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Derek Atterbury's 1984 SS

History of the Small Block Chevy

How to Build & Modify Chevrolet Small-Block V-8 Pistons, Rods & Crankshafts, Motorbooks International, 1992

The small block was introduced in 1955 with 265cid. Unless you are restoring a car and want to be exact in every detail, the early 265 block is not one to use since it has no oil filter. During 1956 this was rectified and the engine continued in production until 1957. In 1957, the engine size was stepped up to 283cia. This engine, with its 3.875in bore and 3.000in stroke, continued production until 1967. Up to about 1958 the small block Chevrolet used a rope type rear main seal,but from this point to the 1986 model the now familiar split neoprene seal was used.

In the 1962 model year the Corvette came out with 327cia. This was the first of the 4.000in bore motors, and set the stage for what was to become the most common bore size among small blocks. Equally note worthy is the fact that the stroke was increased to 3.250in. This necessitated larger counterweights and as a result, some substantial internal modifications had to be done to the 283 design to accommodate a crank shaft with larger counterweights.

From 1967 to 1969, the 302 was produced, although it was probably developed just so Chevrolet had an engine size eligible for TransAm racing. In 1967, it was produced with the small journal crank and in 19681969, with the big journal crank. The year 1967 also saw the introduction of the 350cia engine. This now classic configuration utilized a 4.000in bore with a 3.480in stroke, and has probably become the most common engine size. Along with the introduction of the 350 came the standardization on the big main journals.

In the 1968 model year when the 350 was introduced, blocks moved into the big journal crankshaft era and the 327 was produced both in small and big journal size. This means if you have a 327 big journal crank, you can make a 327 engine out of a 350. Later 327s from 19681969, when the engine was dropped, had bigger main bearing journals than earlier engines. In 1968, the 307cia engine was introduced as a kind of economy engine. It had the 3.875in bore of the 283 and used a cast crank with the 3.250in stroke of the 327 and was produced up to 1973.

The next major milestone in terms of performance was the introduction in 1970 of the 400cia block. This deviated from the standard format in many respects. First, it used a nominal 4.125in bore, as opposed to the 4.000in bore that had become the norm. To achieve the 4.125in bore, some internal casting core changes were necessary. The most obvious external change was the use of three freeze plugs in the side of the block. To accommodate this larger bore size, the bores were siamesed; there was no water between the cylinder bores because the barrels joined in the water jacket. In contrast, all other blocks have water completely surrounding each cylinder bore. Along with this change in the bore size, the 400 motor was equipped with a 3.750in stroke cast crankshaft. To get this bore & stroke combination within the confines of the standard 9.025in crankshaft center to block deck height it was necessary to shorten rod length if the stock piston ring package was to be retained. The standard 5.70in rod was then shortened to 5.56in.

In 1975, the 262cia engine was introduced with a 3.671in bore and a 3.100in stroke. It was intended as a low output economy engine but obviously did not prove popular as it was produced for only one year.

In 1976, the 305cia engine was introduced, which must be the most plentiful engine in existence, next to the 350. Built largely for emission and mileage reasons, this engine sports a 3.763in bore with the crankshaft stroke of the 350 at 3.480in. As of 1992, the 305 is still being produced and looks as if it will continue in production for some time.

In late 1979, a 267cia engine was introduced. This had a 3.500in bore along with the 3.480in stroke of the 350. Like the earlier 262, it was intended as an economy engine, both in terms of cost and fuel consumption. Again like the 262, it did not prove popular and was produced only through model year 1982.

As of 1983, only two displacements of small block were produced the 305 and 350. In 1986, a block design change was made concentrating on the rear main oil seal. Instead of having a split oil seal, the rear main bearing now used a full 360degas. one piece seal. Using this type of block usually requires using the relevant crank and flywheel, as a crankshaft design change was also made. If you have an early crank, Chevrolet has a special seal adaptor kit to convert 1986 and the late block to accept pre 1986 cranks.

A hydraulic roller version of this new block was also introduced at about the same time. The roller follower assembly is not interchangeable with later blocks. Unlike after market rollers that are prevented from rotating by linking them in pairs, the General Motors roller setup has special slotted plates that locate lifters and keep the rollers aligned with the cam lobe.

SBC Casting Numbers

Casting #	Years made	Size	HP levels used for	Notes
3703524	55	265	N/A	Passenger First 6 mos. used mech. cam not hyd.
3720991	56 - 57	265	N/A	Truck/Pass
3731548	57	283	N/A	N/A
3556519 3737739	58 - 61	283	220-290	2-Bolt mains/Truck/Pass
3849852	58 - 64	283	220-315	2-Bolt mains/Truck/Pass
3789935 3864812	62 - 64	283	230-315	2-Bolt mains/Truck/Pass
3959512	62 - 63	327	250	2-Bolt mains
3789817 3794460	62 - 64	327	250	2-Bolt mains Truck/Pass
3858174	62 - 67	350, 327 & 302	210-350	2-Bolt mains/Truck/Pass
3782870	62 - 67	327	250-375	2-Bolt mains/Truck/Pass
3858180	62 - 67	327	250-375	2-Bolt mains/Truck/Pass
3791362	65 - 67	327	N/A	2-Bolt mains/Chevy II
3892657 3782870 3903352 3789817	64 - 67	350, 327 & 302	210-350	2-Bolt mains Truck/Pass
3849852 3849935 3896944 393288	65 - 67	283	N/A	Truck/Pass
389257	67 - 69	302	N/A	2-Bolt mains 67 Small Journal (327 block) 68-69 Large Journal (350 block)
3914653 3914636 3932373 3970020	68 - 73	307	N/A	Truck/Pass
3956632	69	307	200	2-bolt mains
3914660	68	327	210-275	2-bolt mains
3790041	68 - 69	327	210-300	2-Bolt mains

3814660 3955618				Corvette/Camaro/Hi PO
3914678	68 - 79	350, 327 &: 302	210-350	2-Bolt mains
3855961 3958618 3970014 6259425	68 - 76	350	210-300	2-bolt mains Pass.
3970014	68 - 79	350	200-255	2&4-Bolt main
3956618 3932386	68 - 79	350 & 302	250-300	4 bolt mains Truck/Hi Perf
3970010	68 - 79	350 & 327	145-375	2&4-Bolt mains/Truck/Hi Perf
3932388	69	350	300	4-bolt mains
3951511	70 - 73	400	255-265	4 Bolt mains/HD Truck/Pass
330817	70 - 80	400	150-180	2-Bolt mains
360851	74 - 76	262	N/A	Monza
3951509 3030817++	74 - 76	400	150-265	2 Bolt Mains ++High Nickel Block
460776 460777 460778 361979	78 - 79	305	N/A	Lt. Truck/Pass
14016379	78 - 79	350	N/A	Lt.Truck/Pass
366245*	78 - 79	350	N\A	4-Bolt mains *Bowtie High Tin Dipstick in Pan
1401280 14016376 471511	79 - 82	267	N/A	Passenger
14010201 14016381 14010202 14010203	80 - 84	305	N/A	Lt. Truck/Pass
1401029 14010207 14010209	80 - 85	350	205 & up	2&4-Bolt mains Passenger cars
14011064*	82 - 86	350	N\A	4-Bolt mains/*Bowtie High Tin
14088548 14093638 14316379	86 - 88	350	205 & up	2&4-Bolt mains 1 piece rear main seal.

SBC Head Casting Numbers

Casting #	Years made	Valve Size	HP levels used for	Chamber Size / Notes
3782461	61-70	1.94/1.50 & 2.02/1.6	250-375	64 CC Chambers No bolt holes These are the double humps.
3890462	62-68	1.94/1.50	250-350	64 CC Chambers

		& 2.02/1.6		No bolt holes These are also double humps.
3927185	69	1.72/1.50	200-210	70cc Chambers
3927185	69	1.72/1.50	200-210	70cc Chambers
3917293	68	1.72/1.50	210	76cc Chambers
3917291	62-69	1.94/1.50 & 2.02/1.6	275-350	64 CC Chambers No bolt holes These are the 'Turbo' heads.
3927186	68-72	1.94/1.50 & 2.02/1.6	290-370	64 CC Chambers has bolt holes These are the 'powerpack' heads.
3932441	67-79	1.94/1.50	250 & 255	76 CC Chambers Intake flow 152 CFM Exhaust flow 93.2 CFM
3947040	68-70	1.94/1.50 & 2.02/1.6	290-370	64 CC Chambers
3947041	68-70	1.94/1.50 & 2.02/1.6	290-370	64 CC Chambers
3973414	64-70	2.02/1.6	360 & 370	64 CC Chambers Z-28 & Corvette LT-1.
3973487	68-79	1.94/1.50 & 2.02/1.6	165-330	76 CC Chambers X casting has 10 more intake cc volume.
3998993	68-79	1.72/1.50 & 1.94/1.50	115-175	76 CC Chambers Intake flow 150.8 CFM Exhaust flow 91.1 CFM
333882	70-80	1.94/1.50	150-180	76CC Chambers Intake flow 137.2 CFM Exhaust flow 95.4 CFM
462624	76-87	1.94/1.50 & 2.02/1.60	Not listed	76 CC Chambers These are crack prone!

SBC Crank Casting Numbers

Casting #	Stroke	Years made	Main\rod Journal Size	Construction / Notes
1130	3.25	68-73	2.45/2.10	Cast large journal
3815822	3.00	67	2.30/2.00	forged Tuffrided Special Flange
14088532	3.48	86-88	2.45/2.10	Forged One Piece rear main seal.
3279	3.00	68-69	2.45/2.10	forged large journal High Perf.
3814671	3.25	68	2.45/2.10	forged large journal High Perf.
3729449	3.00	55-67	2.30/2.00	Forged small journal
3941182	3.48	68-76	2.45/2.10	forged large journal
3923279	3.00	68	2.45/2.10	forged large journal

				High Perf.
3782680	3.25	62-67	2.30/2.00	Forged Small Journal
3884577	3.25	66-67	2.30/2.20	forged small journal High Perf.
3911011	3.25	68-69	2.45/2.10	cast large journal
3941178	3.00	68-69	2.45/2.10	Forged large journal High perf.
3951529	3.75	70-80	2.65/2.10	Cast large journal Externally Balanced.
3932442	3.48	69-85	2.45/2.10	cast large journal
3892690	3.48	69-85	2.45/2.10	Forged large journal
3941188	3.48	69-71	2.45/2.10	forged large journal High Perf.
3911001	3.25	68-73	2.45/2.10	cast large journal
39411182	3.48	69-85	2.45/2.10	Forged large journal
354431	3.10	75-76	2.45/2.10	Cast large journal only found in the 262, makes good stroker crank for 283's

Intake Casting Numbers

Aluminum Intake Manifolds				
Part Number	**Carb Type**	**Year**	**Engine**	**HP**
3917610	4BBL Holley	1967-68	302	290 (Z/28)
3932472	4 BBL Holley	1969	302	290 (Z/28)
3941126	2X4BBL Holley	1968-69	302	290 (Z/28 crossram bottom half)
3941130	2X4BBL Holley	1968-69	302	290 (Z/28 crossram top half)
Cast Iron Intake Manifolds				
3877652	2BBL (all)	1967	327	210
			283	195
3905393	4BBL Rochester	1967	327	275
			350	295
3916313	2BBL Rochester	1969	350	250
3919801	2BBL Rochester	1968	327	210
3919803	4BBL Rochester	1968	327	285, 325

			350	295
3927183	2BBL Rochester	1969	307	200
			327	210
3927184	4BBL Rochester	1969	350	255, 300

Small blocks and HP recommendations

This is according to several sources, none which completely agree, so I used the lower values from several sources and rounded down to be safe...

2-bolt blocks with OEM main bolts are good to 400hp
2-bolt blocks with ARP main studs are good to 550hp ++High Nickel Blocks to 700hp
4-bolt blocks with OEM main bolts are good to 475hp
4-bolt blocks with ARP main studs are good to 700hp
OEM Blocks with Splayed 4-bolt main studs are good to over 950hp
Bowtie blocks with splayed 4-bolts main studs should handle over 1500+hp!

So essentially, a 2-bolt block w/ studs should handle anything a normally aspirated small block can produce. (assuming everything is in good shape and proper tolerances are closely followed)

Engine RPM plays even a larger factor in determining safe power limits for various block/cap combos.

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OEM 2-bolt blocks are good to 6000 rpm.
2-bolts with ARP studs are good to 7000 rpm.
OEM 4-bolt blocks are good to 7200 rpm.
4-bolts with ARP studs are good up to 8500 rpm.
Bowtie or OEM 4-bolt Splayed Studs and cap are good for well over 8500 rpm.

-These figures were aquired from a Super Chevy magazine, Popular Hot Rodding,
 and a couple local machine shops

In the Article, it stated that a 250hp engine that was spinning at 7500rpm exerted more loading force
on the Main-caps than a 550hp engine spinning at only 5500 rpm.  This means power and RPM must be considered
when selecting how much beef you need in your bottom end.

The HP figures are good references, but the RPM limit of the motor is a better way to choose your block
according to the authors of the article.
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Stock SS File	GM Vehicle Codes	Engine Tech	Small Block Info	Drivetrain Tech	Suspension Tech	Tires & Wheels
Emissions Legal SBC	Street/Strip SBC	Useful Formulas	How To's	Engine Swaps	Bracket Racing	Big Blocks