least a year. They try to locate an example of the "real" car and take copious measurements and detailed notes. The measurements need to all be scaled down to 1/43rd and Nigel let us in on a little secret. Colour also needs to change with scale. That is the reason that the chrome parts on their models are actually nickel plated, rather than chromed. The chrome is too bright and does not look quite right on a 1/43 scale model. The paint colours also need to be "dulled down" a couple of shades to look right. He also let us in on a Canadian connection to the business. They only use and recommend Weldbond adhesive to assemble their models. It goes on white, dries clear, and can be wiped off with a cloth while wet and does not damage paint. Only in Canada! **RAGTOP**

Flying Air Reliant

While cruising the canal from Alveschurch to Stratford Upon Avon, I was surprised to see this low flying Reliant had been snagged by some fast growing vegetation. I believe it might be a Triffid!

100,000 Mile Man

Monday, June 27th. 10:30am just south of Port Elgin, Ontario. After a mere 38 years we arrived at 99,999 miles.

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Ethanol & Octane Issues

BY TERENCE MCKILLEN

In June 2008, the Federal Parliament passed Bill C-33, an Act to amend the Canadian Environmental Protection Act (1999), allowing the government to regulate renewable content in fuels with a requirement for an average of 5% renewable content in gasoline by 2010. This is regulated as an average per brand, so 5% of the overall gasoline volume must be ethanol, not 5% content in all gasoline sold under that brand. Although these are federal regulations, British Columbia, Manitoba, Ontario, and Saskatchewan already had similar regulations in force provincially.

Crude oil is refined at four refineries in Ontario , three of which are located in Sarnia and one in Nanticoke. Crude feedstock is delivered by a single pipeline from Western Canada and another from Montreal. Currently, Ontario refiners have the choice of running Canadian or imported crude oil. More than 60% of the crude oil processed in Ontario is either conventional light, sweet crude oil or high quality synthetic crude oil. Ontario also has access to supplies of finished product from the U.S. markets and can also bring in products from the Montreal refinery. Product is shipped from these refineries primarily by pipeline, although some product is moved by rail and on the St. Lawrence Seaway.

Retail gasoline is actually a blend of several hundred different chemical compounds. Because the composition of the chemicals can vary widely, the quality of gasoline can also vary. High quality gasoline should have the right octane level to prevent knocking, strong cleaning power to prevent carbon build up, deliver more kilometres per litre and be of the correct volatility to ensure a vehicle accelerates smoothly and starts easily.

Some of the gasoline suppliers in Ontario (Shell, Sunoco and Petro-Canada) have joined an auto industry Top Tier certification system to provide a new class of fuel meeting the detergent standards of six major auto manufacturers (Audi, BMW, GM, Honda, Toyota and Volkswagen) that exceeds the requirements of the Canadian General Standards Board (CGSB) for such additives.

Most of the major gasoline suppliers in Ontario currently appear to have excluded ethanol from their premium grades (refer

table Page 50) but in order to maintain the 5% (E5) brand average, the ethanol content of Regular grade gasoline could be as high as 10% (E10). The introduction of E15 fuel may not be far off, although many of the largest car makers have cautioned drivers that filling up with E15 fuel could void their new vehicle's warranty. The ethanol content of gas can also vary by region within the Province, allowing some consumers, depending on their location, to have access to E0 regular gasoline and up to E10 in some Premium gasolines.

Gas stations selling ethanol-blended gasoline are supposed to place a label on the pump indicating which grades of gasoline may contain up to 10% of ethanol. In practise this labelling does not seem to be uniformly adopted. Despite its higher octane rating, Petro-Canada's Ultra 94 (formerly Sunoco Ultra 94) is an E10 gasoline. Consequently, those Petro-Canada gas stations selling Ultra 94 will have some ethanol in all their gas grades.

Using Unleaded Gasoline in Vintage Cars

The tetraethyl lead additive in the older gasoline formula acted as a lubricant for the inlet and exhaust valves. With unleaded gasoline, the lubrication component has been removed, and this can result in valve seat recession (VSR).

Simply put, unleaded gasoline can burn out the valves and their seats, particularly on the exhaust side. The rapidity at which this might happen depends on the amount and type of motoring and could take many years before the effect is noticed on a car that is driven only a few thousand kilometres a season. Some people use lead substitute additives at each gasoline fill up but the only real permanent solution against VSR is to install hardened valve seats and valve guides.

The detergents present in modern unleaded gasoline offers benefits for all cars, no matter how old. Ignition timing and/or carburettor adjustment may be required to deal with changes in gasoline composition and octane rating.

Ethanol

Ethanol, or ethyl alcohol, has the chemical formula C2H5OH. It is the same alcohol found in alcoholic beverages, but ethanol also makes an effective motor fuel. Ethanol has a lower energy content than gasoline. That means that about one-third more ethanol is required to travel the same distance as on gasoline. But other ethanol fuel characteristics, including a high octane rating, result in increased engine efficiency and performance. Ethanol does burn cleaner than gasoline and does reduce the toxicity of car exhaust but it can also be somewhat corrosive inside the engine block, fuel system and gas tank.

Ethanol is hygroscopic, meaning that it readily absorbs water, leading to phase separation and water contamination. It is also an excellent solvent not only capable of dissolving plastic, rubber, fibreglass and other materials and compounds, potentially leading to the premature destruction of fuel lines, pumps, gaskets, O-rings, rubber seals and diaphragms but can take sludge and other varnish like material from the bottom of a gas tank into solution allowing them to be ingested further down the combustion chain.

Currently, research is being conducted at the University of Kettering, in Flint, MI to compare the use of E10 and E0 fuels in classic cars. Preliminary results of the study, published in Hagerty Insurance Agency's magazine found that fuel lines didn't leak, carburettors didn't disintegrate and fuel pumps did not fail with E10 fuels. However, there was minor build-up and corrosion in the carburettors and fuel pumps when using E10 as opposed to gasoline with no ethanol.

The preliminary conclusion is that E10 can be used in older vehicles, although the owner is likely to be faced with additional costs associated with sealing fuel tanks and cleaning and rebuilding fuel systems more frequently than previously. Minor updates and maintenance should include draining fuel out of the carburettor fuel bowls and changing fuel filters more frequently and ensuring that the fuel tank is completely clean with no sediment or sludge. It may also be wise to consider replacing seals, gaskets and fuel lines with modern replacement materials since older fuel system components are often incompatible with ethanol blended fuels.

The federal government expects the regulations to lead to a total reduction of greenhouse gas (GHG) emissions of 23.8

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Mt over 25 years, or an average annual reduction of 0.99 Mt. To put this estimated reduction in perspective, the average annual reduction is about 0.13% of Canada's annual GHG emissions in 2008 - a very "small step for mankind."

Octane Rating

The octane rating is a measure of a fuel's resistance to knocking. Knock, also known as 'pinking', occurs during combustion when the fuel-air mixture detonates ahead of the compression stroke rather than burning smoothly (pre-ignition), thus causing a knocking noise. Using a method established in 1929, gasoline is rated on a scale of 0 -100. In the 1920s gasoline had an octane rating of around 50 to 60. Octane rating does not relate to the energy content of the fuel. It is only a measure of the fuel's tendency to burn in a controlled manner, rather than exploding in an uncontrolled manner. Where the octane number is raised by blending with ethanol, energy content per volume is reduced.

The most common type of octane rating worldwide is the Research Octane Number (RON). RON is determined by running the fuel in a test engine with a variable compression ratio under controlled conditions, and comparing the results with those for mixtures of iso-octane and n-heptane. There is another type of octane rating, called Motor Octane Number (MON), or the aviation lean octane rating, which is a better measure of how the fuel behaves when under load, as it is determined at 900 rpm engine speed, instead of the 600 rpm for RON. MON testing uses a similar test engine to that used in RON testing, but with a preheated fuel mixture, higher engine speed, and variable ignition timing to further stress the fuel's knock resistance. Depending on the composition of the fuel, the MON of a modern gasoline will be about 8 to 10 points lower than the RON, however there is no direct link between RON and MON. Normally, fuel specifications require both a minimum RON and a minimum MON and it is important to note that the octane rating displayed at the pump for a particular gasoline in North America, is the average of the two octane ratings (i.e., (R+M)/2).

Gasoline grades available in Ontario have the following octane ratings:

Super Premium **94** *(only Petro-Canada or Sunoco Ultra)*
Premium **91**
Mix/Blend **89**
Regular **87**

The fuel recommended in the Triumph Handbook for use in TR6s is a 97 octane rating. This refers to the RON method used in the United Kingdom and was meant for the higher compression PI engines delivered there. The recommended fuel grade for the lower compression, carburettor models exported to North America was 91 RON. These octane ratings were equivalent to the old British 4-Star and 2-Star petrol grades. Today, premium gasoline in Canada has a minimum octane rating of 91 while regular gasoline has a minimum octane rating of 87, which would be the equivalent of about a 96 RON and a 91 RON rating respectively. In effect, therefore, if it wasn't for the ethanol issue, our North American TRs should be quite comfortable running on regular gasoline – unless that is, you have increased the compression ratio of your motor! **RAGTOP**

Premium Gas Brands (Ontario)	Octane (R+M/2)	Ethanol (%)	Comments
Shell V-Power Premium	91	None	
Beaver Premium	91	None	Same as Shell
Husky Premium	91	≤10%	All Husky gas grades in Ontario contain ethanol
Pioneer Platinum	91	?	Pioneer did not respond to query for information
Petro-Canada SuperClean	91	None to 10%	at Petro-Canada branded gas stations from Windsor to Beleville and north to Muskoka, not selling Ultra 94, the Premium 91 Octane gasoline does not contain ethanol. In Northern Ontario, North Bay, Sudbury, S.S. Marie, Timmins, Thunder Bay areas and in Eastern Ontario for the Ottawa area, including Pembroke, Cornwall and Brockville, both Regular and Premium gasoline currently do not contain any ethanol. When Ultra 94 is sold then ALL gas grades contain ethanol, including Premium.
Sunoco Super	91	≤10%	All Sunoco gas grades contain ethanol
Esso Supreme	91	None	
Canadian Tire Premium	91	None	
Ultramar Supreme	91	None	

Data in table is based on information received from the oil companies and/or from internet sources and is believed to be correct as at July 31, 2011. Readers are advised to check pump stickers or confirm with the station manager for the actual ethanol content of a selected fuel.

1 Environmental Protection Act Ontario - Regulation 535/05 - Ethanol in gasoline

2 Canadian Refining and Oil Security November 2008 – Natural Resources Canada - www.nrcan.gc.ca/eneene/sources/petpet/refstrarafsur-eng.php

3 Hagerty Insurance - http://www.hagerty.com/lifestyle/hobby_article.aspx?id=55960

4 Canada's Federal Renewable Fuels Regulations: An example of poor decision making. Wood.J., Fraser Forum March/April 2011

5 Repair Operation Manual, Triumph Motors British Leyland UK Limited, Pub. Part. No. 545277/E2

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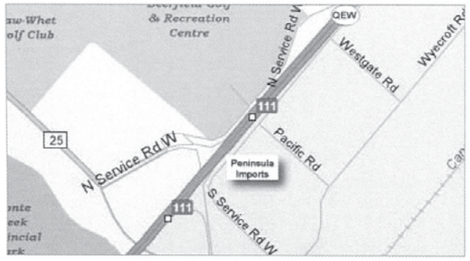

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