

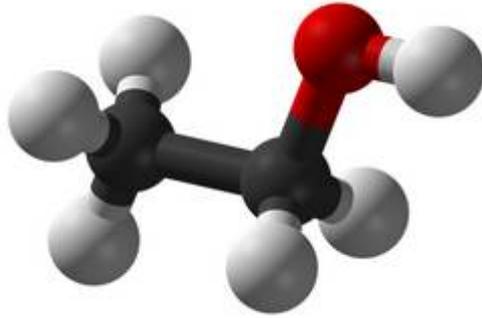
E10

The fuel we will be using in future that is 90% Petrol and 10% Ethanol

Ethanol ??

- ▶ What is Ethanol?
- ▶ Where does it come from?
- ▶ Why do we have to use it?

Atomic structure of Ethanol, C_2H_6O



5 Hydrogen atoms

2 Carbon atoms

1 Oxygen atom with an Hydrogen atom bonded to it

But this is a nicer picture



You are already familiar with Ethanol

- ▶ More commonly known as Alcohol
- ▶ It's in your G&T, Glass of Wine, Pint, Snifter or Wee dram
- ▶ A psychoactive drug and one of the oldest recreational drugs known
- ▶ Ethanol can produce a state known as intoxication when consumed

- ▶ The lab guys will probably call it Ethyl Alcohol
- ▶ Not to be confused with Methyl Alcohol, which you must never drink ☹!!
- ▶ Bootleg Vodka often contains some Methyl Alcohol. Blindness occurs.

Where does it come from ?

- ▶ Ethanol is made by the fermentation of vegetable matter
- ▶ Fermenting vegetable matter produces alcohol
- ▶ The catalyst is Yeast, which exists naturally on vegetable matter
- ▶ Yeast feeds on the sugar producing Alcohol and Carbon Dioxide
- ▶ The leaders in Ethanol are South American countries
- ▶ Originally pioneered where Sugar Cane grown
- ▶ Now it is made by fermentation of Grain in huge amounts

Why

- ▶ Mandated by environmental agencies for cleaner emissions from IC engines
- ▶ There may be other pressures [dependence on foreign oil, cost etc.]

There are many myths and rumours in the world today about E10

- ▶ Corrodes rubber and plastic components
- ▶ Corrodes fuel tanks and engine components
- ▶ Absorbs water
- ▶ Invalidates Guarantees and Warranties

Are these myths true?

Partially

- ▶ Alcohol and water are miscible and experience shows that corrosion can occur on metallic components and that flexible hoses, seals and diaphragms in fuel systems may be degraded to the point of failure under extreme conditions
- ▶ But don't panic, we are all used to using rubber component that degrade with time. Your Tyres, Radiator hoses, fuel hoses will all need replacing eventually
- ▶ The problem is that we must decide what and when to change and what may cause us grief. Tyres have a date code; 6 years seems to be the agreed limit and changing radiator hoses regularly should be a maintenance item

What might be affected?

Starting at the back of the car:

- ▶ Fuel Tank fuel level Indicator float, filler cap seal
- ▶ Flexible connection to Fuel Pump, filter and hard lines
- ▶ Flexible from tank to Fuel pump and filter
- ▶ Flexible to Fuel rail and pressure regulator and return line
- ▶ O Ring seals on Injectors [TBI & TBA]

What else might be affected

- ▶ Seals on push on connectors in fuel lines
 - ▶ Evaporative loss system RV8
 - ▶ Fuel Tank
 - ▶ Filler neck hose
- ▶ These are currently under investigation

What can or must we do?

- ▶ Eventually it will be necessary to replace all affected components with parts proven to be resistant to corrosion
- ▶ It will be more important to deal with MGBV8s first as they are older and might have older less corrosion resistant hoses.

Where can I get the replacement parts?

- ▶ We are working with our associated parts suppliers, Clive Wheatley and Brown & Gammons to ensure that the correct material and parts are available.
- ▶ There are currently several sources of hose and it is important to note that the RV8 will need a different grade to that for a BV8 as fuel injection systems operate at higher fuel pressure than carburettor engines
- ▶ Fitting the higher pressure hoses for an RV8 to a BGT will not cause any problems, but doing so will not lengthen the hose life
- ▶ Correct clips must be used.

Fuel hose Clips

- ▶ It is important to select the right clip to secure the hose
- ▶ Industry recommends a Constant Tension Clip [or Band] to prevent evaporative loss and leaks.



Jargon

- ▶ Water absorption. Ethanol and water are miscible and thus any water can go into solution and may drop out, but the probability is low and not much worse than current.
- ▶ Phase separation. Separation of the Ethanol and the petrol may occur and modify the rate and probability of water absorption
- ▶ Tony Lake and I have found huge amounts of data and reports on tests carried out by experienced institutes. I have it available if you want to read it.

Effects on engine are Complex

- ▶ Contains its own Oxygen, combustion is likely to be improved
- ▶ Ethanol burns at a higher temperature, check cooling system
- ▶ Using E10 may slightly increase fuel consumption, but also may not
- ▶ The control loop in the 14CUX ECU should compensate

More Information

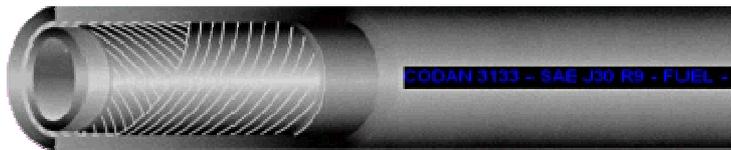
- ▶ Alcohol can be a Gas
- ▶ QinetiQ report
- ▶ TL Hand out
- ▶ Assorted reports [copies if required]

Conclusions

- ▶ My conclusion is that E10 is not a threat to Fuel Injected RV8s
- ▶ An article in Totally T Type by Paul Ireland draws largely the same conclusions. He also found there was some galvanic corrosion between aluminium and steel with E10.
- ▶ Tests in New Zealand sponsored by the Ministry of Transport found that blends up to E10 with and without corrosion inhibitor and with and without added water were non damaging to aluminium.

Fuel Hose to SAE J30 R9 specification [R7 is current specification for Unleaded

***SureFlex R9 Fuel Hose* Low Permeation
Fuel Injection Hose for Modern Fuels**



Sizes Available

- ▶ **Nominal Actual Sizes**
- ▶ Imperial ID Metric ID Metric OD
- ▶ 3/16" 4.8mm 11.6mm
- ▶ 1/4" 5.6mm 12.6mm
- ▶ 5/16" 7.6mm 14.6mm
- ▶ 3/8" 9.5mm 16.5mm
- ▶ Pressures
- ▶ Working Pressure 225 PSI
- ▶ Safety Factor 4:1
- ▶ Burst Pressure 900 PSI

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The best Clips are Constant Tension Clips

