

What Heavy-Duty Shocks were Installed on 1978-79 Corvettes?

The 1978 corvette was the heaviest Corvette ever built and the gross weight distribution from front to rear, unlike previous years, was managed by nine front coil spring options using computer selection with RPO FE7 getting the beefiest. Nearly 27 percent or 12,590 1978 Corvettes were equipped with FE7...with a great proportion installed on the Limited Edition Pace Car. The results of a study using GMAD manifests (buildsheets) reveals new insights into shock systems used in 1978-79 Corvettes that conflicts with Assembly Production Manuals (AIM) records. Results are supported by field observations (judging events) of shocks installed on various optioned 1978 Corvettes where the use of buildsheet data reconciles with those findings.

The push for safer automobiles began in the 1960s and by 1978, C3s had been caught up in numerous safety measures introduced throughout its production cycle. One measure was the mandated regulation for bumper height begun in 1968. Bumper height was required to fall within a “window” mandated by federal Motor Vehicle Manufacturer’s Association (MVMA) regulations. MVMA resulted in a proliferation of front coil springs. The maximum-to-minimum height window was a factor in certifying the 5-mph bumper introduced in 1973. As Corvettes got heavier, the need for a greater range of suspension systems grew to accommodate vehicle safety. By 1978-79, nine spring weights options were called out by computer to wrestle the heaviest Corvettes in history into compliance with bumper height requirements. Apparently, to dial in those beefy 1978 Corvettes, an extra heavy-duty rear shock was used, one scheduled for 1979 production!

Background

The inspiration to study what initially was viewed as shock-number anomalies, was the opportunity to go to school on the first and last Pace Cars built for dealer sales; VIN 900003 and VIN 906502. At the time, the pair were in the possession of Bud’s Chevrolet. Tom Hendricks invited me to visit Bud’s and bring a camera. He would have the pair set up on the lift for Bowtie-type viewing.



Figure 1: 1978 Pace Cars VIN 900003 and 906502.
Courtesy Bud’s Chevrolet

The task of a chassis judge, is to judge shocks by assessing condition and originality while casually observing only the obvious date codes and part numbers. However, Bowtie judging offers the curious chassis judge to note the series of embossed numbers,

both date codes and part numbers. After assessing hundreds of shocks, I couldn't help but note three rear shocks used in 1978; base suspension and then, apparently, two heavy-duty applications. That same year, the Good Year P Series tires were introduced with the much wider P255/60R15 (RPO QBS) requiring body modifications. Early speculation on my part was that the wider, heavier new tires were a factor in shock selection and complicated heavy-duty shock requirements. What remained was to determine what other options called out the 1979 FE7 rear shock.

A first step was to determine shock part numbers that were listed in the 1978 and 1979 AIMs. Those sources reported that GM# 498578 was the FE7 rear shock in 1978 and a carryover from 1977. Table 1 lists front and rear shock numbers for base suspension and heavy-duty suspension options along with broadcast codes.

Table 1
Shock Part Numbers & Broadcast Codes

Suspension Option	Base Suspension		Heavy-Duty Suspensions		
	Front	Rear	Front	Rear	
				RPO L82	RPO FE7
Part #	4984575	4984576	4984577	4984578	22012402
Broadcast Code	CH	CJ	CK	CL	CE

Note: Front spring chart calculations include vehicle curb weight and tire selection; and in 1978-79, base or RPO QGR (P225/70R15) versus the P255/60R15 GT Radial.

Field Study

Early on, low-mileage, 1978 Corvettes revealed shock part numbers not listed in the 1978 AIM. But it was an opportunity to study book-end Pace Cars built for resale by authorized Chevrolet dealers, Pace Car VINs 900003 and 906502. The pair offered clues that tied shock use to RPOs.¹ Both Corvettes were optioned with RPOs L82, M21, QBS and FE7. Both were equipped with the GM# 22012402 rear shock with label code **CE** (Figure 2). The front shock sported the heavy-duty **CK** shock. However, these Pace Cars were loaded and did not explain those power team applications that used the 1977 FE7 rear shock GM# 4984578. For example, a most unexpected finding was among 1978 coupes with various options whose owners also had the buildsheets, such as L48s! Often FE7 shocks were seen on coupes equipped with an L48 with and without tire options QBS and QGR (P225/70R15).



Figure 2: 1978-79 FE7 rear shock – CE

¹ Courtesy of Bud's Chevrolet, author visited and viewed both Pace Cars in 2011.

In particular was VIN 406069, an RPO B2Z (Silver Anniversary paint scheme) equipped with L48, QBS, ZN1 and FE7 but sporting the GM# 22012402 shock.

It became apparent with our field studies that the GM# 22012402 shock was installed on 1978 Corvettes when optioned with FE7 regardless of engine or tire size. But what determined when the heavy-duty, and former FE7 rear shock GM# 4984578 was used? What combination of options called it out and here we look to buildsheet data.

Buildsheet Data

The strongest data that supports field observations that a second heavy-duty rear shock was used in 1978 comes from buildsheet data that lists three rear shock broadcast codes; **CE**, **CJ** and **CL**. When RPO FE7 is listed, **CE** is called out while **CJ** is called out for base suspension. The third rear shock, **CL** is listed in the 1978 AIM and, as noted above, used in 1977 for FE7.

However, it took the analysis of buildsheet data to understand the option combinations that called out the **CL** shock, given the additional factor in 1978 was RPO QBS, the Good Year P255/60R15 that factored into the weight and bumper height requirements. Interestingly enough, model type (Pace Car vs. coup), transmission selection or tire size as well as other options did not have a significant affect rear shock selection. It came down to engine RPO; L48 vs. L82.

Figure 3, 4 and 5 are snapshots of buildsheets; Figure 3 shows a 1978 manifest (buildsheet) with RPO FE7 and **CE** for the rear shock; Figure 4 is a 1978 L82 non-FE7 and shows **CL** and; Figure 5 is a 1979 with RPO FE7 and **CE**.

The buildsheet analysis showed that with base suspension and L48, the **CJ** rear shock was called out; when the buildsheet listed L82 and base suspension, **CL** was called out. The L82 adds 20 pounds of weight to the vehicle, given the use of forged rods, crank and pistons, (L48 uses castings), the addition of emission equipment, and exhaust pipes (2 ½”) to support L82 operations. The front shock **CK** was used for heavy-duty shock applications, both **CE** and **CL**. The **CH** front shock was called out for all base

5WB	CH								
15	16	17	18	19	20	21	22	23	24
FRONT SPRING	REAR SPRING	FRONT SHOCK	REAR SHOCK	STRUT KNUCKLE	STEERING GEAR	STABILIZER BAR			
ANY	ANY	NFT	CK	CE	B1 82	WZ 296596			

Figure 3:
1978 FE7: Box# 17 (CK) and 18 (CE) FE7 codes

5WB	CH								
15	16	17	18	19	20	21	22	23	24
FRONT SPRING	REAR SPRING	FRONT SHOCK	REAR SHOCK	STRUT KNUCKLE	STEERING GEAR	STABILIZER BAR			
AJ	AJ	NFS	CK	CL	B1 82	WZ 296518			

Figure 4: 1978 L82/non-FE7: Box# 17 (CK) and 18 (CL) codes. Note box# 16 (NFS) and 21 (518) lists base suspension broadcast codes.

UH	OJ								
15	16	17	18	19	20	21	22	23	24
FRONT SPRING	REAR SPRING	FRONT SHOCK	REAR SHOCK	STRUT KNUCKLE	STEERING GEAR	STABILIZER BAR			
AHY	AHY	NFT	CK	CE	49 50	WZ 296596			

Figure 5:
1979 FE7: Box# 17 (CK) and 18 (CE) FE7 codes. Note box 21 shows FE7 front stabilizer code.

suspensions. Buildsheet data supports the view that **CE** rear shock was the application for RPO FE7 for either L48 or L82 engine options. To summarize, rear shock broadcast code call outs are as follows:

- Code **CE** used each time FE7 is specified
- Code **CL** used when L82 is specified and non-FE7 optioned
- Code **CJ** used when L48 is specified and non-FE7 optioned
- Code **CK** used for heavy-duty front shock applications.

Note that Figure 4 represents a heavy-duty shock application but with base suspension components. Compare boxes 15, 16 and 21 in Figure 4 with either Figure 3 or 5 where FE7 suspension parts are referenced. Figure 6 illustrates the FE7 rear spring code.

Table 2: Broadcast Code Box References

Box #	Broadcast Code Description
15	Front springs
16	Rear leaf spring
17	Front shock
18	Rear shock
19	Steering knuckle
20	Steering gear
21	Stabilizer bar – front



Figure 6:
NFT FE7 rear spring broadcast code. Box 16 on GMAD manifest.

Summary

The link between field study and buildsheet data stems from the availability of owners with low-mileage 1978 Corvettes that have the vehicle, buildsheet and original suspension, and willing to share the vehicle and its documents. As a result, this study reveals that in 1978, three shock options were used with RPO FE7 using the heavy-duty shock intended for 1979 production. Also learned is that all Z78s were equipped with RPO QBS or the P255 Radial GT tire. However, not all Z78 optioned 1978 Corvettes called out **CE** for the rear shock; it became dependent on engine size.

Once more, this author is grateful to John Hinckley who provided insights into the St. Louis assembly process. In an NCRS Technical Forum, he discussed the proliferation of coil springs and the use of “computer-selection” to meet the MVMA bumper height requirement. Hinckley revealed that Corvettes did not require the number of variables as the Caprice/Impala that used numerous combinations including tire size options and load rate number. The “lightweight” Corvette got away easy...initially!

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