Technical Committee

I have been asked by our President to take over the duties of the Technical Committee. However, I have been a mechanic only in my own garage. Fortunately, we do have one current and one former mechanic in the Club and they have volunteered to assist me should I require a bit of guidance. I also have the ever-present Internet if I need to research technical issues.

My first Tech article will cover a subject near-and-dear to any driver, gasoline. Yeah, I know. With an expensive sports car, who cares? Just put in the high test and "let her rip…" Well, maybe some of you have noticed that with the price of gasoline lately, a fill-up is exceeding $50. Do we really need to spend $3.40 a gallon to make these monsters run? And what about us C1 and C2 guys? Can we expect to damage the engine due to the lack of lead? What factors affect the C3 and C4 drivers at the pump?

To have common grounds for discussion, we must examine the concept of Octane Rating. Most automotive gasoline is rated by two methods, Research (R) and Motor (M). The Research method always yields a higher number than Motor. In the past, you had to look closely at any posted rating at the pump to determine the actual octane rating. Nowadays, the fuel you see at the pump is an average of the two and uses this formula: (R+M)/2. Premium is usually 93 and regular 87. By comparison, many racing fuels are well over 100 and can go as high as 119. So, is higher-octane gas always better for your Corvette or even your every day driver? Well, not necessarily. All gasoline, of any octane rating, contains the exact same energy density (125,000 BTUs/Gallon). Simply put, high-octane gas is no more "powerful" than regular. All "octane" does for a high compression, high performance engine is delay any possible pre-ignition of the fuel. Octane is an early-detonation (knock or ping) inhibitor.

Let me begin with the late model 'Vettes, C4s, C5s and C6s. With modern on-board computers, automobile manufacturers can almost instantaneously adjust the engine timing to compensate for mild deviations in octane rating. So, as an example, the C6 Corvette Owner's Manual first recommends a TOP-TIER Detergent Gasoline. But, they go on to say,

"Use a premium unleaded gasoline with a posted octane rating of 91 or higher. You may also use regular unleaded gasoline rated at 87 octane or higher, but your vehicle's acceleration may be slightly reduced and you may notice a slight audible knocking noise, commonly referred to as spark knock."

The C4 and C5 owner manuals have similar statements to the C6 literature, although they refer to gasoline meeting ATSM standards, use the terms "regular" and "middle grade" and in the case of early C4s, even allow the use of 85-octane fuel in some situations.

Notice two items. First, very few retailers sell 91-octane gas, only 87, 89, and 93. Maybe they read these manuals too, and hope you will always default to the more expensive 93-octane grade.

Second, note how Chevrolet says TOP-TIER gasoline, a concept started in 2004. This GM recommendation has caused quite a stir, especially for those C5 owners who have suffered with fuel quantity indication problems. Some owners claim to have seen articles saying that Chevrolet recommends only Shell or maybe, one or two other brands. Actually, Shell is only one of 12 (or 17 depending on who's list you use) TOP-TIER gasoline retailers. Non TOP-TIER gasoline does not have any harmful ingredients for your fuel system; it's just that it contains only the EPA recommended levels of detergent. TOP-TIER retailers use more than the recommended amount of detergent in their gas. Higher detergent levels can prevent the fuel sensor contacts from corroding which can prevent erroneous fuel indications.

However, if you have an issue with your fuel indication system, you can also buy detergents to correct this sort of issue promptly. Techron (used in Chevron and Texaco gasoline) is just one brand of these readily available additive detergents. Or, if you must be true-blue GM, read this: ***"When Top Tier fuels are not available, consider a bottle of GM Fuel System treatment PLUS, P/N# 88861011 (in Canada, # 88861012), at oil change time which will remove intake system and injector deposits. GM does not recommend any other fuel system cleaner."***

What about early model Corvettes? For those of us with real old cars, there is yet another issue. Not so much the octane level, but the lack of lead. Yes, lead kills people and that's why it's not in gas any more. But, lead also lubricates the valve guides and prevents corrosion or pitting of the valve seats. Actually, lead "substitutes" are sold that can mitigate some of these issues. However, with original C1 and C2 engines using unleaded gas, it is best is to drive reasonably since heavy loads/acceleration increases valve seat damage. If for some reason you ever pull your engine, you can have the valves changed or flash chromed and the seats changed to hardened stellite.

Those with C3s have yet another concern. For example, the 1974 Corvette owner's manual recommends 91 Research Octane. Well, you're going to have a bit of a problem here since virtually no retailer posts the Research Octane rating, just the average as discussed above. For reference, the Research method is usually about 8 points higher than Motor. So, the (R+M)/2 average is about 4 points lower than Research. Thus, we're back to 87-octane regular gas using the formula above. Now, this is a generalized computation, but you can see how comparing apples and oranges in gasoline octane can steer the driver to the more expense choice.

So, what do I recommend? Well, the safe answer is use 93-octane premium. But, if you don't want your money pouring into the Middle East any faster than it is going already, you could try a 50/50 mix of 89 and 93 octane for C5s and C6s. That would approximate the 91-octane recommendation. Or, you could try 87 (regular) and see what happens. With no heavy knocking, you're fine. If you get any knock and it bothers you, move up to 89, and so forth. As the car sees more miles, you may have to switch to a bit higher octane rating, as older cars tend to be less tolerant of lower octane fuels. I have used 87-octane in my C6 with no issues whatever. But, then again, I do not floor my car at coming off every traffic light! For my solid axle car, I have resorted to another method of reducing valve seat wear, but you'll have to catch me at Woody's to get the skinny on that.

See you next month… Vic