

## CADILLAC

1949-1975

331, 365, 390, 425, 429, 472, and 500

It was Cadillac (along with Oldsmobile) that brought out the first modern ohv American V-8 in 1949. The ohv V-8 set the pattern for the rest of the industry and would dominate American engine design until the early 1980s.

At the time, the Cadillac engine was considered to be an engineering marvel. Here was an engine that was smaller and lighter than the previous Cadillac V-8 and yet it produced more power. The engine design has been credited to three men—Harry F. Barr (the staff engineer who was in charge of Cadillac engine design and later helped design the Chevrolet small-block V-8), Edward N. Cole (chief engineer at Cadillac, who also went to Chevrolet along with Barr and later became president of GM), and John F. "Jack" Gordon (Cadillac's general manager, who also became GM's president).

The 331 cid Cadillac V-8, with a bore and stroke of 3.8125x3.625 in., put out 160 hp with a 7.5:1 compression ratio. The engine was 4 in. shorter and 4 in. narrower than the Cadillac flathead V-8, and it also weighed 188lb less. The reason for the engine's more compact dimensions was the new type of "slipper" piston design used on the engine, which was credited to Byron Ellis, a piston designer at Cadillac. The new slipper piston design, which had its sides cut away, enabled the piston to fit in between the crankshaft's counterweights at the bottom of its stroke. The use of this type of piston enabled the use of shorter connecting rods and therefore a shorter engine block.

The Cadillac V-8 engine had some interesting features that made it quite different from anything else offered in Detroit at the time. First, the engine's valves were located in the cylinder head, over the combustion chamber. The overhead valves were actuated by a camshaft located in the center of the engine, through a system of hydraulic lifters, pushrods, and shaft-mounted rocker arms. The engine also had an "oversquare" bore and stroke dimension, meaning that, unlike the flathead engines, the bore was larger than the stroke. Previously, it was thought that an engine, in order to produce enough low-end torque, would need to have a longer stroke and a smaller bore. (When an engine has the same size bore and stroke, the engine is said to be "square.") The oversquare design meant less piston travel (and therefore less wear) when compared to the long-stroke flathead. Another benefit of the new engine design was the possibility of using higher compression ratios, better engine breathing through larger and more direct porting and valves, and a more efficient combustion chamber design.

It took years for other manufacturers to come up with their own ohv V-8 engines. Chrysler came out with its Fire Power Hemi engines in 1951; the Lincoln V-8 was first used in 1952; and Chevrolet finally came out with the famous small-block V-8 in 1955 (it didn't break any new ground, but was rather a refinement of a previous design concept).

The 331 cid Cadillac V-8 was replaced by a bored-out version of the engine in 1956 that displaced 365 cid; in 1959 the engine was stroked to produce 390 cid.

The engine went through a complete redesign in 1963, yet it still had the same bore and stroke, for 390 cid. It was bored again

in 1964 to 429 cid, and this displacement was in product through 1967.

Once again, the engine went through a makeover in 1970. Displacement increased to 472 cid and to a whopping 500 cid in 1970. These displacements proved to be too large to continue during the 1970s, so the Cadillac V-8 was reduced to a still large 429 cid in 1977. Even that proved to be too large, so the engine was again reduced in size in 1980 to 368 cid.

The Cadillac V-8's emphasis over the years was to produce enough power to move the increasingly heavier Cadillac cars in a reasonable manner and do so in a quiet, unobtrusive, and reliable manner. In that respect, the engine has proved to be a success.

### 331 cid

The 331 was introduced in 1949, and it had a bore and stroke of 3.8125x3.625 in. It was rated at 160 hp with a two-barrel carburetor. The engine used shaft-mounted rocker arms, a hydraulic camshaft, forged-steel connecting rods, and cast-iron intake and exhaust manifold.

The 331 cid displacement would be in service until 1955, with increasingly higher output. This was due to higher compression ratios and the use of a four-barrel carburetor beginning in 1952.

### 365 cid

The Cadillac V-8 was bored to 4.00 in. in 1956, while retaining the 3.625 in. stroke. The engine kept the same basic configuration as the 331 cid engine it replaced, and by 1958, in its fourth year of production, the 365 cid engine was pumping out 310 hp with the four-barrel carburetor.

Cadillac also used a multiple-carburetor system in 1958. The engine used a Tri-Power induction system that featured three twin-barrel carburetors for a 335 hp output.

### 390 cid

With the same 4.00 in. bore and a longer 3.875 in. stroke, the Cadillac V-8 displaced 390 cid beginning with the 1959 model year. The engine would remain in service until 1962. With the four-barrel carburetor, power was up to 325 hp.

The optional Tri-Power induction system continued on the 1959–1960 engines, this time putting out 345 hp.

In 1963, the "old" 390 cid engine was replaced by a "new" 390 cid Cadillac V-8. Although both engines had the same bore and stroke and even the same power output, 325 hp, the only parts that interchanged were the cylinder heads and connecting rods.

The engine featured a new engine block that was shorter by 1.1 in. and that also had a lower deck height, by 0.445 in. This resulted in a more compact engine. The engine block was lighter, by 30lb, and it featured numerous internal modifications to strengthen its structure, as well as larger main bearings. Because the block was lower, shorter pistons were used. A major difference was the new front aluminum housing. Not only did it cover the timing chain but also provided mounting



the distributor, oil pump, water pump, and fuel pump. Even the oil filter was attached to the housing. The engine's intake manifold was also new. It sat lower in the valley between the cylinder heads—good for hood clearance but not good for high performance, which wasn't a primary concern at Cadillac, anyway. The new engine was 50lb lighter than the 390 cid it replaced.

### 425 cid

With more and more emphasis on fuel economy during the 1970s, even the Cadillac buyer became concerned with it. A 500 cid was no longer a strong selling point and no matter what you did with the engine, it would always be the definitive "gas guzzler." The Cadillac V-8 was destroked and debored to 4.082x4.06 in., for 425 cid. With an 8.5:1 compression ratio and all the usual emission gear, the engine was rated at 180 hp, SAE net. Interestingly, the original 1949 Cadillac 331 cid engine was rated at 141 hp net. The engine was in production through the 1978 model year.

### 429 cid

Almost immediately, the new 1963 390 cid engine was bored and stroked to 4.125x4.00 in. in 1964 for 429 cid. This was only 1 cid less than the Lincoln V-8. Power went up to 340 hp to help compensate for the Cadillac's greater weight.

The 429 cid engine would remain in service until 1967.

### 472 cid

The 472 cid engine was introduced in 1968 for several reasons. First, Cadillacs were still growing in terms of weight and size. The existing 429 cid Cadillac V-8 was at the limit in terms of practical displacement and the only way to get more cubic inches was through a new block that had wider bore spacing, which made bore increases possible. Lincoln also had brought out its 462 cid engine (and later in the model year, a new canted-valve 460 cid V-8), and it was important for Cadillac to have a larger displacement engine than Lincoln. It was a matter of pride. Before the gas crisis hit, Ford was going to increase the 460's displacement to 501 cid, but never did. The cubic-inch race eventually reversed itself into a contest of who could bring out the smallest V-8.

With a bore spacing of 5.00 in., there was plenty of room for a bore of 4.30 in. With a stroke of 4.06 in., the result was 472 cid. Power was at 375 hp with 525ft-lb torque.

Although all the major components of the engine (block, heads, and crank) were new, Cadillac kept the same configuration as the older V-8. All the engine accessories were driven from the front cover, and the oil filter was attached to the front of the engine.

### 500 cid

In 1970, the 472 was stroked to 4.304 in., for 500 cid. It was rated at 400 hp with 550ft-lb torque. It was, and still is, the largest passenger car engine made since 1949. The engine was in service through the 1976 model year when, with a four-barrel carburetor, it was rated at 190 hp, and with electronic fuel injection (EFI), at 215 hp.

### Engine Blocks

The Cadillac engine block was highly innovative when it first came out in 1949. It used five main bearings to support the crankshaft, and it was compact and much lighter than the flathead blocks. All Cadillac engines used two-bolt main-bearing caps. Pre-1963 blocks have different crankshaft main-bearing and rod bearing journal sizes than the 1963 and later blocks (see the table). Cadillac V-8 engines have used cast-iron crankshafts and forged-steel connecting rods. The 1968 and later engines used cast connecting rods.

### Cylinder Heads

Cadillac pioneered the wedge combustion chamber design. Cadillac cylinder heads had ports similar in configuration to those of

the Oldsmobile V-8 engine—paired intake ports while only the center exhaust ports were paired. All Cadillac cylinder heads used shaft-mounted rockers. The 1949–1967 heads used a conventional rocker shaft, while the 1968 and later engines had a different system. Paired rockers were mounted on a rocker arm support.

The 1949–1967 cylinder heads used removable valve guides; later engines had integral valve guides. Valve sizes are listed in the tables.

### Intake Manifolds

There wasn't much variety in intake manifolds for the Cadillac V-8. The 1949–1951 engines had a two-barrel intake manifold; subsequent engines had a four-barrel intake manifold. The exceptions were the 1955–1957 2x4V engines, 1958–1960 Tri-Power engines, and the 1976 and later EFI engines. All Cadillac intake manifolds were cast iron.

### Exhaust Manifolds

Cadillac exhaust manifolds were conventional cast-iron units. Front-wheel-drive Eldorado engines were equipped with manifold that specifically fit those engines and do not interchange with engines for rear-drive cars.

### Engine Identification

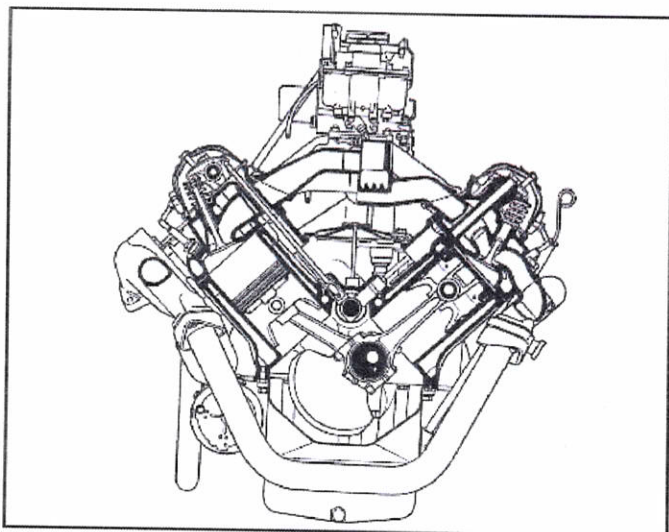
Each Cadillac engine block, cylinder head, and exhaust and intake manifold is cast with a casting number and a date code. The date code indicates the date the part was cast.

Cadillac also stamped the vehicle's VIN on the engine block, the location of which is listed in the table. Cadillac also used an Engine Unit Number (EUN), which was stamped into the left rear section of the engine block. The EUN recorded at what numerical sequence an engine was assembled, and in earlier years the number included letter(s) and numbers that indicated whether the engine or vehicle was equipped with such features as air conditioning, power steering, and/or other equipment (see the table). Gradually that practice fell into disuse, and the EUN simply recorded the engine assembly sequence in a given year. In such cases, the number started with the model year.

From 1972 to 1975, Cadillac included a letter code in the VIN indicating engine. An R code denotes a 472 cid engine; an S code denotes a 500 cid engine.

### EUN Codes

Series	Code
<b>1950</b>	
61	8-M-1 and up, m/t
60S, 61, 62, 75	9-M-1 and up, a/t
75, 86	2-M-1 and up, m/t
86	7-M-1 and up, a/t
<b>1951</b>	
60S, 61, 62, 75	9-N-1 and up, a/t
86	2-N-1 and up, m/t
86	7-N-1 and up, a/t
<b>1952</b>	
60S, 62, 75	9-R-1 and up, a/t
60S, 62, 75	4-R-1 and up, a/t, p/s
75, 86	2-R-1 and up, m/t
86	7-R-1 and up, a/t
86	5-R-1 and up, a/t, p/s
<b>1953</b>	
60S, 62, 75	9-S-1 and up, a/t
60S, 62, 75	4-S-1 and up, a/t, p/s
60S, 62, 75	4-SK-1 and up, a/t, p/s, a/c
60S, 62, 75	9-SK-1 and up, a/t, a/c
75, 86	2-S-1 and up, m/t
75, 86	2-SK-1 and up, m/t, a/c
86	7-S-1 and up, a/t
86	5-S-1 and up, a/t, p/s



The Cadillac overhead valve V-8 was quite revolutionary when it was introduced in 1949 and set the pattern for future American V-8 engines. It was smaller, yet more powerful, than previous Cadillac engines. Cadillac Motor Division

### EUN Codes

#### Series

86

86

#### 1954

60S, 62, 75

#### Code

7-SK-1 and up, a/t, a/c

5-SK-1 and up, a/t, p/s, a/c

#### Series

60S, 62, 75

60S, 62, 75

60S, 62, 75

86

86

86

86

#### 1955

60S, 62, 75 270 hp

60S, 62, 75 270 hp

60S, 62 270 hp

60S, 62 270 hp

86 250 hp

86 250 hp

#### 1956

60S, 62, 75 305 hp

60S, 62, 75 285 hp

60S, 62 305 hp

60S, 62 305 hp

86 285 hp

86 285 hp

#### 1957-1966

all series

all series

#### Code

4-TK-1 and up, a/c

9-T-1 and up, m/t

9-TK-1 and up, a/t

5-T-1 and up, p/s

5-TK-1 and up, p/s, a/c

7-T-1 and up

7-TK-1 and up, a/c

4V1 and up

4VK1 and up, a/c

7V1 and up

7VK1 and up, a/c

5V1 and up

5VK1 and up, a/c

4X1 and up

4XK1 and up, a/c

7X1 and up

7XK1 and up, a/c

5X1 and up

5XK1 and up, a/c

X, w/o a/c

K, w/a/c

### VIN Location

#### Year

1949-1958

1959-1967

1968-1975

#### Location

Upper right front corner of the engine block

Left side of the engine block

Upper part of the engine block, behind the intake manifold

### Engine Specifications

	Displacement	Carburetor	Horsepower	Torque	Compression Ratio	Notes
<b>1949-1951</b>						
	331	2V	160@3,800	312@1,800	7.50	
<b>1952</b>						
	331	4V	190@4,000	322@2,400	7.50	
<b>1953</b>						
	331	4V	210@4,150	330@2,700	8.25	
<b>1954</b>						
	331	4V	230@4,400	330@2,700	8.25	
<b>1955</b>						
	331	4V	250@4,600	345@2,800	9.1	
	331	2x4V	270@4,800	330@3,200	9.1	Eldorado
<b>1956</b>						
	365	4V	285@4,600	400@2,800	9.75	
	365	2x4V	305@4,700	400@3,200	9.75	Eldorado
<b>1957</b>						
	365	4V	300@4,800	400@2,800	10.0	
	365	2x4V	325@4,800	400@3,200	10.0	Eldorado
<b>1958</b>						
	365	4V	310@4,800	405@3,100	10.25	
	365	3x2V	335@4,800	405@3,400	10.25	Eldorado
<b>1959</b>						
	390	4V	325@4,800	430@3,100	10.50	
	390	3x2V	345@4,800	435@3,400	10.50	Eldorado
<b>1960</b>						
	390	4V	325@4,800	430@3,100	10.50	
	390	3x2V	345@4,800	435@3,400	10.50	Eldorado
<b>1961-1963</b>						
	390	4V	325@4,800	430@3,100	10.50	



Displacement	Carburetor	Horsepower	Torque	Compression Ratio	Notes
<b>1964-1967</b>					
429	4V	340@4,600	480@3,000	10.50	
<b>1968-1969</b>					
472	4V	375@4,400	525@3,000	10.50	
<b>1970</b>					
472	4V	375@4,400	525@3,000	10.00	
500	4V	400@4,400	550@3,000	10.00	
<b>1971</b>					
472	4V	345@4,400	500@2,800	8.50	
500	4V	365@4,400	535@3,000	8.50	
<b>1972-1973</b>					
472	4V	220@4,000	365@2,400	8.50	
500	4V	235@3,800	385@2,400	8.50	
<b>1974</b>					
472	4V	205@3,600	365@2,000	8.25	
500	4V	210@3,800	385@2,400	8.25	
<b>1975</b>					
500	4V	190@3,600	360@2,000	8.50	

### Engine Internal Dimensions

Displacement	Bore and Stroke	Rod Bearings	Main Bearings	Intake/Exhaust Valves
331	3.8125x3.625	2.2488-2.2493	2.499-2.4995	1.75/1.437 (1952-1955 1.75/1.562)
365	4.000x3.625	2.2488-2.2493	2.624-2.625	1.75/1.562
1959-1962 390	4.000x3.875	2.2488-2.2493	2.624-2.625	1.875/1.50
1963 390	4.000x3.875	2.2488-2.2493	3.000	1.875/1.50
429	4.130x4.000	2.2488-2.2493	3.000	1.875/1.50
472	4.300x4.060	2.500	3.250	2.00/1.625
500	4.300x4.304	2.500	3.250	2.00/1.625

### Block, Head, and Manifold Part and Casting Numbers

Year	Engine	Part or Casting Number	Year	Engine	Part or Casting Number
<b>Engine Blocks</b>			<b>Intake Manifolds</b>		
1957	365	1464819	1958	365	3511487
1958	365	1467267	1958	365 3x2V	casting 1469889
1959-1962	390	1469230, 1473257	1959-1960	390	3512079
1963	390	1469230, 1473267	1959-1960	390 3x2V	3512080, casting 1472225
<b>Cylinder Heads</b>			1961-1962	390	3512079
1949-1951	331	3630158 right, 3630157 left	1963	390	3512079
1952	331	3630263 right, 3630262 left	1964-1966	429	3632870
1953	331	3630323 right, 3630324 left	1967	429	3632881
1954	331	3630458 right, 3630455 left	1968	472	casting 1486425
1955	331	3630582 right, 3630583 left	1969	472	casting 1486425
1956	365	3630634 right, 3630635 left	1970-1972	472/500	3515328
1957	365	3630755 right, 3630754 left	1973-1974	472/500	3515539
1958-1963	390	(casting 1465406/1465431)	1975	500	3516375 (EFI), 3516179
		(casting 1473449/1468025)	<b>Exhaust Manifolds</b>		
1964-1965	429	3632907 right, 3632909 left	1949-1951	331	1453961 right, 1453754 left
1966-1967	429	3632909 right, 3632908 left, w/ A.I.R.	1952-1955	331	1461368 right, 1461495 left
1966-1967	429	3632907 right, 3632909 left, w/o A.I.R.	1956	365	1462987 right, 1464110 left
1968-1969	472	3633123	1957	365	1464237 right, 1464110 left
1970	472/500	3633450	1958	365	1469298 right, 1475463 left
1971-1973	472/500	3633544	1959-1962	390	1475390 right, 1475463 left
1974	472/500	3633917	1963-1964	390	1477980 right, 1475463 left
1975	500	3633979, 3633964, 3633917	1965	429	1481668 right, 1475463 left, Fleetwood 75
<b>Intake Manifolds</b>			1965-1967	429	1483915 right, 1482752 left
1949	331	casting 1455104	1967	429	1485556 right, 1485555 left, Eldorado
1950-1951	331	casting 1456741	1968-1969	472	1486442 right, 1486383 left
1952-1955	331	casting 1463414	1968	472	1485750 right, 1485749 left, Eldorado
1955	331 2x4V	3510439	1970-1974	472/500	1495095 right, 1486383 left
1956	365 2x4V	3510626	1975	500	1486442 right, 1486383 left
1956	365	casting 1464176			
1957	365	casting 1465061			
1957	365 2x4V	3510701			