

R-1234YF VS. R-134A IN HEAVY-DUTY AND OFF ROAD HVAC SYSTEMS

Red Dot has been using its calorimeter and vehicle environmental chamber to measure the impact on current heavy-duty R-134a systems – including both CCOT and TXV control – when the refrigerant is replaced with the R=1234yf. Here is what our testing engineers found:

- The majority of systems showed no significant change in performance. The biggest drop in performance (22 percent) occurred when we did not change the expansion valve. This resulted in multiple unregulated factors, including the super heat and the speed of the electric compressor.
- It is imperative to change the refrigerant oil when using an alternate refrigerant, in order for both substances to properly mix, flow through the system and return to the compressor.
- Recover performance by using an internal heat exchanger, which increases the sub-cooling in the system.
- Do not use R-1234yf with an orifice tube, as it reduces the capacity, resulting in decreased efficiency and performance overall.

Heavy-duty recommended service procedure update

Because the off-road industry uses more charge, longer hoses, and higher CFM vacuum pumps in their recovery stations than on-road vehicles, service suppliers require different safety considerations, service equipment and service procedures for R-134a. As a chairman of the SAE HFTC6 committee, Robert Brocx (Red Dot's Technical Steward) is helping to draft industry regulation to address exactly this issue: "J3126: Air Conditioning Service Procedures for Heavy-Duty and Off-Highway Work Machines Using R-134a Refrigerant."

One area the guidelines will cover is standard protocol for identifying leaks. Unlike on-road vehicles, it is recommended that off-road technicians use nitrogen gas to identify leaks. Because this approach avoids air contamination and conserves resources, it should be recognized as an industry best practice.