

Servicing the Bora's cooling system

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It had been some time since my Boar's coolant had been replaced so I decided to go ahead and remove the radiator and service the electric fans while I was at it.

The first step is to drain the old coolant. I looked under the car and could not find access a radiator drain plug. Checked user and parts manual and there was no indication of a drain plug. Since I was planning on removing the radiator, I did not spend a lot of time looking for the drain plug.

Inside the trunk remove the radiator cover and disconnect the two radiator hoses. Once all the old coolant drains out it is a good idea to lift the rear end of the car as this will permit additional coolant to drain. Make sure the heater valve is open (set to hot) so that the coolant within the heater core can drain.



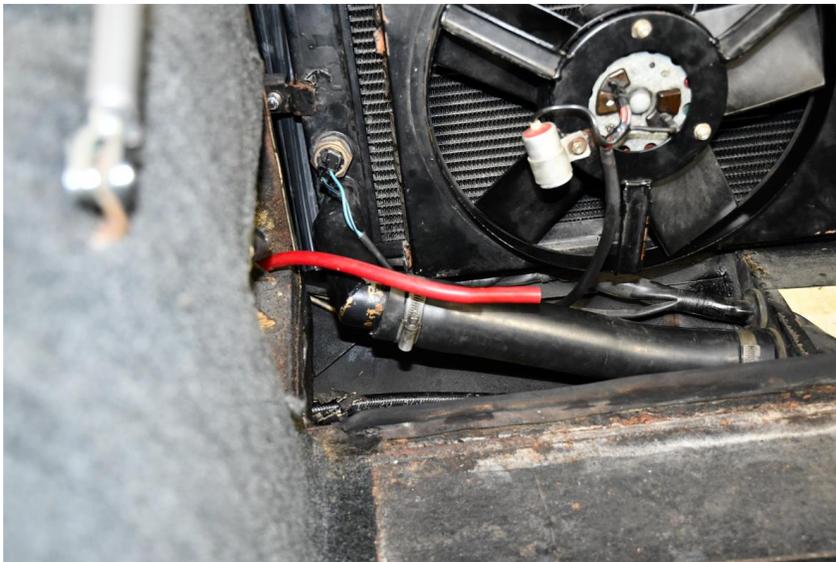
Lift the rear of the car when draining and refilling the cooling system.

To remove the radiator; from the bumper area, remove the four small bolts that hold the AC condenser to the radiator. From within the trunk there are 4 brackets that hold the radiator in place. There is also a small hose that needs to be unplugged located on the top right of the radiator. Now that everything is loose comes the hardest part, which is to remove the two hoses on the bottom of the radiator. The fit is rather tight, and it takes some work to get them out.



Compared to the Ghibli radiator this thing is tiny.

With the radiator out I used a garden hose to clean it. I filled the radiator with a mixture of a cleaner (Purple Power) and water and let it sit for about an hour and then flushed it with the garden hose. My Bora's radiator looked to be in very good condition, but it was good to remove old leaves, dead bugs and clean everything. With the radiator out I could now see that there is indeed a drain plug located on the lower left-hand side of the radiator. It sure would have been nice if the Bora's user manual would have mentioned this drain plug!



Drain plug is located on the left side. The plug is not visible in this photo. You will need to feel your way and use a 14mm wrench to remove it. There is not much clearance.

Before removing the radiator, I wanted to have some idea of the efficiency of the original Bosch electric fans and to measure if when done air flow had improved. I used a carburetor synchronizer tool to measure the air flow through the condenser and radiator. I put the synchronizer in front of the AC condenser with the fans on (jump the thermo switch and turn on the ignition). The area in front of one

fan measured 4.0 while the other measured 4.5. I also used a multimeter to measure the amperage being consumed, which was about 4.5 amps each.

I used WD-40 to lubricate the fans. My goal was to take the fans apart but that proved to be a challenge as the nut that holds the fan blades would not come out.



Air flow meter

Most of the foam around the fan shroud was disintegrating so I used insulation foam from a hardware store (Home Depot) to seal all the areas around the shroud.

Tip: with the radiator removed I noticed that the metal area on top of the radiator (under the Maserati badge) had never been properly rust proofed at the factory. There was not even a coat of paint! This is the time to clean that area, apply a primer and black paint.

The radiator/fan assembly was reinstalled, and it was time to fill the cooling system. I suspected that a significant portion of the old coolant was still in the engine, so I decided to fill the system with distilled water, bring the engine to proper temperature, drain the water and then fill it with water and coolant.

To fill the cooling system you need to disconnect a small hose located on top of the thermostat housing, which is in front of the engine, close to the firewall. This will permit air to escape. Now raise the rear of the car much possible. Before raising the rear, I like to open the rear hatch and put something to hold in place. Opening the rear hatch once the rear has been lifted may prove to be a challenge.



Disconnect small hose on top of thermostat housing to permit air to escape.

Using a funnel and hose to access the expansion tank, fill the system until you see water streaming out of the thermostat cover. Reconnect the small hose and continue to fill the system. I found it took about 3 gallons of distilled water to fill the system. According to the owner's manual the Bora's cooling system has a capacity of 16 liter (4 gallons), which means there was still a gallon of the old stuff still in the engine.



Funnel with hose to refill the cooling system

Drove the car for a few miles, with the heater on, and once I saw the radiator fans come on, I knew the thermostat had opened and the new distilled water had mixed with the old coolant.

After sitting overnight, it was time to drain the water. Luckily now I knew where the drain plug was located as removing the radiator hoses is not fun. Removing the drain is also a bit challenging. It takes a 14mm wrench and there is not much room to work. The water that came out was almost as green as what came out originally. Yet another indication that a significant amount of coolant does not get drained. I would be extremely careful using the type of chemicals you put into the radiator to clean the system. Flushing all traces of that chemical will be nearly impossible.

Since distilled water is inexpensive, I decided to do a second flush by adding 3 gallons of distilled water, bringing the engine to temperature, and draining it again. The water continued to be somewhat green, but I figured what was left in the engine was “good enough” to proceed.

My Bora is in an environment where it will never see extreme cold weather, therefore I like using a mixture of 25% coolant and 75% distilled water. Started by putting in a gallon of Prestone coolant, followed by a bottle of Redline Water Wetter. I have no idea if Water Wetter really works or if it is snake oil but Redline makes good products so not harm can be done.



A cleaner to degrease the inside of the radiator, coolant, plenty of distilled water and Water Wetter which claims it can lower the temperature up to 20 degrees.

After the work was done, I re-measured the air flow through the condenser and it went up to 5.5 on the flow meter. I suspect fixing the disintegrated foam contributed the most to the improvement.

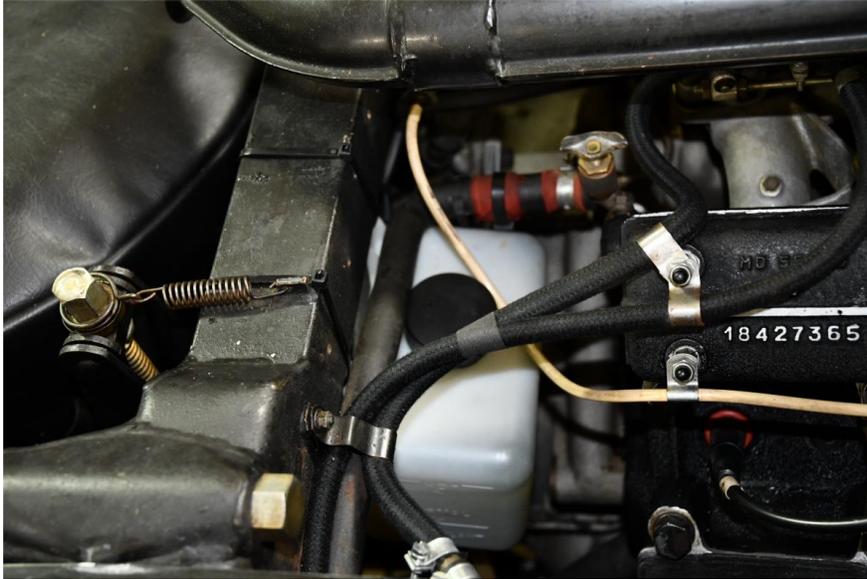
Tip: the coolant expansion tank of the Bora is a terrible designed. It is in a place hard to reach, plus you cannot visually tell the coolant level. A simple solution, which requires no permanent modifications, is to install an aftermarket overflow tank available at most parts stores.



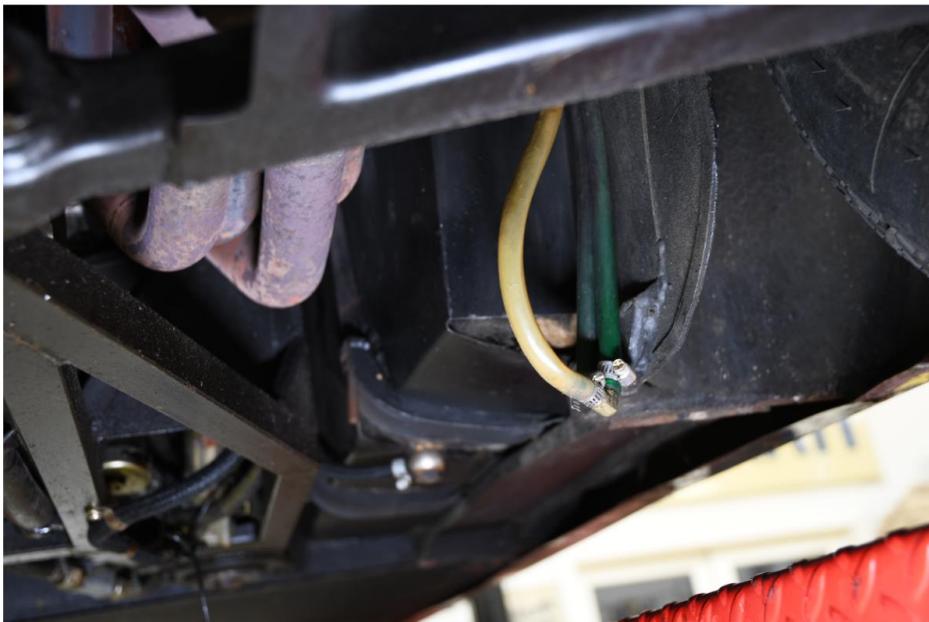
Hard to reach expansion tank

When coolant gets hot it expands. The Bora's expansion tank is supposed to be filled to about 50% to allow the air inside the tank to escape when the coolant expands. If you look closely at a radiator cap there is a seal followed by a spring. The spring determines the pressure rating of the cap. If the cap is rated at 7 lbs the air pressure within the expansion tank will push against this spring and the air will escape when it reaches 7 lbs. As the coolant cools down it will contract, and the cap has a valve that allows air back into the expansion tank. If that valve was not there a vacuum would be created and the hoses would collapse; not a good thing.

With an overflow tank you fill the expansion tank all the way to the top. As the coolant heats up and expands it will flow pass the radiator cap down the overflow hose and into the overflow tank. When the coolant cools down the coolant when flows back into the expansion tank keeping it always completely full. The big advantage is that you now visually check the coolant level simply by looking at the overflow tank, plus it is much easier to add coolant if needed.



I installed the plastic overflow tank using a couple of tie straps



The green hose on the right is the original overflow from the expansion tank to the floor. I connect the overflow tank hose using a 90 degree fitting. Really simple to do.



You do not want air to come into the expansion tank once an overflow tank is installed, therefore make sure the radiator cap has a rubber seal along the top of the cap.

After you drive the car several times make sure to check the level of the overflow tank and the expansion tank. If everything is working normally, with the engine cold, you should see about 1/3 of the overflow tank full, and the expansion tank completely full. If you have coolant in the overflow tank and an air gap inside the expansion tank, then air is somehow coming into the system, most likely a leaky cap or a bad hose connection.