

My spreadsheet used to determine stroke for the knucklehead project.

### Engine Sizes and Piston Speeds

$$S_{pm} = \frac{2 \times \text{stroke inches} \times \text{RPM}}{12}$$

Stroke		3 1/2	3.968	4 1/4	4 3/8	4 1/2	4 5/8	4 3/4	5	5 1/4				
Bore	3 7/16	65.0	73.7	78.9	83.5	85.8	85.9	88.2	92.8	97.5				
	3 1/2	67.3	76.4	81.8	84.2	86.6	89.0	91.4	96.2	101.0				
	3 5/8	72.2	81.9	87.7	90.3	92.9	95.5	98.0	103.2	108.4				
	3 11/16	74.8	84.8	90.8	93.5	96.1	98.8	101.5	106.8	112.2				
	3 13/16	79.9	90.6	97.1	99.9	102.7	105.6	108.5	114.2	119.9				
	3 7/8	82.6	93.6	100.2	103.2	106.1	109.1	112.0	117.9	123.8				
	4	88.0	99.7	106.8	110.0	113.1	116.2	119.4	125.7	131.9				
	4 1/8	93.5	106.1	113.6	116.9	120.3	123.6	127.0	133.6	140.3				
	4 1/4	99.3	112.6	120.6	124.1	127.7	131.2	134.8	141.9	149.0				
	4 3/8	99.3	119.3	127.8	131.5	135.3	139.1	142.8	150.3	157.8				
4 1/2	111.3	126.2	135.2	139.2	143.1	147.1	151.1	159.0	167.0					
Piston Speeds in feet per minute, fpm														
Recommendations for normal safe engine life														
Cast iron crankshafts limit = 3500 fpm														
Forged crankshafts limit = 4000 fpm														
Drag Racing components extreme limits = 5500 fpm														
HD Stock 4.0" stroke @ 5500 rpm = 3670 fpm														
HD 103" Stroker 4 3/8" @ 6200 rpm = 4521 fpm														
Piston Speed in fpm														
Stroke		3 7/8	3 31/32	4	4 1/8	4 1/4	4 3/8	4 1/2	4 5/8	4 3/4	5	5 1/8	5 1/4	5 1/2
RPM	3500	2260	2315	2333	2406	2479	2552	1750	2698	2771	2917	2990	3063	3208
	4000	2583	2646	2667	2750	2833	2917	3000	3083	3167	3333	3417	3500	3667
	4500	2906	2977	3000	3094	3188	3281	3375	3469	3563	3750	3844	3938	4125
	5000	3229	3307	3333	3438	3542	3646	3750	3854	3958	4167	4271	4375	4583
	5500	3552	3638	3667	3781	3896	4010	4125	4240	4354	4583	4698	4813	5042
	6000	3875	3969	4000	4125	4250	4375	4500	4625	4750	5000	5125	5250	5500
	6500	4198	4299	4333	4469	4604	4740	4875	5010	5146	5417	5552	5688	5958
Shovel Head 74" Stroke = 3 31/32														
80" Stroke = 4 1/4														

Supra X stroke 123mm

$$S_{pm} = \frac{2 \times 4.055 \times 5400}{12}$$

$$RPM = \frac{4000 S_{ps} \times 6}{4.055}$$

With OEM crank - RPM limit should be 6000. Above that piston speed for anything other than short bursts become too high's

4 1/2" stroke @ 4000 rpm = 5333 rpm  
 4 1/2" stroke @ 4500 rpm = 6000 rpm  
 5.0" stroke @ 4000 rpm = 4800 rpm  
 5.0" stroke @ 4500 rpm = 5400 rpm