

# Mwrench Spring Dyno

Mwrench has been busy this Holiday season! Finally got the necessary test equipment in to fabricate a Spring Dyno! I could have bought one complete and ready to go but didn't like the design. Most of the low cost Spring Dynos (<\$1000) would only measure a spring of 6 inches diameter or smaller. The main reason to do the exercise was to measure springs for the BMW E31. The E31 front springs plus spring perches are over 7 inches in diameter.

In addition, I wanted a Spring Dyno that I could measure an installed spring on the strut assembly. The Spring Dyno that I constructed is 4 feet tall and will accommodate a fully assembled E24, E28, E30, E31, E32, E34 strut assembly. Spring compression numbers may now be compared with various springs and shocks to get a better idea of ride height and compliance.

The electronic measurement for the compression in inches hasn't been finished yet but the numbers using a veneer caliper is getting consistent results. Once I have the precision digital Z axis measurement, I will re-run the test and compare the results.

Future efforts will be to make an adapter that can measure the twist resistance of anti-sway bars, both front and rear.

Please look at the accompanying chart, It is confirmed that the H&R front springs are indeed linear (not progressive) and the H&R rear springs are indeed softer then the stock OEM E31 rear springs.

Enjoy!  
Ed

04-Jan-06



Front E31 OEM spring.



Front E31 OEM CSI spring.



Front E31 H&R spring



Rear E31 spring



Rear E31 spring compressed



Rear E31 CSI spring



Rear E31 H&R Spring

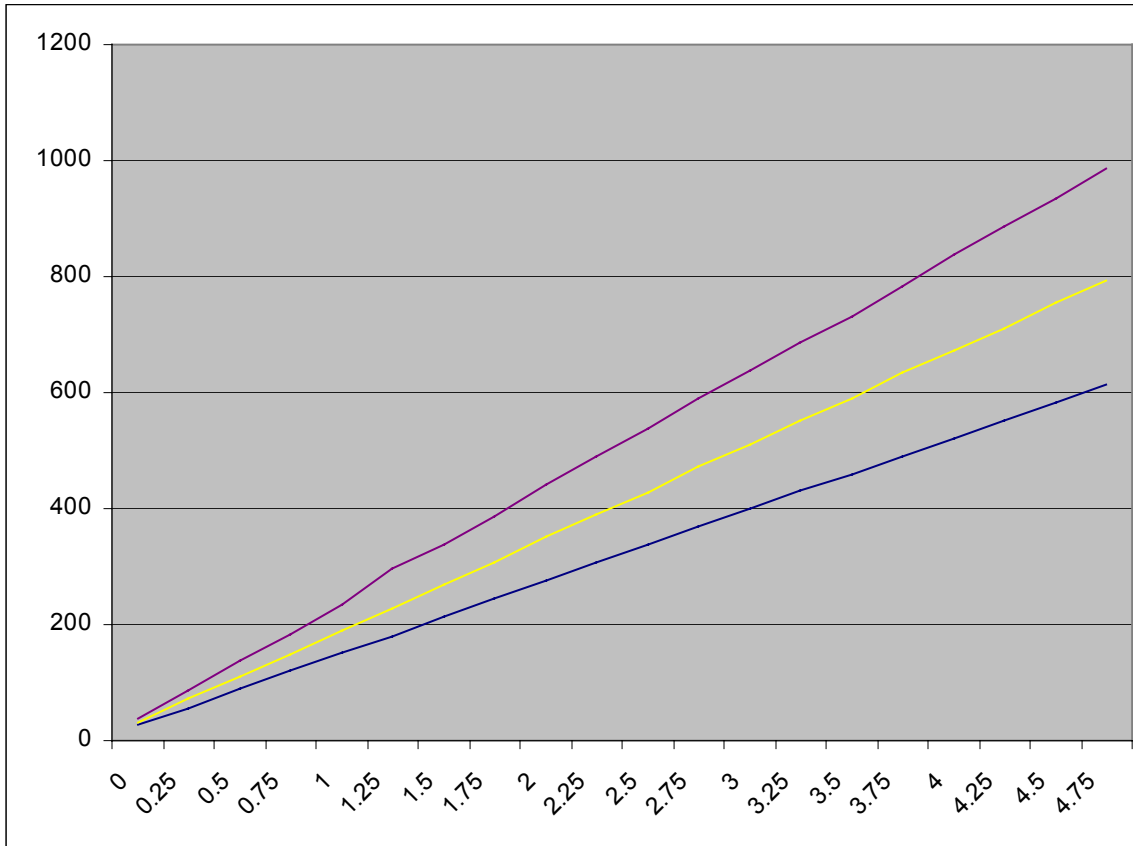
E31 front Spring Rate

2-Jan-06

Comp	CI	Lb/inch	H&R	Lb/inch	CSI	Lb/inch
0						
0.25	26		32		38	
0.5	56		71		86	
0.75	90		110		137	
1	120	120	148	148	184	184
1.25	152		189		235	
1.5	181		229		295	
1.75	213		270		339	
2	245	125	307	159	387	203
2.25	276		352		440	
2.5	306		390		490	
2.75	338		429		538	
3	368	123	472	165	588	201
3.25	400		510		638	
3.5	430		552		685	
3.75	460		588		732	
4	491	123	633	161	784	196
4.25	522		673		837	
4.5	553		711		887	
4.75	583		754		933	
5	614	123	792	159	987	203

test range |  
11 inches

6 inches



**E31 Rear Spring Rate**

2-Jan-06

Comp	CI	lb/inch	H&R	lb/inch	CSI	lb/inch
0						
0.25	95		75		132	
0.5	186		154		257	
0.75	277		239		382	
1	369	369	318	318	515	517
1.25	469		398		660	
1.5	562		482		801	
1.75	656		557		940	
2	747	378	638	320	1092	575
2.25	841		720		1244	
2.5	937		804		1408	
2.75	1033		889		1589	
3	1129	383	970	332	1752	660
3.25	1225		1057		1928	
3.5	1321		1141		2096	
3.75	1420		1225		2276	
4	1520	398	1310	340	2450	698

test range |  
12 inches

8 inches

