

Technical Notes — January ‘08’



Vic Natiello



C5 Corvettes and C6 Corvettes (through 2007) use the Tremec T-56 manual 6-Speed transmission (option code MN6). The 2008 model now employs the Tremec TR-6060 (option code MM6 or MZ6). The new 2009 ZR-1 will employ a beefed-up version of the TR-6060. For this article we will address the discussions over the Internet and in Corvette circles about difficult shifting associated with the Tremec T-56 transmissions. You know there has to be some truth in that discussion, for in the 2008 Corvette, GM’s advertising specifically addresses the issue by touting the smoother shifting of the new manual transmission.

But why worry about stick shift transmissions? The new paddle shift Automatic 6-Speed on the C6 Corvette has the best of both worlds, right? You can drive it as a stick or manual. Well, not so fast. First of all, the MN0 transmission is not a true manual transmission like the Ferrari or BMW models. Thus, it robs about 7% more horsepower from the rear wheels than its MN6 manual 6-Speed counterpart. Secondly, it is a whopping \$1250 option. Thus, in 2007, the percentages of Corvettes with orders for the 6-Speed Manual, Paddle Shift Automatic and 6-Speed Manual are relatively unchanged from 2006. One would have expected to see a decrease in true manual 6-Speeds in favor of the Paddle Shift as it has the Automatic modes, but that was not the case. The MN0 Paddle Shift had an option penetration of 55.3% versus 2006’s 56.1%. Therefore, manual transmissions might still be around for a while. To the right is a cutaway of the Tremec T-56.



Oh, before we go on, here is a bit of parentage you might want to know about your “all American sports car.” Transmission Technologies Corporation (TTC) is the parent company of Tremec, which it bought in 1994. Tremec later acquired [Borg Warner’s](#) manual transmission operation in 1997. TTC is a joint venture between [Dana Corporation](#) and DESC’s automotive operation. So, here’s the kicker: DESC is one of **Mexico’s** largest automotive component suppliers. So much for “all American.”

So, what do the poor C5 and C6 drivers do with their clunky shifting T-56? Well, there are apparently two solutions to any shifting difficulty you may have. First, build a better transmission. That’s what GM’s new TremecTR-6060 is attempting to do by making many internal modifications to the previous unit. This advantage cannot be easily overcome on existing T-56s without extensive modification of your tranny. Unless you’re into racing, no one will spend money to tear down their stock transmission to slightly improve the shifting. The second issue revolves around stock transmissions that over time become more difficult to shift in certain gears. There has been extensive discussion about reducing such difficulties with the T-56’s by changing your transmission fluid or replacing it with synthetics or even some sort of non-ATF.

For prospective, let’s see where Corvette manual transmissions have gone over the decades. For those of us with older cars, the manual transmission fluid was oil. Specifically, 90 weight (SAE 90W) Multi-purpose gear lubricant in the C1s with GM allowing either 80W or 90W in the C-3s. Even mineral oil was permitted according to the owner’s manual in the C1 days. Nowadays, if you’ve ever rebuilt your early model Vette tranny, you’ll find these lubricants are not easily available. I had to go with a 75-90W when I rebuilt the 62’s transmission since straight 90W cannot be easily found. When I did, I used fully synthetic gear oil. Most folks have a mistaken belief that synthetic just means slipperier. Actually, the main advantage of synthetic oils is the much higher resistance to thermal breakdown.

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So, what’s the story with the modern manual transmission? Well, first of all, because of tiny needle bearings and blocking ring materials, modern 6-Speeds don’t use gear oil. They are filled with automatic transmission fluid from the factory. In particular, C5 and early C6 owner’s manuals recommended DEXRON III automatic transmission fluid (ATF). DEXRON is a specification, by the way, not a name brand manufacturer. The 2007 and 2008 Corvette recommend Manual transmission fluid, GM Part #88861800 because GM let the DEXRON license expire in 2006. DEXRON III spec H was in use before GM gave up its license. Since GM no longer controls the current DEXRON spec, I cannot say that DEXRON III produced nowadays is totally compatible with previous GM recommended product. I might add that one source noted the 2008 car uses Texaco ATF Type III 1863 fluid instead of the above GM manual transmission fluid. Nevertheless, no C5 or C6 manual ever recommends any periodic changing of the manual transmission fluid. Essentially, it’s fluid for life.

The hype over the Internet revolves around synthetic fluids. To improve shifting should a T-56 owner just replace the DEXRON ATF or put in a synthetic ATF? Many Vette owners contributing to forums claim that changing the manual transmission fluid definitely improves shifting. However, the battle rages over exactly what fluid. In particular, early C5’s (1997 – 2000) have blocking rings in the transmission that have paper (cellulose based) liners whereas later transmissions had blocking rings made with a synthetic compound, a Kevlar/carbon fiber. Some sources claim that synthetic fluid can deteriorate the paper-based rings and cause further problems with the transmission. Others claim all sorts of success using a variety of synthetic automatic transmission fluid (ATF) and even some say that they use paraffinic base stock products, like GM synchromesh fluid, in place of ATF.

From my research, I can tell you some specifics recommendations. A GM service bulletin for another car that use the Manual transmission fluid, GM Part #88861800, also says that DEXRON III fluid may be used as a substitute. However, that same bulletin strongly warns that DEXRON IV fluid should never be used. So, here’s a case where the higher number, newer fluid is not the better fluid. I know many of you have see engine oil specs like SE go to SF then SG and so on. In that case, newer more stringent spec fluids are a valid substitute. In this case, it is not true. Use DEXRON III, not DEXRON IV.

Second, the rebuild manual for Tremec T-56 transmissions, while generally specifying DEXRON II ATF fluid, specifically forbids the use of gear oil in their transmissions because it “MAY DAMAGE THE BLOCKING RING MATERIAL”. So, you are left with the following options if you wish to change your manual transmission fluid to improve your transmission’s shifting: 1) Non-synthetic DEXRON III ATF, which comes from the factory. Or, 2) Some sort of synthetic ATF. By the way, what the heck are blocking rings, anyway? They are part of the synchromesh assembly. Here’s a comparison of the liners showing the earlier, paper based blocking on the left and the newer, Kevlar/carbon fiber lined blocking rings on the right.

By the way, note that the Tremec manual specifically notes that the wrong fluid may damage blocking ring material. In general, that is the heart of the discussion on the Internet forums. Some folks claim synthetic automatic transmission fluids meeting the DEXRON III specification can be substituted **at will** for DEXRON III non-synthetic fluids. Others say and claim to have proof, that while this may not be a problem on 2001 and later Corvettes using blocking rings with the Kevlar/carbon fiber, using synthetic fluids could cause trouble in 1997 – 2000 Corvettes with paper-based lined blocking rings in their T-56 transmissions.



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Since the Tremec manual specifically says that the blocking rings may be damaged by what amounts to a fluid of different chemical make-up, I don't feel it's wise to simply blow off those folks who claim that synthetic ATF may do the same thing.

So, what's the point in this article? Simple: Don't believe everything you hear from friends or some mechanic. When it comes to using anything different than stock components or fluids in your \$50,000+ sports car, it's wise to do your own investigation. Remember my article about headlights and the "replacement" blue bulbs that emulated HIDs? If you have shifting issues with your T-56, and you feel changing the fluid with the stock ATF may help, as many claim, it is certainly not out of the question. At roughly \$10/quart for 3.7 quarts without labor, it's not a bad price to make your driving experience more pleasurable. Once you factor in labor, it could be quite a bit more. But remember, changing fluid in a manual transmission is not nearly as difficult a task as an automatic. I've done it a half dozen times in my garage over the years. Once you decide that Synthetic is your bag of tea, because it sounds high-tech and cool, then I'd get into the books, especially if you have a pre-2001 C5. In case you wonder why I write tech articles about such a picayune issue, that's easy to answer: This discussion has already affected one of our Club members.

For reference, here the Tremec Service letter regarding fluids in their manual transmissions.

Service Topics Number: 2-03

Date: March 14, 2003

Subject: Recommended Fluids

Transmission Models Affected: All

Due to various synchronizer materials used in TREMEC transmissions, and different climates and applications, no one single fluid will work for all transmissions. For example, fluids that are high in sulfur content may damage the surface of brass blocker rings found in many transmissions, while some oils may damage the bonding material used in carbon fiber papers. Heavy weight oils generally provide better lubrication to bearing surfaces; however they may cause harder shifts, particularly in cold weather.

Recommended oil change intervals should be based on specific usage. In most cases a "fill for life" is adequate, while in severe applications such as drag racing, or road racing a more frequent fluid change should be prescribed. Excessive heat will cause most fluids to breakdown and ultimately cause damage to the transmission. The transmission should be filled through the fill plug located on the side of the transmission. Proper fill level is achieved once the oil reaches the fill hole. Recommended fluids by transmission model are listed below:

TR-3550 / TKO

GM Synchronesh has proven to provide the best performance for these transmissions, which use brass synchronizers.

T-5, T-56, TR-3650

These transmissions use a combination of brass, carbon fiber and paper-lined synchronizers. An ATF fluid such as Dexron III will provide the best results.