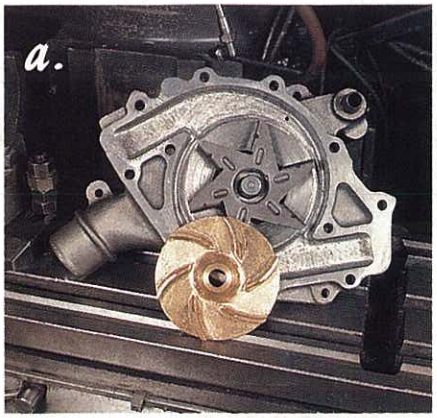
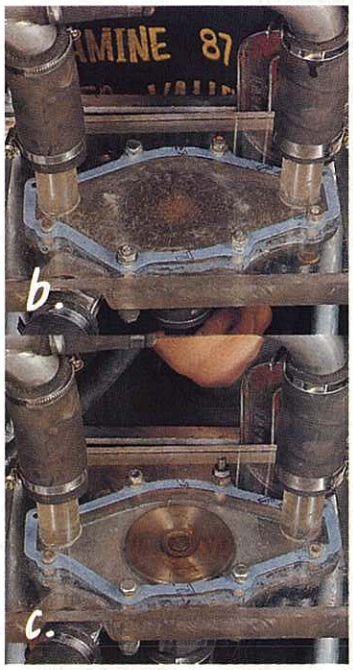


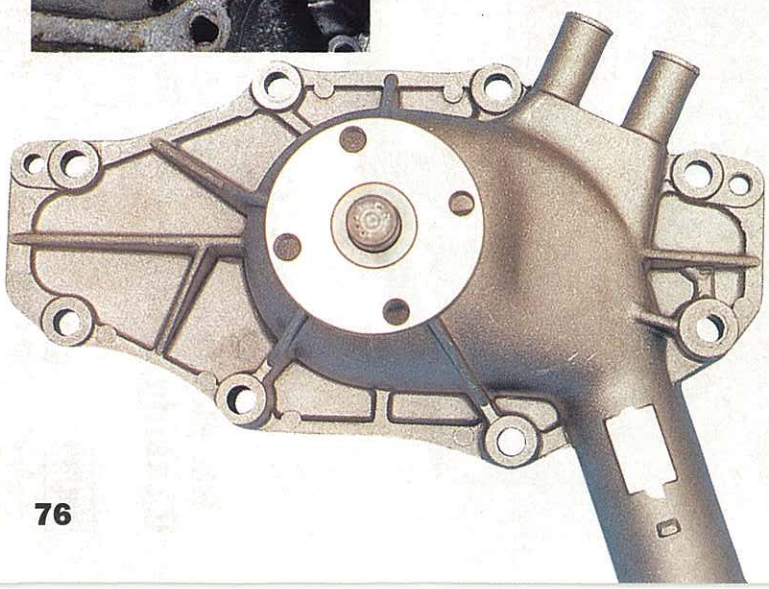
LEFT TOP TO BOTTOM:
a) Here's a replacement pump for a 460. The old-style pressed impeller is shown sitting in the case with the bronze replacement unit ready to be fitted.
b) Significant cavitation in a 308 pump.
c) After fitting a properly modified impeller the coolant looks just like it should.
d) Here's what unchecked cavitation can do to the insides of your system.



The rate of flow is determined by pressure and the size of the hole through which the fluid passes. EcoTrans produces DFCs of different sizes. Obviously, the one best suited to your needs depends on your vehicle.

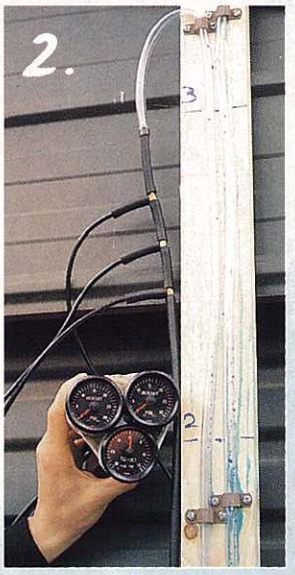
After increasing flow by fitting a more efficient pump, your next problem could be that the coolant moves through the radiator so quickly it doesn't get cooled by the airflow. If your radiator has a volume of, say, 0.8 litres and flow is 200 litres per minute, flow through it will be around 3.3 litres per second. This means the residence time in the radiator of any 0.8 litres of coolant is around a quarter of a second, which is often not long enough for the passing airstream to cool it effectively.

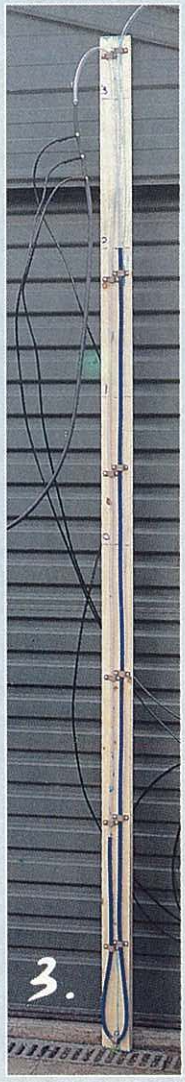
BELOW: The outsides of modified pumps don't look much different from standard units.



TESTING YOUR GAUGES

Whenever you start measuring things it's a good idea to calibrate your equipment. Sometimes testing procedures can be deceptively simple. Initially, we established the low readings on the scales of each meter. All three were connected by means of T-pieces to a simple bike pump at one end and a tube full of water at the other end (photographs 1 & 2). The tube of water makes an extremely accurate measuring device called a manometer. When there is no pressure in the tube, the water levels in each side will be level with each other. As pressure in the side with the gauges is increased, water in the far (open) side of the tube is pushed up. It takes 1psi to create a difference of 27 inches between the levels of water in either side of the tube. So when the pressure side drops 13.5" and the open side rises 13.5" (a difference of 27") you have applied a pressure of 1psi. At this stage, you'd want to see all your gauges reading 1psi. If they're not it doesn't matter. Just note the differences. (In photograph 2, the manometer is showing 2psi.)





The problem with a water manometer is that every psi you want to measure needs 13.5" of tube height. So measuring any more than a few psi means the unit starts to become very tall. Still, you'll be able to use one to measure the first few pounds on your gauges. After checking the lower-scale readings for agreement and noting any differences, you can block the inlet to the manometer, keep pumping and note if any initial differences between gauge indications stay constant at higher readings. You could also use compressed air if you have it. Testing your gauges like this means the results of your cooling system measurements will be accurate.

A manometer can also be used to measure vacuum. Connecting one to a vacuum simply means the water will move in the opposite direction from a pressure reading.