



# Service bulletin

C. 218  
E.P. 5

THE BRITISH MOTOR CORPORATION (AUSTRALIA) PTY. LIMITED

FOR THE ATTENTION OF SERVICE AND PARTS MANAGERS.

## PRESSURISED COOLING SYSTEMS

Now that the warmer weather is upon us, it would appear desirable to re-state, for the benefit of all concerned, the background of the pressurised cooling systems used on most of our vehicles, especially the Austin Freeway and Wolseley 24/80.

When discussing vehicle cooling systems it should always be remembered that it is the air flow through the radiator and over the engine which does the actual cooling, the water serving to even out the temperatures at the various points in the engine, which it can do because of its high specific heat, and then to give up the heat which it has received to the cooling medium, the air. Care should therefore be taken not to permit the blocking of the air passages by grass hoppers, etc., or by the fitting of any accessories or overheating may result.

In order to achieve the most satisfactory compromise between cooling performance, ease and size of installation and cost when designing a cooling system, advantage is taken of a basic law of cooling which states that the rate of cooling of a hot object is proportional to the temperature difference between that object and its surroundings. In the case of a vehicle cooling system it is therefore desirable to maintain the mean water temperature across the radiator ( the hot object ) as high as possible above ambient. In order to obtain this high mean radiator temperature, advantage is also taken of another law which states that when a liquid is heated in a closed system its boiling point will increase with increase of vapour pressure in the system and, in the case of water, boiling occurs at approximately 118° (or 245 F) when the vapour pressure in the system is 13 lbs. per square inch above atmospheric. You will have noted how cooling system pressures have increased during the post war years from atmospheric to the present 13 lbs. per square inch as radiator technology advanced and reliable systems to withstand these higher pressures were developed.

Having designed a pressurised system to operate at a high mean radiator temperature, it is obvious that on occasions, either when ambient temperatures are high and the engine is operating at high outputs, or when air flow through the radiator is very low, such as occurs at idle in traffic, then the water temperature will rise above 100° (the normal boiling temperature at atmospheric pressure) without boiling occurring.

CARS

AUSTIN

FREEWAY

STATION

WAGON

WOLSELEY

24/80

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If the water temperature did not rise above  $100^{\circ}\text{C}$  then all the advantages of the pressurised cooling system would be lost. Care should be taken therefore to examine carefully any reported cases of overheating to ensure that owners fully understand that under certain conditions the vehicle is designed to operate with a water temperature above  $100^{\circ}\text{C}$ .

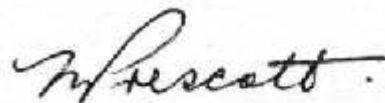
The red band on the Freeway temperature gauge commences at  $105^{\circ}\text{C}$  in order to provide a warning band between  $105^{\circ}\text{C}$  and  $118^{\circ}\text{C}$ , at which temperature boiling will occur. If the vehicle operates consistently in the red band at relatively low ambients, or well within the band at higher ambients, then a careful examination should be made of the entire cooling system to ensure that there are no obvious defects. When carrying out this examination care should be taken not to remove the radiator pressure cap when hot because boiling will immediately occur when the pressure is released with consequent danger to the operator. In the case of the Wolseley the temperature gauge has a chaplet at  $105^{\circ}\text{C}$  and again continuous operation at a reading higher than this should result in a similar check being made on the cooling system. As it is apparent that many owners do not appreciate that boiling will not occur until  $118^{\circ}\text{C}$  it has been decided to remove the figures "105" from the Wolseley gauge and replace them by a "E" at  $110^{\circ}\text{C}$ .

In order that the specified standard of cooling is reached, it is essential to maintain the correct pressure in the system by use of the original equipment pressure cap. Substitute caps may not develop the correct pressure, obviously a higher pressure may damage the radiator and a lower pressure will impair the cooling. Hose joints must be tight and water pump seals of the correct type (13H.772) to withstand the pressure. If loss of water from the cooling system is experienced then the water level in the radiator top tank should be checked and kept approximately 1" below the bottom of the filler neck, which will allow for the expansion which takes place when the water is heated.

You will have noted a larger radiator is fitted to the Wolseley 24/80 than to the Freeway. This larger radiator is necessary to achieve the specified cooling standard due to the lower air flow through the radiator caused by the Wolseley radiator grille. For this reason the Freeway radiator must never be fitted to a Wolseley 24/80. Conversely, in view of the high standard of cooling performance achieved on the Freeway, it should never be necessary to fit the Wolseley radiator to the Freeway.

The point to remember, when in traffic jams all the air flow through the radiator is produced by the fan and the fan speed should be kept up by the use of a lower gear.

You may also encounter cases of "after boiling", particularly when the engine has been switched off after idling for a long period in a traffic jam or after a long, hard run. This is caused by the stored up heat in the engine being released to the cooling water at a time when there is no air flow through the radiator, to take away this heat. The occurrence of after boiling does not necessarily indicate any defect in the cooling system whatsoever but will result in loss of water through the overflow and owners should be advised to keep their radiators topped up to 1" below the bottom of the filler neck to allow for this.



N. Prescott  
Service Manager