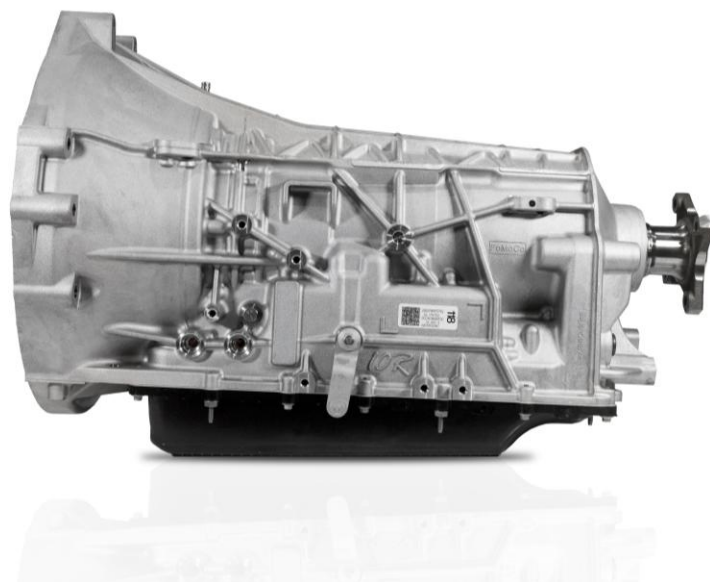




Tech Tips: Suncoast Performance

Automotive manufacturers rarely collaborate, particularly when they are direct competitors. However, tightening fuel economy and emissions regulations can force innovation in unexpected ways. That pressure led to the development of the Ford 10R80 10-speed automatic transmission, co-developed with General Motors, with Ford leading the engineering effort. The objective was ambitious: design a transmission capable of handling modern high-horsepower engines while achieving efficiency levels approaching a continuously variable transmission. The result now powers vehicles ranging from the Mustang GT and F-150 Raptor to the Expedition and Lincoln Navigator.

For SunCoast Performance, a leader in driveline engineering since 1989, the 10R80 presented both an opportunity and a challenge. In 2018, SunCoast made a significant investment in the platform, purchasing eight new 10-speed-equipped vehicles strictly for research and development. This allowed the engineering team to analyze real-world thermal behavior, clutch loading, pressure stability, and lubrication performance across street driving, towing conditions, and extreme performance use.



At the same time, SunCoast worked closely with the NMRA to help develop the 8.60 racing class, which was built specifically around the Ford Mustang and the new 10-speed transmission. SunCoast sponsored the class and collaborated directly with racers campaigning SunCoast-equipped transmissions. Racing dramatically accelerated the learning curve. Failures observed under competition conditions closely mirrored those seen in daily-driven and towing applications, only occurring at a much faster rate. This reinforced a critical conclusion: solving high-RPM and high-load degradation would directly improve long-term durability across all use cases.



The engineering priorities quickly became clear. Clutch capacity, heat management, lubrication circuits, and hydraulic consistency were the primary limiting factors. Solutions developed for the 10R80 also proved applicable to the broader 10-speed family, including the 10L80, 10L1000, 10R60, and 10R140.

From a design standpoint, the 10R80 is already an impressive transmission. Its wide 7.39 overall ratio spread, deep 4.70 first gear, and close ratio spacing limit RPM drop to roughly 20 percent per shift. This keeps the engine in its optimal power band, improving acceleration, drivability, and efficiency. The tight spacing also allows for more aggressive camshaft profiles in naturally aspirated builds and improved boost recovery in forced-induction applications.

SunCoast's upgraded 10R80 builds on these strengths with targeted internal improvements. Raybestos GPZ friction materials are used throughout all clutch packs, providing higher friction coefficients, improved heat resistance, and increased torque capacity. These materials perform more effectively as load increases, reducing slip and improving shift consistency under demanding conditions.

Known weak points within the transmission, particularly the heavily cycled D, E, and F clutches, are addressed through expanded-capacity clutch modules. By increasing clutch count and surface area, SunCoast reduces thermal saturation, minimizes wear, and improves clutch longevity without requiring case machining or modification.

Hydraulic control is equally critical. The SunCoast Pro-Loc valve body corrects deficiencies in lockup and apply circuits, delivering faster and cleaner torque converter clutch engagement. This reduces heat generation, improves shift quality, and helps prevent premature converter clutch failure. Supporting this is the Pro-Loc



high-output pump, which eliminates pressure instability and cavitation at high RPM while maintaining consistent line pressure across the operating range.

The result is a Ford 10R80 transmission engineered with intent. It is race-validated, street-proven, and designed to meet the realities of modern performance demands. It is not just stronger, but more consistent, more efficient, and built for long-term reliability. For more information on their 10-speed offerings, visit suncoastperformance.com.

