Calibration Results

Date: When Tested
Type: LB7 w/HighPO Point
Notes: LB7 (as received)

Injector	Test point MPa	Test point uS	Results QTY mm³/shot	Results STD%	Results BackFlow ml/min
#1 78817 6251			**280.70**	0.35	
			162.10	0.20	**30**
			2.78	2.62	
			37.55	0.51	Nozzle Flow ml/min
			11.19	1.13	**1490**
#2 58527 0839			**284.10**	0.39	
			166.20	0.57	**41**
			1.58	3.48	
			36.92	0.71	Nozzle Flow ml/min
			9.19	1.74	**1514**
#3 78817 6191			**281.00**	0.24	
			162.50	0.15	**25**
			2.10	3.80	
			37.31	0.72	Nozzle Flow ml/min
			9.58	1.16	**1548**
#4 78817 6193			**284.20**	0.12	
			164.30	0.24	**39**
			1.86	3.22	
			34.59	0.42	Nozzle Flow ml/min
			9.41	1.17	**1590**
#5 58527 5994 hot			**280.70**	0.23	
			166.70	0.19	**62**
			3.20	2.32	
			39.94	0.60	Nozzle Flow ml/min
			10.77	1.22	**1502**
#6 78817 2073			**280.20**	0.12	
			162.40	0.15	**33**
			2.06	2.81	
			36.48	0.51	Nozzle Flow ml/min
			8.81	1.89	**1542**
#7 58527 5978			**276.90**	0.11	
			161.00	0.16	**48**
			1.97	3.52	
			39.85	0.46	Nozzle Flow ml/min
			12.31	1.07	**1496**
#8 78817 6195			**279.20**	0.13	
			163.30	0.63	**37**
			2.78	3.35	
			38.95	0.67	Nozzle Flow ml/min
			11.43	0.97	**1510**

			% Spread
Test Point	180	2800	2.60
	160	1700	3.50

Key
Output Spread within Factory Tolerances
Output Spread within Service Limits

Injector internal leakage - normal is 30 to 40 ml/min when they get 60 or above it's time to consider replacing internal pressure seal or entire injector depending on where leak is occurring. If full set is at 60 or higher hot start problems show up. End use should be considered. For all out competition leakage is less of a factor than for a street truck with single pump

Nozzle flow measurement done on our flow bench in ml/min. Divide by 1000 to get liters per minute. Viscor 1487 AW/2 Calibration fluid (SAE J967 or ISO 4113) at 100 bar 40 deg C

Injector shot to shot stability measurement. We use this information to detect internal injector problems such as debris, varnishing and wear

Injector output data at rail pressures and pulse widths shown. In spec is green, serviceable is yellow and out of spec is red

Injector number etched into each injector. **We use cylinder number if provided with set.** Injector factory build date and serial number are recorded for future troubleshooting if it is still visible.

Injector test rail pressure and pulse widths - Typical values shown, we can test up to 195MPa (working toward 200+ Mpa) and any pulsewidth desired. Custom mapping available.

Summary of injector set as measured

why Exergy

With our background in OE development and manufacturing we bring a unique perspective to the high performance world. We know what features and specifications need to be to ensure proper function, we know how to produce them and how to verify they are correct. The verification process/equipment we use is very untypical of a standard diesel repair shop and allows us to look at many more system performance characteristics beyond average fuel output.

We test from idle to full power using factory calibration points and a few of our own points added for the high performance market. We can fully map injector sets and have done so for a number of customers who want to best utilize their stand alone ECU, or EFI Live capabilities.

We use equipment developed and used by Bosch for the design and development of diesel fuel systems (specifically common rail) and have the expertise on staff to properly operate and maintain this very sophisticated equipment. Some on our staff were part of the development of this equipment and common rail injectors when they were employed by Bosch. This equipment is not only able to measure injection quantity, but also shot-to-shot consistency and injection timing.

Based on the injector sets we have analyzed from others neither shot-to-shot consistency or injection timing is being controlled. In our opinion not only are these parameters not being controlled, they likely are not measured. They are making changes that bring the injectors output into calibration at a few low pressure test points, but in doing so they are unknowingly affecting the hydraulic response of the injector to the electrical drive signal. We have seen injection timing vary up to 3 crank degrees on freshly "remaned/blueprinted" injectors within the same set.

When considering a high performance fuel system supplier be sure to ask if they provide test results from your injectors. Most performance injector sources measure output but how many are testing at full rail pressure? ...measuring shot-to-shot consistency? ...injection timing?

In summary, our "toolbox" (i.e., system knowledge, test equipment, modification processes, supplier base, ...) is very extensive. Most of us have been in the diesel business in excess of 15 years and have worked on the design and development of diesel fuel systems both mechanically and electronically controlled for everything from ships to single cylinder utility engines.

In our opinion, the preceeding discussion points are "why" you should choose Exergy. However, you do not need to just take our opinion, read on to learn what some of the top engine tuners' have said about our products and services.