# 27 Cooling system servicing (draining, flushing and refilling) (every 100,000 miles or 60 months)

**Warning:**
Do not allow antifreeze to come in contact with your skin or painted surfaces of the vehicle. Rinse off spills immediately with plenty of water. Antifreeze is highly toxic if ingested. Never leave antifreeze lying around in an open container or in puddles on the floor; children and pets are attracted by its sweet smell and may drink it. Check with local authorities about disposing of used antifreeze. Many communities have collection centers which will see that antifreeze is disposed of safely. Never dump used antifreeze on the ground or pour it into drains.

**Warning:**
On models equipped with lifetime coolant, never reuse the coolant. If the cooling system is partially drained, the corrosion protection effect of the coolant is significantly reduced. If a large quantity of coolant is removed, the entire cooling system must be drained and refilled with new coolant. If a small amount (under a quart), is drained, new fluid must be used to replace the coolant drained from the system.

**Caution:**
Do not mix coolants of different colors. Doing so might damage the cooling system and/or the engine. The manufacturer specifies either a green colored coolant or a yellow colored coolant to be used in these systems. Read the warning label in the engine compartment for additional information.

**Note:**
Non-toxic antifreeze is now manufactured and available at local auto parts stores, but even this type must be disposed of properly.

**Note:**
Periodically, the cooling system should be drained, flushed and refilled to replenish the antifreeze mixture and prevent formation of rust and corrosion, which can impair the performance of the cooling system and cause engine damage. When the cooling system is serviced, all hoses and the expansion tank cap should be checked and replaced if necessary.

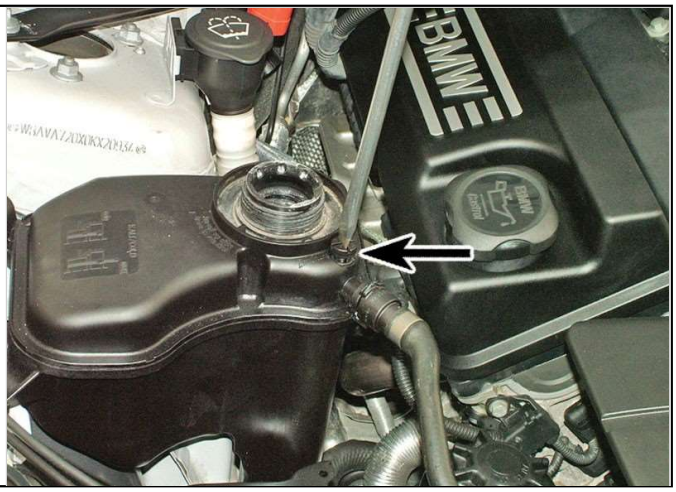
## Draining

1 With the engine completely cold, cover the expansion tank cap with a rag and slowly turn the cap counterclockwise to relieve the pressure in the cooling system (a hissing sound may be heard). Wait until any pressure in the system is released, then continue to turn the cap until it can be removed. The effectiveness of the coolant can easily be checked with an inexpensive hydrometer **(see illustration)** .

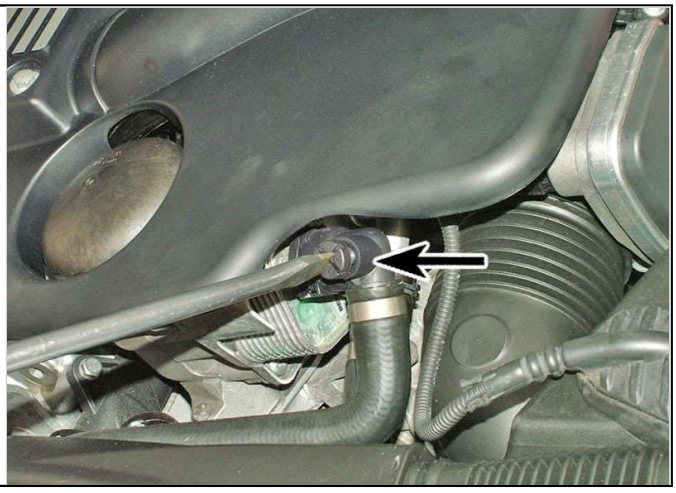
**27.1 Use a hydrometer to check the strength of the antifreeze**

2 Unscrew the bleeder screw from the top of the expansion tank. 2.0L models, are equipped with two more bleeder screws; one at the radiator return hose and the other at the transmission cooler (automatic transmission models). Some 3.0L models are equipped with a bleed screw adjacent to the oil filler cap **(see illustrations)** .

**27.2a Loosen the bleed screw on the expansion tank . . .**

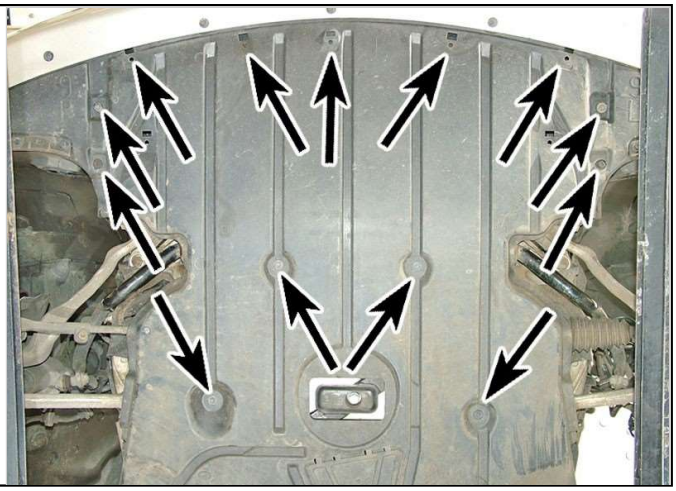



**27.2b . . . and the one adjacent to the oil filter cap – 3.0L models shown**

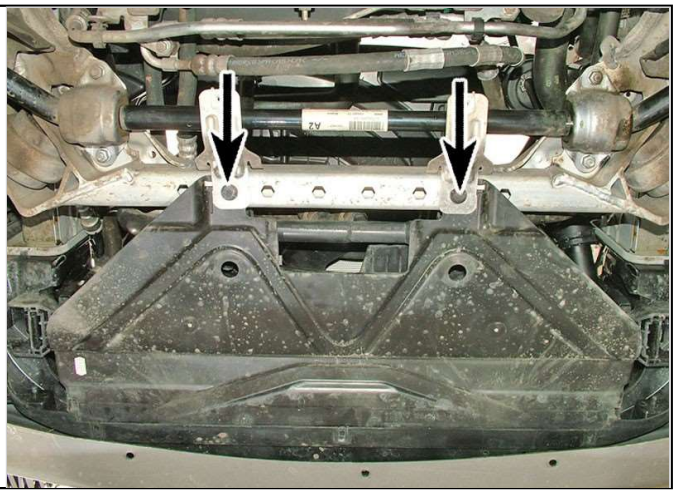


3 Raise the front of the vehicle and support it securely on jackstands. Remove the retaining bolts/clips and the splash shields from beneath the engine and radiator **(see illustrations)** .

**27.3a Remove the splash shield fasteners and splash shield**



**27.3b Remove the radiator splash shield mounting bolts and the shield under the radiator**

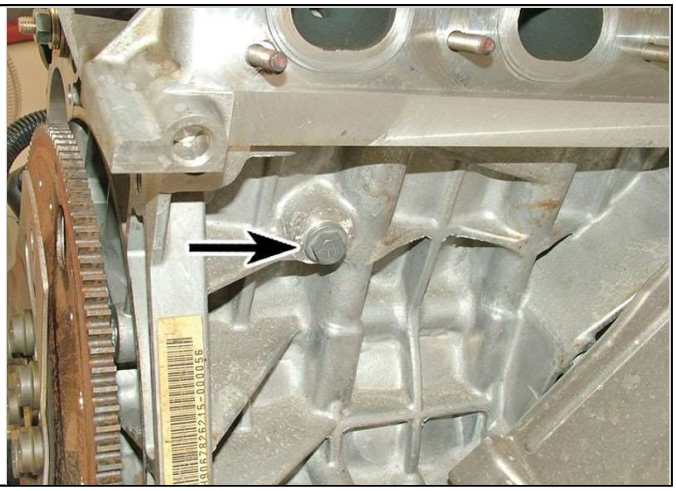


4 Position a suitable container beneath the drain plug on the left side of the radiator. Unscrew the drain plug and allow the coolant to drain into the container **(see illustration)** . On models without a radiator drain plug, release the clamp and disconnect the radiator lower hose.

**27.4 Loosen the radiator drain plug**

5 To fully drain the system, also unscrew the coolant drain plug from the right-hand side of the cylinder block and allow the remainder of the coolant to drain into the container **(see illustration)** . Note that access to the drain plug is extremely limited.

**27.5 The cylinder block drain plug is located on the right-hand side**



6 If the coolant has been drained for a reason other than replacement, then it can be re-used, provided it is clean, though this is not recommended.

7 Once all the coolant has drained, install a new gasket or O-ring on the block drain plug and tighten it to the specified torque.

## Flushing

8 If coolant replacement has been neglected, or if the antifreeze mixture has become diluted, then in time the cooling system may gradually lose efficiency, as the coolant passages become restricted due to rust, scale deposits, and other sediment. The cooling system efficiency can be restored by flushing the system clean.

9 The radiator should be flushed independently of the engine, to avoid unnecessary contamination.

### Radiator flushing

10 To flush the radiator, disconnect the top and bottom hoses and any other relevant hoses from the radiator (see Chapter 3 ).

11 Insert a garden hose into the radiator top inlet. Direct a flow of clean water through the radiator, and continue flushing until clean water emerges from the radiator bottom outlet.

12 If after a reasonable period the water still does not run clear, the radiator can be flushed with a good proprietary cooling system cleaning agent. It is important that the manufacturer's instructions are followed carefully. If the contamination is particularly bad, insert the hose in the radiator bottom outlet, and reverse-flush the radiator.

### Engine flushing

13 To flush the engine, remove the thermostat (see Chapter 3 ), then temporarily reinstall the thermostat cover.

14 With the top and bottom hoses disconnected from the radiator, insert a garden hose into the radiator top hose. Direct a clean flow of water through the engine, and continue flushing until clean water emerges from the radiator bottom hose.

15 On completion of flushing, reinstall the thermostat and reconnect the hoses (see Chapter 3 ).

## Filling

16 Before attempting to fill the cooling system, make sure that all hoses and clamps are in good condition, that the clamps are tight and the radiator and cylinder block drain plugs are securely tightened. **Note:** *Antifreeze mixture must be used all year round to prevent corrosion of the engine components.*

17 Loosen the bleed screw(s) **(see illustrations 27.2a and 27.2b)** .

18 Turn on the ignition (without starting the engine), and set the heater control to maximum temperature, with the fan speed set to low. This opens the heating valves.

19 Remove the expansion tank filler cap. Fill the system by pouring the coolant slowly into the expansion tank to prevent air pockets from forming. **Note:** *Both bleed screws should be open.*

20 If the coolant is being replaced, begin by pouring in new coolant (a 50/50 mix of water and antifreeze).

21 As soon as coolant emerges from the bleed screw(s) free from air bubbles, tighten the screw(s) securely.

22 Once the level in the expansion tank starts to rise, squeeze the radiator top and bottom hoses to help expel any trapped air in the system. Once all the air is expelled, top off the coolant level until the float in the expansion tank rises to indicate the maximum level, then install the expansion tank cap.

23 Start the engine and run it until it reaches normal operating temperature, then stop the engine and allow it to cool.

24 Check for leaks, particularly around disturbed components. Check the coolant level in the expansion tank, and top off if necessary. **Note:** *The system must be cold before an accurate level is indicated in the expansion tank. If the expansion tank cap is removed while the engine is still warm, cover the cap with a thick cloth, and unscrew the cap slowly to gradually relieve the system pressure (a hissing sound will normally be heard). Wait until any pressure remaining in the system is released, then continue to turn the cap until it can be removed.*