Engine raw water supply.

Vessel Area: Aft shower compartment.

Location: Starboard side on hull behind shower cabinet.

Purpose: Sea water intake line for aft head flush.

A sound practice is to inspect, clean or replace each of the duck-bill valves once a year. The duck-bills are notorious for slipping out of one's hand and disappearing into the bowels of the vessel, so always have spares available when doing the inspection.

Hose Clamps

Where would we be without hose clamps? They seem to be ubiquitous on a boat. Their bright side is the wide variety of applications they can be used for (besides their intended use) and their ability to do the job well and unattended for long periods of time. But they have a dark side: there is great variability in the quality of the stainless steel used by various manufacturers that can lead to rapid corrosion and failure. Failure due to fatigue is not uncommon. When it comes to hose clamps you get what you pay for – beware of the cheap imports.

A less obvious problem is the fact that hose material can deform over time to the point where the clamping force is lessened and leakage begins. The initial minor leakage can lead to corrosion and failure of the clamp and, potentially, to a catastrophic leak.

A good maintenance practice is, once a year, to start at one end of the vessel and inspect every hose clamp by gently torqueing the tensioning screw. You will be surprised at how many need substantial tightening. It will not be unusual to find one or more that have badly corroded and/or fractured.

A good maintenance and safety practice is to carry multiple spares of each size of hose clamp. You won't regret it as there can never be too many extras aboard. Include some very large ones as they can be useful for emergency repairs.

Hose clamp fracture due to corrosion and/or stress is the reason why all connections that could have a serious impact on vessel safety should have double clamps (and these arranged to tighten in opposing directions).

In areas where there is high vibration and/or temperature (e.g. on the engine), standard hose clamps with perforations used to adjust them with the tensioning screw can significantly abrade and weaken the surface of the hoses. In these critical areas, band clamps that have a smooth surface in contact with the hose, while more expensive, are a good investment. I recently replaced all engine hoses on *Onward* and switched to band clamps.

As any boater has painfully learned, hose clamps need to be handled carefully to avoid a painful cut. Recently, a good friend's finger was cut by a hose clamp and the wound became infected to the point where two hospitalizations and two surgeries were required to stem the infection. So, take care. Tape over obvious threats. Check out the plastic end protectors that have recently come on the market.

Lists are good on a boat, so as you do your yearly stem-to-stern hose clamp check make a list or a schematic to help you with this task in the future.

A good maintenance and safety practice is to carry multiple spares of each size of hose clamp.