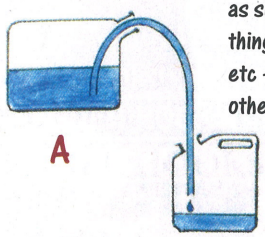
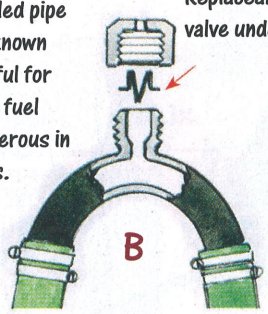
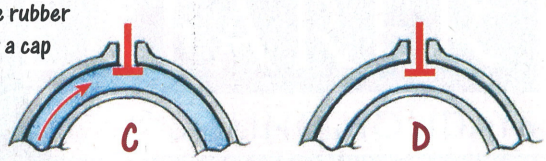
Dick Everitt explains anti-siphon valves and vented loops

A. Given the right conditions, a liquid in a completely filled pipe can flow uphill. This is known as siphoning and is useful for things like transferring fuel etc – but it can be dangerous in other enclosed systems.

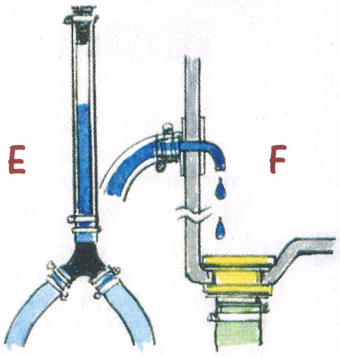




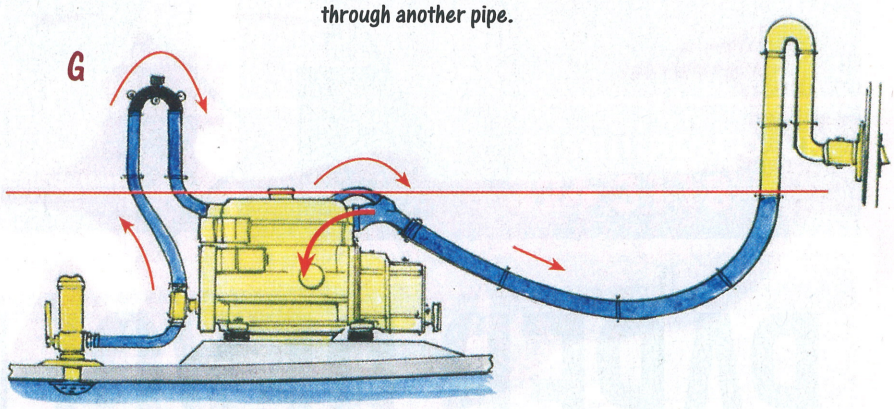


B. To prevent liquid siphoning through pipework, anti-siphon bends or vented loops are installed above the waterline. They often have some sort of valve at the top – but this can fail so needs regular checking.

C. Pressure in the pipes closes the valve, but when the pressure is released the valve opens (D) letting in air, which prevents siphoning. To see if it's working, blow in the top through another pipe.



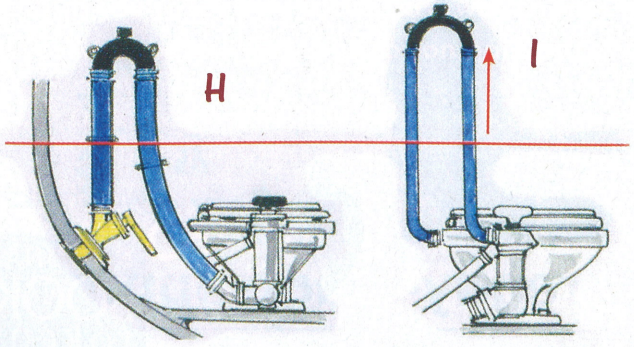
E. Because valves might stick shut, some people raise them above the 'water pressure head' to stay dry. Others don't use a valve and instead just have a bleed draining overboard, or down a cockpit drain (F). This last idea is good on the engine cooling system as the tell-tale flow acts as a constant reminder that water is getting into the system.

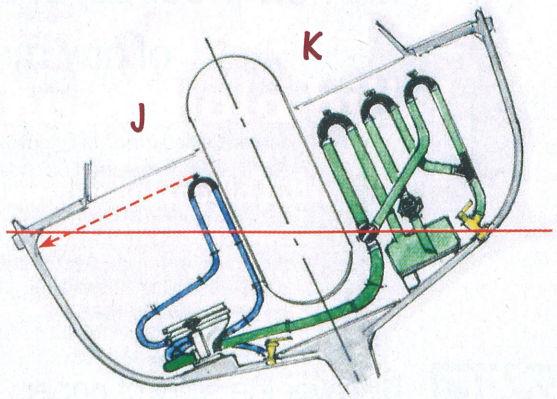


G. If the engine is below the waterline, the cooling water inlet pipe should have an anti-siphon break above the waterline. But if the valve sticks closed then water could siphon in, past the pump, through the engine cooling galleries and out into the exhaust pipe. Here it will collect until it reaches the water level outside, and if you're really unlucky is could flow forward, through the exhaust valves and into the cylinders with disastrous consequences for the engine.

H. Heads below the waterline must have vented loops, and when at sea make sure the crew shut off the seacocks after use.

I. The inlet vent should be between the pump and the bowl, so the pump pressure closes the anti-siphon valve.





J. Vented loops need to be well above the heeled waterline. See how this inlet loop would be too low if it was fixed to the side of the hull.

K. Some boats have very complicated systems to ensure the sea can't siphon in through the holding tank pipework.