Reprinted from
HEAVY DUTY AFTERMARKET Journal

INJECTOR INDEPENDENCE

When my dad started L&J Diesel in 1968, anyone could get into the fuel injection business and walk into Cummins or Detroit or Cat and buy tooling, test equipment, training and components. An independent could build an emissions-compliant injection system just like the OEMs.

You depended on the OEM for internal calibration, or the tolerances, of how this injector should perform when you tested it on a machine.

However, in the '90s, when emissions standards became difficult to meet, the OEMs did a lot of research and development on the fuel systems to control them electronically. The OEMs took advantage of this transition and said they weren't going to provide that information, schooling, components or tooling any longer.

Yet the EPA Clean Air Act of 2003 states very clearly that internal calibrations are to be made available for emissions-related components.

I'd say over 90 percent of the leap in emissions technology for the diesel engine is in the fuel system.

The big leap was the development of common rail, which allowed the injector to inject more than once in a cycle. The OEM can take advantage of that to lower emissions.

It's extremely difficult to test a common rail injector that's injecting multiple times in one cycle. One of the smallest amounts injected is about a millimeter cubed. There are 50 millimeters cubed in a single drop of water. And you're not just measuring that 1 millimeter cubed; you have to have high resolution in order to have precision testing. The resolution needed to define plus or minus tolerances is 1/10 of a millimeter cubed, or 2/1000th of a drop of water.

Why won't the EPA force OEMs to supply calibration data as called for in the Clean Air Act?

On top of that, we need to measure each separate injection within the cycle. I compare it to two fighter jets traveling 2 inches apart at twice the speed of sound – and measuring that gap over 20 times a second!

A major injection manufacturer spent over $1 billion to develop an instrument to measure these multiple injections, and the cost to distributors is astronomical. So I decided to come up with a different way to do it.

The fastest thing in the world is light. So we use fiber optics, in addition to a specialized flowmeter. Doing it with light is a less expensive way to do it, which allows the aftermarket to get back in the game.

The problem is, now we can measure those tolerances, but we don't have the correct numbers to compare them to, because the OEM doesn't give them out anymore.

Smaller repair facilities have been driven to repair and remanufacture electronic unit injectors without the ability to certify a repair meets or exceeds OEM and EPA standards. The aftermarket remanufacturing practices need internal calibration data for a "certifiable testing and validation" protocol.

Lack of this data has driven the aftermarket to focus emission reduction on exhaust aftertreatment using retrofitted product designs. Huge grants are available that focus solely on these aftertreatment technologies.

However, this approach does not address the problem of improperly remanufactured or serviced fuel injection equipment. With internal calibration data to standardize and verify procedures, these aftertreatment solutions would have an improved long-term effect with fewer emissions generated during the combustion process.

Providing a standard would go a long way towards lifting the quality of aftermarket repairs and reducing noxious emissions due to diesel engines, as well as contribute to small business preservation, the free competitive enterprise and to maintain and strengthen the overall economy of our nation.

Omar Cueto, owner of L&J Diesel Service and Dieselogic in Jacksonville, Fla., has been on a crusade since August 2009, speaking with numerous government agencies and industry groups about this issue. For more information, visit www.fiespec.org.