



## SMELLY +2?

### ELAN + 2 PETROL TANKS

Here is a suggestion for modification to the fuel tank breather system for Elan +2.

Evaluation of the situation is as follows:

#### ORIGINAL SYSTEM IN THE LOTUS ELAN +2

1. The fuel filler enters the tank some way down from the top.
2. When the level of the tank fills beyond the top of the filler pipe, the top of the tank needs to be vented to get rid of air.
3. While filling, the rate of air to be expelled is high, and therefore the pipe diameter needs to be big.
4. Two breather pipes are needed because if the tank is full and the car is parked on a slope (side-ways, so to speak), the highest point of the system will be one side or the other. At least one breather pipe is then guaranteed to be higher than the fuel level.
5. Apart from the filling process, breathers are needed at all times

for 2 more reasons:

To allow air in to take up the volume of fuel as it is used by the engine.

To allow expansion or contraction, especially of the air above the fuel, associated with temperature changes (consider all ways and slopes of how a car can be parked!)

6. Each of the 2 breather pipes pass from the tank, up to and across the roof (behind the linings) and then down the opposite side of the car. Termination is under the car. Please note the following:

a) After all accelerations and cornering, any fuel that has gone up one or other of the pipes will return to tank.

b) Even if the car is upside down, (nominally) no fuel leaks out; the highest point of the system is then the termination point of the breathers under the car.

7. Vented cap is not required, because the 2 pipes provide breather capability

#### PROBLEMS WITH ORIGINAL SYSTEM

1. Permanent breather via 2 large bore pipes means carry-over of petrol fumes. This is problematic (smelly) especially in confined spaces (e.g. garage).
2. Cars fitted with vented caps have unsightly petrol stains down the rear nearside wing.

#### MODIFIED BREATHER SYSTEM LAYOUT

1. Big bore tubes are taken from both of the tank breathers forward and up across the top of the tank to meet in the middle.
2. At this junction, a big bore tube is taken to a connection, which has been made in the fuel tank filler neck.
3. A small-bore tube is also taken from the junction to one side, up to and across the roof, and down to terminate under the car (i.e. the route of one of the original big breather pipes). The original big bore pipe can be left in place and the new small bore pipe threaded through.

#### KEY POINTS OF THE MODIFIED BREATHER SYSTEM

1. When the tank is filled, air is expelled at high rate via the big bore tubing, which connects into the filler neck.
2. If the tank is filled to the top and the car is slightly tilted side-ways, then one of the breathers is always at the highest point and continues to vent away the air.
3. Once the filling process has taken place, the cap should seal the filler neck, with no vent at all at this location. The rear wing then doesn't get fuel spilling out on it during right hand cornering.
4. To account for change in temperature effects and to allow air to take up the volume, as the engine uses fuel, a small permanent breather is necessary. This is the purpose of the small-bore pipe, which terminates under the car. Because this permanent vent needs only to be small, there is practically no fuel vapour carry over, as with the original system.

Ken Ind

#### PROPOSAL FOR IMPROVED FUEL TANK BREATHER SYSTEM FOR ELAN +2

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