33 Coolant replacement

Cooling system draining

> Warning:
> Wait until the engine is cold before starting this procedure. Do not allow antifreeze to come in contact with your skin, or with the painted surfaces of the vehicle. Rinse off spills immediately with plenty of water. Never leave antifreeze lying around in an open container, or in a puddle in the driveway or on the garage floor. Children and pets are attracted by its sweet smell, but antifreeze can be fatal if ingested.

1 With the engine completely cold, cover the expansion tank cap with a wad of rag, and slowly turn the cap counterclockwise to relieve the pressure in the cooling system (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.

2 On models where expansion tank is built into the radiator, unscrew the bleed screw from the top of the expansion tank.

3 Where necessary, remove the retaining screws and remove the undercover from beneath the radiator.

4 Position a suitable container beneath the drain plug on the base of the radiator. Unscrew the drain plug and allow the coolant to drain into the container.

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.

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

7 Once all the coolant has drained, install the bleed screw to the radiator. Install a new sealing washer to the block drain plug and tighten it to the specified torque.

Cooling system 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, with reference to 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 their 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 install 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, install the thermostat and reconnect the hoses with reference to Chapter 3 .

Cooling system filling

16 Before attempting to fill the cooling system, make sure that all hoses and clips are in good condition, and that the clips are tight and the radiator and cylinder block drain plugs are securely tightened. Note that an antifreeze mixture must be used all year round, to prevent corrosion of the engine components (see following sub-Section).

17 On models where expansion tank is built into the radiator, unscrew the bleed screw from the top of the expansion tank **(see illustration)** . On four-cylinder models also loosen the bleed screw which is situated on the top of the thermostat housing.

33.17 Where the expansion tank is an integral part of the radiator, unscrew the bleed screw from the top of the tank

18 Remove the expansion tank filler cap and turn the heater temperature control knob to the maximum heat position. Fill the system by slowly pouring the coolant into the expansion tank to prevent airlocks from forming.

19 If the coolant is being replaced, begin by pouring in a couple of liters of water, followed by the correct quantity of antifreeze, then top-up with more water.

20 On four-cylinder models, as soon as coolant free from air bubbles emerges from the thermostat housing screw, tighten the screw securely.

21 Where the expansion tank is an integral part of the radiator, as coolant free from the air bubbles emerges from the radiator bleed hole, securely tighten the bleed screw **(see illustration)** .

33.21 Slowly fill the expansion tank until coolant free from air bubbles emerges from the bleed hole (arrow) then install the bleed screw

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-up the coolant level to the “MAX” mark and 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-up if necessary. Note that 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.

Antifreeze mixture

25 The antifreeze should always be replaced at the specified intervals. This is necessary not only to maintain the antifreeze properties, but also to prevent corrosion which would otherwise occur as the corrosion inhibitors become progressively less effective.

26 Always use an ethylene-glycol based antifreeze which is suitable for use in mixed-metal cooling systems. The quantity of antifreeze and levels of protection are indicated in the Specifications.

27 Before adding antifreeze, the cooling system should be completely drained, preferably flushed, and all hoses checked for condition and security.

28 After filling with antifreeze, a label should be attached to the expansion tank, stating the type and concentration of antifreeze used, and the date installed. Any subsequent topping-up should be made with the same type and concentration of antifreeze.