

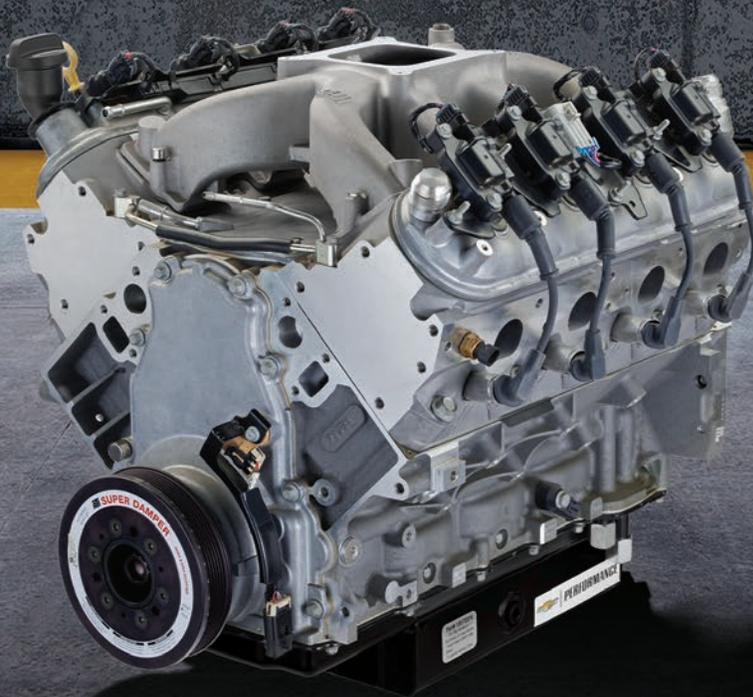


CHEVROLET

PERFORMANCE
VEHICLES / PARTS / RACING

CT525

**CIRCLE TRACK RACING ENGINE
TECHNICAL MANUAL**



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This Technical Manual is dedicated to the memory of

Robert E. (Bob) Cross

1957-2010

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INTRODUCTION

Chevrolet Performance is committed to providing proven, innovative performance technology that is truly More than just Power. Chevrolet Performance Parts are engineered, developed and tested by the factory to meet your expectations for fit and function. Visit our website at www.ChevroletPerformance.com for the Chevrolet Performance Parts authorized Center near you.

This book provides general information on components and procedures that may be useful for engine break-in

and technical inspection. Observe all safety precautions and warnings as needed. Wear eye protection and appropriate protective clothing. When working under or around the vehicle support it securely with jack-stands. Use only the proper tools. Exercise extreme caution when working with flammable, corrosive, and hazardous liquids and materials. Some procedures require special equipment and skills. If you do not have the appropriate training, expertise, and tools to perform any part of the installation then contact a professional.

LEGAL INFORMATION

This publication is intended to provide information about your circle track engine and related components. The publication also describes procedures and modifications that may be useful during the installation. It is not intended to replace the comprehensive service manuals or parts catalogs which cover General Motors engines and components. Rather, it is designed to provide supplemental information in areas of interest and to do-it-yourself enthusiasts and mechanics.

This publication pertains to engines and vehicles which are used off the public highways except where

specifically noted otherwise. Federal law restricts the removal of any part of a federally required emission control system on motor vehicles. Further, many states have enacted laws which prohibit tampering with or modifying any required emission or noise control system. Vehicles which are not operated on public highways are generally exempt from most regulations. As are some special interest and pre-emission vehicles. The reader is strongly urged to check all applicable local and state laws.

HISTORY

GM has a long history of providing the engine of choice for circle track racing. The introduction of the small block Chevy in 1955 started it all. Production parts were durable, and the engines were plentiful. In the 1960's, Chevrolet started producing HD parts for racing activities and a whole industry was started.

Over time, the competitive nature of racing drove costs increasingly higher and sanctioning bodies found it increasingly difficult to police the competitors. In the 1990's, several tracks and individuals took Chevrolet's successful crate engines designed for the street and adapted them for circle track applications. The potential for cost savings was tremendous.

Based on the success of the 3 traditional Gen0/1 Small Block CT engines, GM Racing and Chevrolet Performance Parts engineers have developed a modern production

engine into a circle track race motor. The base engine for the CT 525 comes from the highly successful latest generation of the LS engine family, the 6.2L LS3 Gen 4 V-8. This engine is then up-fitted with a Circle Track Racing Oil Pan, Open Plenum Carbureted 4 barrel Intake Manifold, ASA Camshaft, and a Ported Left side Valve Cover for breathers.

Each engine is assembled with all new parts on a production line to keep costs down. The engines then are up-fitted with special oil pans, valve covers and sealing bolts. Factory sealing of the engines are one of the keys to the success of the program as this makes it difficult to tamper with the engine and helps maintain equality among the competitors. If used as directed, the engines should provide several seasons of use with minimal maintenance.



CIRCLE TRACK ENGINES – POSITION STATEMENT

General Motors does not endorse nor encourage any internal engine repairs or modifications to any sealed racing engine in the field. Due to the competitive nature of the intended application, any maintenance or repairs that require the sealing bolts to be removed for any reason deem the engine non-factory assembled and the competitiveness becomes questionable. Some sanctioning bodies or racing groups may allow rebuilding or modifications but that sanctioning body or group is solely responsible for verifying the integrity of the engine from that point forward.

Circle Track racing engines from Chevrolet Performance Parts are equipped from the factory with tamper-resistant seals. Chevrolet Performance does not endorse nor encourage any internal engine parts replacement, repairs or modifications to any sealed racing engine. If the GM-supplied engine seals are removed for any reason, Chevrolet Performance cannot ensure engine equality and consistency for performance or durability. In the event where internal repairs become necessary, Chevrolet Performance encourages the engine owner to consult with the local promoter/presiding track official to determine if the engine must be replaced with a new, factory-sealed engine. Replacement is the Preferred/Recommended process in order to maintain the integrity of a "Sealed Crate Engine Program".

Chevrolet Performance does not supply seals for a rebuilt factory engine, nor does it endorse or approve independent engine rebuilders as "GM-authorized" engine rebuilders.

All Chevrolet Performance crate engines, including circletrack, are manufactured with all new components. A non-firing cold test is conducted as part of end of assembly line testing on all crate engines. During this test the engine is spun at low speed and various parameters, including compression, are checked against established standards to ensure that quality requirements are met.

Chevrolet Performance requires proper "break in" procedures to be followed, as outlined in owner's manuals or instruction sheets. Diagnostic testing such as "leak down" tests are not a reliable indication of engine output or durability to perform as promoted.

Chevrolet Performance crate engines are tested to generate advertised power and torque values are representative of engines in series production. Observed results vary.

WHERE TO BUY

Circle track crate engines can be purchased from any GM Dealer in the USA, Canada and other countries. Our recommendation is to contact an authorized Chevrolet Performance Parts dealer which is more familiar with GM's high-performance parts line. Contact 1 (800) 468-7387 or www.chevroletperformance.com to find a dealer near you.

WARRANTY

Circle track crate engines have no warranty. They are intended for off-road racing activities only.

GM 525 CIRCLE TRACK PACKAGE



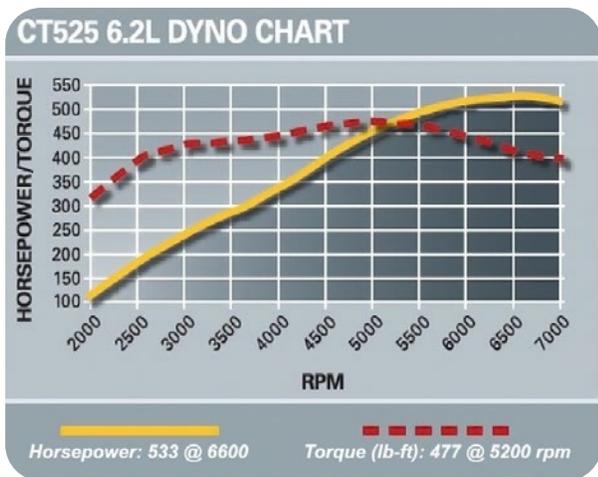
Engine Specifications

The LS3CT525 engine package was developed off the powerful production Corvette LS3 engine package and is sold as P/N 19434598. It is sold complete, intake to oil pan, including coil packs. It does not include the ignition system, fuel pump, wiring, exhaust manifolds or water pump.

The LS3 engine is 6.2 Liters (376 Cubic Inches), using a 4.065" bore and 3.62" stroke crank mated with forged aluminum pistons and powder metal forged rods. Compression ratio is 10.7-1.

Several parts are changed from the stock engine to make up the Circle Track package. A single plane 4bbl intake manifold, ASA Camshaft profile, circle track type oil pan, ATI balancer, forged pistons, ARP Rod Bolts and specific engine breathers round out the package. The ASA camshaft and free flowing heads boost HP to 533 HP @ 6600 RPM and torque to 477 lb.-ft @ 5200 RPM. Dyno testing was done with stepped headers and a 750 CFM HP carburetor. Headers were 1 3/4" tube 10" long transitioning into 1 7/8" tube for total length of 32" long and exiting into 3 1/2" collector.

Camshaft specifications are .226 intake & .236 exhaust @ .050 duration along with a .525" lift allow this package to breathe. The engine is all aluminum weighing in at 415 lbs dry.



Engine Installation

All LS style engines have different motor mount bolt hole locations than a traditional small block Chevrolet. Aftermarket companies have brackets that will adapt the LS bolt pattern to a small block mount or to a circle track style chassis mount. The rear bell-housing pattern is the same as small block except the RH upper bolt boss is deleted. Make sure you install all the bolts in the bell-housing for full strength. Rear bell-housing bolts are metric size threads M-10 x 1.5-6H (length determined by bell-housing). All conventional Chevrolet bell-housings will bolt to the LS engines with the use of longer dowel pins and correct metric bolts.

KRC Racing Motor Mount Adapter shown →



RECOMMENDED BREAK-IN PROCEDURE

Start-up is critical to help ensure engine life. This procedure was written with the intent to provide a quick reference and guideline to starting a new or rebuilt engine if a dynamometer (dyno.) is not available. If you are using a dyno., refer to the dyno operator's guidelines for start up and initial break in of the engine.

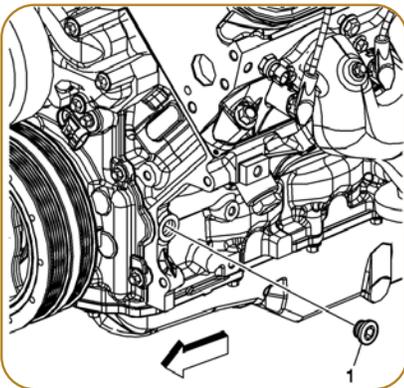
1. Safety First! Make sure you have proper tools as well as eye protection. If the car is on the ground, be sure the wheels are chocked and the transmission is in neutral.

CAUTION! This engine assembly needs to be filled with oil! After installing the engine, ensure the crankcase has been filled with the appropriate motor oil to the recommended oil fill level.

2a. Be sure to check the oil level in the engine and prime the oil system, then recheck the oil level. It should be at the bottom of the oil level plug when the plug is threaded in the pan. Correct oil level with this circle track oil pan is achieved when the oil just touches the bottom of the indicator plug with the plug fully threaded into the oil pan bung. [The pan alone holds 6 qts] the remote oil filter and cooler will be additional oil. Use as large of an oil filter as possible, ensuring a minimum of 10 Gallons Per Hour (GPH) flow capacity and 25 micron filtration rating. A BRAND NEW ENGINE OIL COOLER MUST BE USED, WITH A MIN FLOW OF 10 GPM. It is recommended that Mobil 1 0W-40 motor oil be used (engine oil must meet Dexron R specification which will be indicated on the oil label, Mobil 1 meets this specification). Also check and fill as required any other necessary fluids such as coolant, power steering fluid, etc.

2b. This engine MUST be primed with oil before starting. The use of Kent-Moore engine preluber kit J45299 is the preferred process for priming.

Note: A constant and continuous flow of clean engine oil is required in order to properly prime the engine. Be sure to use approved engine oil, as specified. Do not overfill!



1. Install the oil filter and tighten.
2. Locate and remove the engine block left front oil gallery plug (1).
3. Install the M16 x 1.5 adapter P/N 509375.
4. Remove the engine oil filter, and fill with clean engine oil.

J 45299 Engine Preluber

RECOMMENDED BREAK-IN PROCEDURE *(CONTINUED)*



J 45299 Engine Preluber

5. Install the flexible hose to the adapter and open the valve.
6. Pump the handle on the J45299 preluber in order to flow a minimum of 1-1.9 liters (1-2 quarts) engine oil. Observe the flow of engine oil through the flexible hose and into the engine assembly. The engine will be primed after a small amount of pressure change is seen on the in car oil pressure gauge while pumping J45299
7. Close the valve and remove the flexible hose and adapter from the engine.
8. Apply approved thread sealer and Install the oil gallery plug to the engine and tighten to 60 N·m (44 lb ft).

Top-off the engine oil to the proper level.

Due to the empty hoses, oil filter, and oil cooler, it is much more important to prime this set up vs. a street driven or OEM engine.

In the absence of a preluber kit, the following process can be used. Install an oil pressure gauge (the existing oil pressure sensor location at the upper rear of the engine may be used). Disconnect fuel and the ignition control system (removing power from the ignition control module is recommended). Note: Make sure that no fuel or ignition power can be provided to the engine. Remove all of the spark plugs which will reduce the load on the engine bearings and starter motor during the oil priming sequence.

2c. Once, the fuel and ignition control systems have been disconnected, crank the engine using the starter for 10 seconds and check for oil pressure. If no pressure is indicated, wait 30 seconds and crank again for 10 seconds. Repeat this process until oil pressure is indicated on the gauge.

3. Dyno break-in is recommended.

4. Reconnect the fuel and ignition control systems. Start the engine and listen for any unusual noises. If no unusual noises are noted, run the engine from idle to approximately 1800 RPM, then 0% throttle back to idle. Perform this sequence continuously up and down until normal operating temperature is reached.

DO NOT RUN THE ENGINE AT A CONSTANT HIGH RPM WITH NO LOAD! VARYING RPM, IDLE TO 1800 RPM UP AND DOWN IS ALL THAT IS NEEDED.

5. When possible, you should always allow the engine to warm up prior to driving. It is a good practice to allow the oil sump and water temperature to reach 180°F before applying heavy loads or performing hard acceleration runs.

6. Adjust Carburetor (carb.) settings. Idle mixture screws, base idle, floats, Etc.

7. After first 30 minutes of the engine running, re-set carb. adjustments.

8. Drive the vehicle at varying speeds and loads for first 30 laps. Be sure to avoid Wide Open Throttle (WOT) and sustained high RPM accelerations

9. Run 5-6 medium-throttle accelerations to about 4500 rpm and let off in gear and coast back down to 2000 rpm, after each acceleration.

10. Perform several (WOT) accelerations to 5000 rpm. Allow the engine to return to idle, with the throttle blade shut. This procedure will assist in seating the rings properly.

11. Change the oil and filter. Replace the oil following the procedure in step 2a. from above. Use as large of an oil filter as possible, ensuring a minimum of 10 Gallons Per Hour (GPH) flow capacity and 25 micron filtration rating. Inspect the oil and oil filter for any foreign particles to ensure that the engine is functioning properly.

12. Drive the next 25 laps without high rpm's (below 5000 rpm), hard use, or extended periods of high loading.

13. Change the oil and filter again.

14. Your engine is now ready for racing.

ENGINE COMPONENTS

Sealing System

The CT525 Circle Track Crate engines are sealed from the factory with four anti-tamper bolt cover assemblies. The CT525 Circle Track engine is fitted with the seal assemblies on the intake manifold, front cover, and oil pan. These are specially designed to deter access to internal engine components. GM Replacement bolt cover assemblies are not sold to the public. This ensures the integrity of the race program. See Rebuild Section to understand repairs, rebuilds and replacement options. Each Stainless Steel seal assembly has a unique encrypted code, laser marked onto the cap along with a Chevrolet Bowtie trademark logo. The base of each seal assembly has the Chevrolet Bowtie trademark logos in four locations on the outer surface.

Tech inspectors can determine if there has been any creative activity going on with a given engine in a matter of seconds with this new system. A handheld digital camera takes a photo that is in turn decoded by proprietary software that can reside on a laptop computer.



Cylinder Block

The LS3 cylinder block is made from cast aluminum. Cast in liners are finish machined and honed to 103.25mm (4.065"). It has 6 bolt cross-bolted main caps that provide a solid foundation for the crankshaft and entire engine package. Deck Height is 9.240".

Note: There are 8 oil passageways in the top of the block above the camshaft. These are sealed by the stock LS3 valley tray. These are part of the Active Fuel Management system (AFM) used on other engines that share the block. The Corvette LS3 does not use AFM, so these oil passageways are sealed off when the valley tray is installed.

Caution: Do not use any other valley plate or major oil hemorrhaging will occur and the engine will fail.



Crankshaft

LS3 engine had a cast iron crankshaft with rolled fillets and one-piece rear seal. Stroke is the same as other cranks, 3.62". The thrust is located on # 3 main or the center of the crank. Main journal size is 2.558" Rod journal size is 2.098" See Specs. The crankshaft incorporates a 58X trigger wheel at the rear for accurate crankshaft timing. It is factory balanced for the rod and piston weights. Crankshaft weight with the crank timing gear on it is approximately 51 Lbs. Due to crankshaft balancing, crank weight can vary.



Connecting Rods

The connecting rods are powdered metal with cracked caps. LS3 rods are 6.098" long.



Oil Pump

The LS3 uses a standard Gearotor oil pump design. This is one of the most efficient oil pump designs used today. Normal oil pressures are 15+ lbs at 1100 RPM idle and 40+ lbs @ 5000+ RPM.

Figure 01 is a picture of the new oil pump.



Fig 1

In figure 02 the cover is removed to show the Gearotor gears and how the center gear locates on the crankshaft to drive the outer gear. The fitting on the lower right (Fig 02) also shows the bypass valve and spring.



Fig 2

Pistons & Rings & Rods

Pistons are forged aluminum for 103.25 mm (4.065") bores and use full floating pins. They have no valve reliefs and can only handle up to .525" lift camshafts with less than 340 degrees duration. The rings are a low tension design with a 1.5mm top, 1.5mm second and a 2mm oil ring. The rod bolts are ARP P/N 134-6006.

Cam Shaft

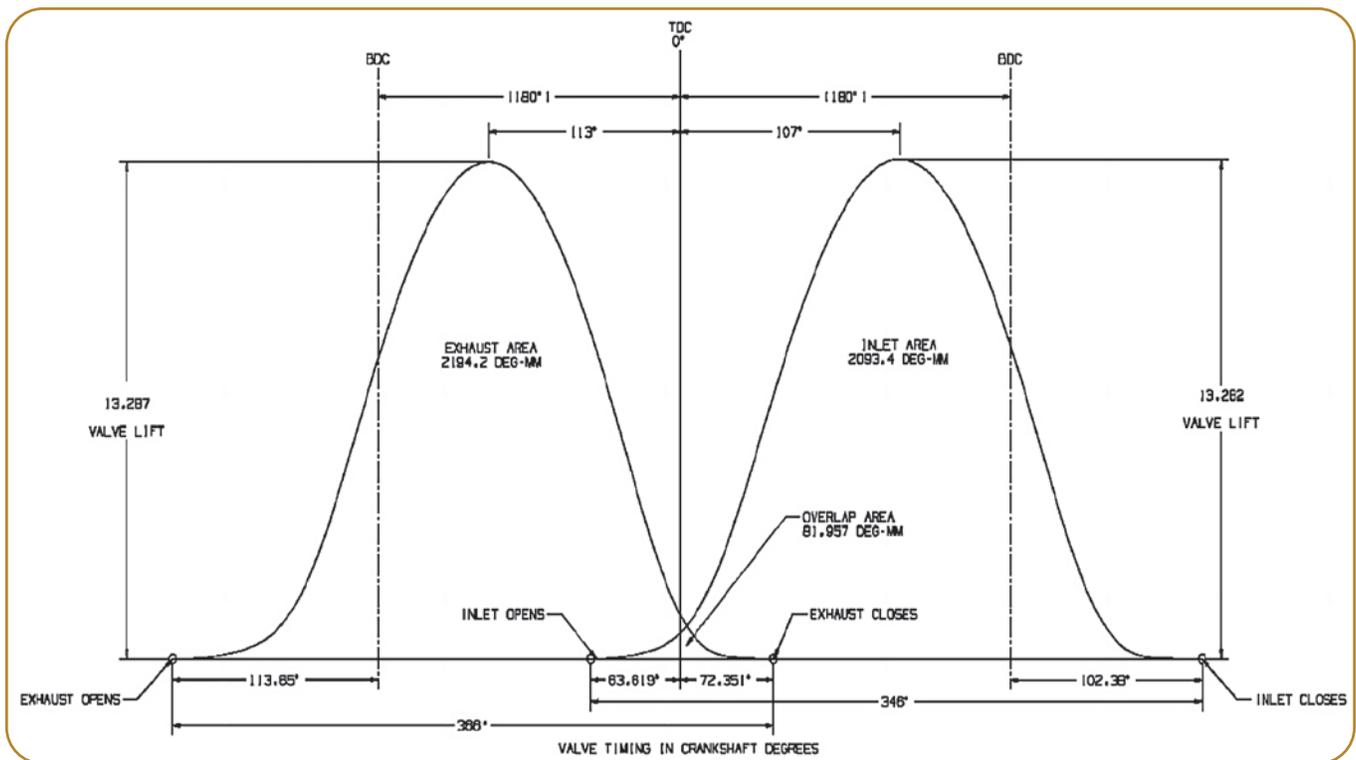
The camshaft is a hydraulic Roller design. It is made from Billet steel. The camshaft specifications were developed from the original LS-1 ASA program. The cam specifications are .226 intake & .236 exhaust duration @ .050" lift and .525" valve lift. This camshaft allows the engine package to take full advantage of the LS-3 rectangular port cylinder head breathing.

Cam duration is 226 degrees intake and 236 degrees exhaust @ 0.050 in.

Lope separation is 110 Degrees

Intake lift at lobe is .3075 in.

Exhaust lift at lobe is .3077 in.



Timing Gears

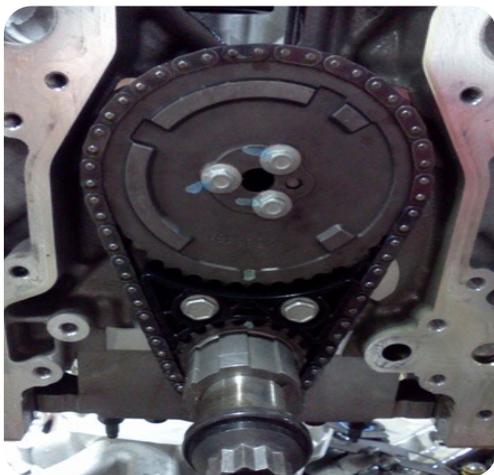
The stock LS3 engine uses a 58X-4X crank and timing arrangement with a single bolt camshaft gear. The camshaft gear is replaced in the CT525 package with the 2006 LS2 3 bolt 4X cam gear which is compatible with the 58X crank trigger.

In 2006 GM changed the timing arrangement from 24X-1 to 58X-4. The change to 58X-4 was more in line with industry standards and can allow the engine to operate in a reduced capacity mode, if the crankshaft sensor fails.

The 88958770 ASA camshaft uses the earlier 3 bolt cam gear retaining method. A 2006 LS2 timing gear is both compatible with the 3 bolt design and the 4X cam sensor.

The 3 bolt camshaft gear P/N 12586481 is installed with 3 P/N 12556127 bolts. If you need to replace the cam sensor there are 2 different designs used in the LS3. P/N 12627501 is the 1st design. 12613158 is the second design.

Below is picture of 4X reluctor 3 bolt camshaft timing gear used in CT525.



Timing Chain

The CT525 package uses the stock LS3 timing chain. This chain has held up good under severe duty applications.

Front Cover

The front cover is die cast aluminum and incorporates the cam sensor in it. The LS3 uses as 4X timing gear along with a 58x crank gear for precise timing control.



Cylinder Head

Cylinder heads are made from Cast aluminum. The revised cylinder heads are what make this engine so powerful. The LS3 head is based partially off the LS7 design. The design change from Cathedral port to rectangular port increased the flow potential tremendously but requires an offset intake rocker arm.

Combustion chamber is 70cc. Using 55mm (2.165") Hollow stem intake valves and 40mm (1.59") solid exhaust valves. Intake port runners are 260cc and the exhaust port runners are 98cc. The intake port flows up to 310 CFM stock.

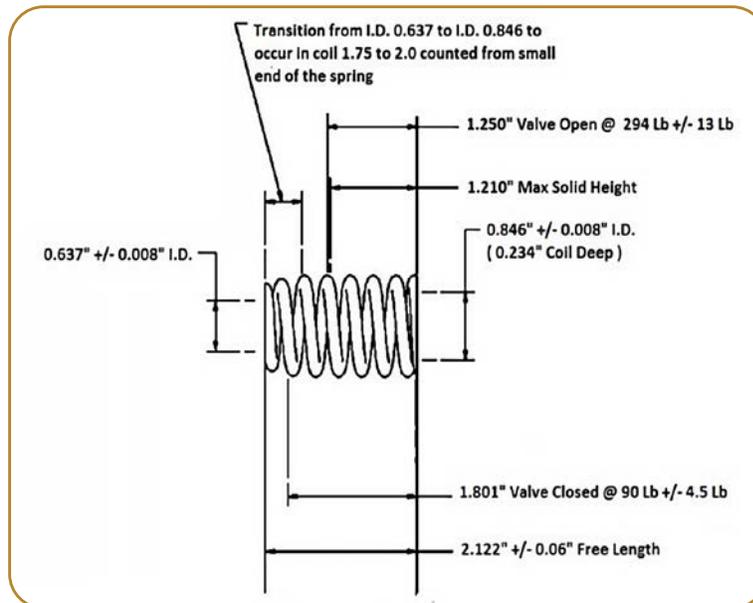
The valve angles are 15 degrees. The valve location has been moved to accommodate the huge 2.165" intake valve and 1.59" exhaust valve. The intake valve is now .854" from piston center line and the exhaust is 1.158" from the centerline.



Note: LS3 heads cannot be used on bores smaller than 4" diameter.

Valve springs

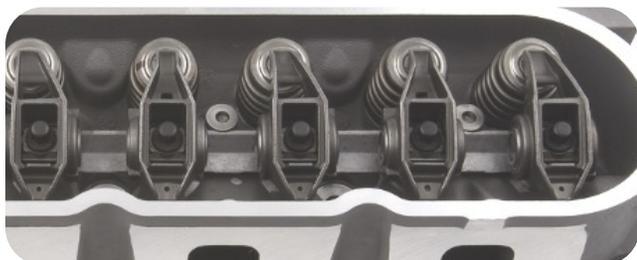
The LS3 engine uses the Bee-Hive style valve spring which is superior to other type springs for this application. It is lightweight and can control the valve train very well. The original CT525 was built with a yellow valve spring, and later changed to a blue spring due to part availability. In late 2020, the spring color was changed to a natural color with an ivory stripe. The latest P/N is listed in the parts below. GM has performed extensive testing to verify there is no performance differences between any of the springs. It is 1.27" in diameter, 1.06" at the top and 1.8" installed height. Spring pressures are 90lb +/- 13 lb at .525 valve lift.



Pushrods & Rocker Arms

The LS3 engine uses pushrods made from 1010 steel. They are 7.325" long. LS3 engines use two different rocker arms. Both are 1.7:1 ratio investment cast with roller pedestal. The intake rocker arms are off-set .200" P/N 12696105. The exhaust rocker arms are straight P/N 12681275. Both use a roller trunnion design but do not have a roller tip.

The rocker arms are located by a coined bar that sits on top of the head machining and has the Half Moon locators for each rocker arm. Each rocker arm is secured with a special 8mm bolt.



Lifters

The LS3 525 Engine uses stock hydraulic lifters. They are secured and located with these plastic anti-rotation locator trays. There are 4 of the trays in the engine which handle 2 cylinders. Each tray is secured with a single special designed 8mm bolt. The special bolt holds the trays in place and allows them to move slightly. They are also captured in the block by head.



Ignition System

The CT525 uses production LS3 coils along with an ignition box P/N 19355863. The ignition box will need to be programmed with a laptop for the correct timing advance curve. A CD disk is included with each box along with a data cable. The CD program is compatible with most Windows operating systems including Vista. Programming is quick and simple. Open the program, then follow these steps.

1. You will need to have 12 volts power and ground hooked up to the box to transfer the new advance curve to the box.
2. GM recommends the timing be set at 27 degrees @ 3000 RPM for best power with 91 octane fuel.
3. Set your advance curve for 5-6 degrees @ 400-500 RPM and then set your next point to 27 degrees @ 3000 RPM. This will give you a straight-line advance. Program the 27 degrees flat out to 8000 RPM in the table.

4. Program the upper Map grid to Zero timing.
5. Then set both high and low Rev Limits to 6600 RPM. (Click on the RPM and a box will come up that you scale up or down.)
6. Save the settings and then transfer the program to the box.
7. Do not install one of the supplied Pills in the box. The box will revert back to the timing curve of the Pill and you will lose your programmed curve and have to redo it. Some tracks or sanctioning bodies may require use of their own preprogrammed Pill or ignition box. Check with your track or sanctioning body rules for clarification.

See Fig 3a & 3b for pictures of the 19355418 Ignition box and wiring harness.

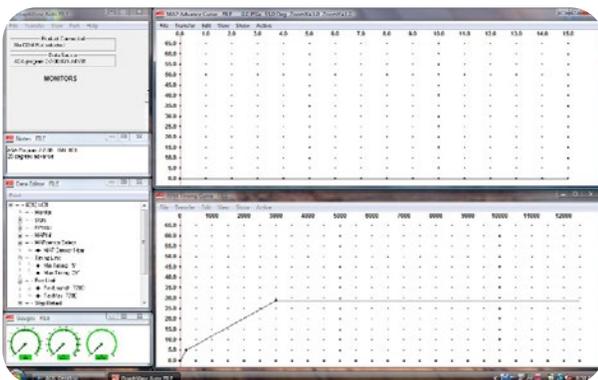


Fig 3a



Fig 3b

Spark Plugs, Wires and Boots

Recommended spark plugs are AC Delco P/N 41-985 and gapped to .040"

Firing order is 1-8-7-2-6-5-4-3. Production spark plug wires have a fitting that locks into the coil so it doesn't fall out. GM highly recommends using spark plug wire heat covers since newer design chassis's route the headers closer to the engine. These can be purchased inexpensively from Summit P/N DEI-0105502 or Speedway Motors P/N 698-2524. Those part numbers come 8 to a package and are 6" in length. See Fig 04 below.



Fig 4

Oiling System Requirements

GM puts 5W-30 Mobil 1 oil in the stock LS3 as delivered in the Corvette. 0W-40 Mobil 1 (oil must meet Dexron R specification) oil is the recommended oil for the CT525 circle track engine package.



Circle Track Oil Pan

The engine comes with a steel wet sump oil pan P/N 19243065 that uses 8 quarts of oil. It has a RH kick out and 6 trap doors. (Fig 05) The oil pan is 4 1/2" deep. Total depth compared to standard small blocks is 7" as measured from the crank centerline.



Fig 5

The engine still uses the stock windage tray along with the oil pan windage tray to reduce the amount of aerated oil in the engine.

Oil Filter and Remote Routing. On the LH rear side of the pan are two -10 outlet fittings. The front -10 fitting is oil feed from the oil pump (out) to the oil filter. Oil lines from the oil filter and oil cooler (in) to the rear -10 fitting to feed the engine. See Fig 06 Below.



Fig 6

Oil Level. Oil level is **critical** to proper engine life. When engine oil is full, the oil will just touch the bottom of the access bolt on the RH side of the pan. (Fig 7a & 7b) This keeps the oil below the windage tray. DO NOT over fill the system.

Figure 7b shows a picture of the fill plug from the inside of the pan. The bottom of the plug is just below the windage tray. Oil level should just touch the bottom of this plug.



Fig 7a

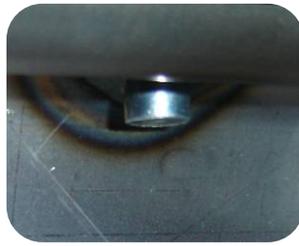


Fig 7b

Oil Temperature Sensor Fitting. The oil pan has a 1/2" NPT fitting on the Left side in the center for an oil temp sensor. This can be used for an oil temp gauge sensor or be plugged. It is highly recommended you use an Oil temp gauge and keep the temps below 260 degrees. (Fig 08)



Fig 8

Block Dipstick Plug. The circle track pan does not use the stock dipstick. Plug P/N 12667039 is installed in the stock machined hole on the RH side of the block. See Fig 09.



Fig 9

Oil Filter Requirements

Make sure you use the largest filter you can with minimum of 10 GPH per minute and 25 micron rating such as a Fram HP1 or larger filter. A remote filter adapter is required with minimum of -10 AN lines. Several manufactures make good and easy to mount adapters.



Oil Cooler

A remote oil cooler is mandatory. It should be located in front of the radiator. It should be a minimum of 7" x 14" with minimum flow of 10 GPM and -10 AN or 1/2" inlets. You want to see between 200-270 degree oil temps.

Oil Pressure Gauge Adapter

An oil pressure gauge port is located at the left rear of the valley plate. The factory uses a M-16 x 1.5 metric thread so you will need an adapter.

Autometer sells a metric to NPT adapter under P/N 2268. This adapter is required to convert the production sensor holes M16x 1.5 threads to 1/8" NPT. See Fig 10. Be sure use the copper seal included with the adapter or leaks may occur.



Fig 10

Oil Pressure Sender. With the addition of a 1/8" pipe tee, both the fuel pump oil pressure sensor and the in car oil pressure gauge can be plumbed. See Fig 11.



Fig 11

The oil sender seen in Fig 11 is for the fuel pump shut off. See Fuel Pump section.

Note: This is very important for safety.

Balancer Installation

An ATI Balancer, P/N 917279, with special durometer rubber is included and recommended for circle track applications. The dampener is 6 3/4" in diameter and the smaller 6 rib pulley drives the serpentine system 10% slower. This balancer design does not incorporate the Air Conditioning pulley, it only has provisions for the water pump pulley. Fig 12.



Fig 12

Important: Tighten the 6 counter sunk bolts to 16 ft lbs and the 3/8" 12 point bolts to 28-30 ft lbs.

Crankshaft Bolt. Fig 13 – An ARP bolt P/N 234-2503 is required. Use red Loctite on the threads and add silicone sealer on both sides of the washer when installing. Torque to 235 ft lbs using Ultra Torque Fastener Assembly Lubricant.



Fig 13

Crankshaft Balancer Pin. GM production does not use a keyway slot to locate harmonic balancers like the older small blocks did. GM factory balancers are zero balanced and do not use timing marks like a standard small block so they don't require a keyway to locate them. The circle track engine requires a pin to locate the ATI balancer. When using an ATI balancer the crank needs to be drilled. See Fig 14. The CT525 crank is drilled from the factory and a 3/16" x .500" (.185") pin is installed. This secures the ATI balancer so it doesn't slip.

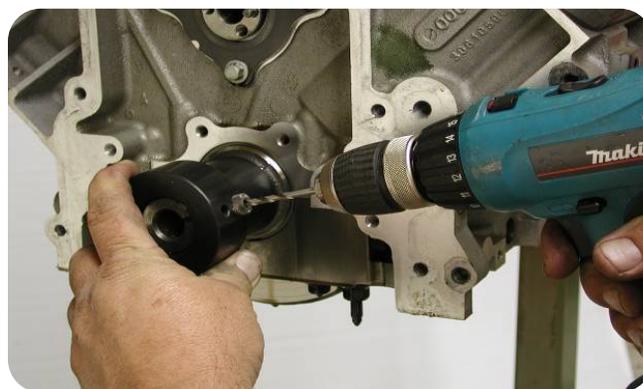


Fig 14

GM discovered the need to secure the balancer on the original LS1 ASA program. The engineers found that when engines hit the RPM chip repetitively the balancer would slip on the crankshaft. This would cause damage to the crank and everything that was driven off the front of the engine.



In Fig 15 you can clearly see the pin. It is located at the 2 o'clock position in the picture.

Fig 15

Cooling System

Radiator. An adequate radiator is recommended that can keep the engine within 180-210 degrees water temperature is mandatory.

Surge Tank. A Surge or Expansion tank with the CT525 package must be used. It can be attached to the RH bar above the water pump thermostat. The bottom of the surge tank should be hooked to the front heater hose outlet. The rear heater hose outlet can be plugged. Important: Route the LH upper head air bleed line to the upper top of the surge tank. (This will insure air is properly bled from the engine). It is also recommended to run a -4 line from the RH top side of the radiator to the surge tank as well. See Fig 16.

Note: Failure to route LH upper head air bleed line to surge tank will result in engine failure.



Fig 16

Water pump

A water pump is required. GM P/N 12725009 or equivalent is required. Torque the bolts as follows:

First pass	15N•m	11 lb ft
Final pass	30 N•m	22 lb ft

Electric Fan

An electric fan is recommended to keep the engine within a 180-210 degree range.

KRC Racing also makes a front end accessory drive kit with a standard rotation water pump and a fan mounting flange on the water pump to allow the use of a mechanical fan if desired.



Serpentine Belt Drive System

Several Aftermarket Companies offer Accessory drive kits for the CT 525. Pictured below is a very popular kit from KRC Racing. This is a compact system that provides a well proven alternator and power-steering pump. This system comes complete with all pulleys, brackets, bolts, alternator, power-steering pump, and tensioner for a clean installation and works well with the CT 525 underdrive balancer pulley.



Intake Manifold

The single plane 4bbl intake P/N 25534401 was designed in conjunction with GM Racing. This intake is used on the LS3 circle track engine. It has a 4150 style carb flange and was designed to provide good HP & a flat torque curve. Runner lengths and plenum volume work very good with the 376 C.I.'s in this engine package. See Fig 17.



Fig 16

It uses gasket P/N 19172114 for proper sealing. Note: The 25534401 intake has the same crank centerlined to carb mounting base height (16 1/4") as the 19434604 engine package.

Carburetor Recommendation

A Holley 4150 series carburetor Model 80541-1 (650 cubic feet / minute HP series) is recommended for competition use. (Note: Catalog Dyno numbers were derived using an 80528-1 750 HP carburetor and may provide a few more HP but it did not have the throttle response on the shorter tracks.

Carburetor Spacer

A 1" tall tapered spacer was used during some testing and was found to have the best performance. See Fig 18.



Fig 18

Breather Requirements

The CT525 package comes with a left-hand valve cover that has been modified with two -16 AN male fittings welded into the cover. The rear fitting utilizes the valve cover baffle, while the front fitting is not baffled. It is critical to set up the ventilation tube routings and heights to allow for drain back in the front fitting. GM recommends a minimum of 2 breathers for adequate capacity of venting.

Shown below is a configuration that has been successful in GM development testing. At no time should you allow engine crankcase pressure to build up in the engine.



Pictured below is a similar kit offered by KRC racing



Flywheel & Starter

GM has both flywheels and flex-plates if you plan to use a stock transmission.

Aftermarket. If using an aftermarket trans and/or bell-housing you must use a special clutch button. Contact Tilton, Quarter Master, Brinn, or other manufactures depending on what starter and transmission you're using.

Flywheel Bolts. The LS series engines have metric thread bolts. Make sure you use the proper size and length bolt for the flexplate or clutch button your using. Refer to the manufactures recommended torque specifications.

Starter. Refer to the bellhousing manufacture for the correct starter for you application.

Fuel Pump Requirements

All LS1-LS9 style engines do not have provisions for a block mounted mechanical fuel pump. An electric fuel pump is recommended for the CT525 engine. A minimum of 110 GPH is required. The pump must be wired using an oil pressure shut off for safety. **This is mandatory.** The fuel pump should never be wired direct to the ignition. The fuel pump should be located close to the fuel cell in a protected area to prevent damage. A -10 or minimum of 1/2" fuel line is needed to handle the fuel requirements of the engine.

Another fuel pump option is a belt driven mechanical fuel pump. Several aftermarket companies [KSE and Jones Racing Products to mention a few] offer belt driven pumps that drive from the front or rear of the crankshaft, and can provide an adequate fuel supply to the CT525.

ENGINE SPECIFICATIONS

Type.....	6.2L Gen IV Small Block V8
Displacement	376 cubic inches
Bore x Stroke	4.065 inch x 3.62 inch
Compression.....	10.7:1
Block	Cast aluminum, six bolt cross-bolted main caps
Cylinder Head	Cast aluminum rectangle port
Valve Diameter (Intake/Exhaust)	2.165"/1.590"
Chamber Volume	68cc
Crankshaft	Nodular iron, internally balanced
Connecting Rods.....	Powdered metal
Pistons	Forged aluminum
Camshaft	Hydraulic roller tappet
Lift525" intake, .525" exhaust
Duration	226° intake, 236° exhaust @.050" tappet lift
Centerline	110° LSA
Rocker Arm Ratio	1.7:1
Oil Capacity	6 quarts without filter
Oil Pressure (Minimum, with hot oil).....	6 psig @ 1000 RPM
.....	18 psig @ 2000 RPM
.....	24 psig @ 4000 RPM
Recommended Oil	0W-40 Mobil 1 motor oil or equivalent (must meet Dexron R specification)
Fuel	Premium unleaded - 92 (R+M/2)
Maximum Engine Speed	6700 RPM
Spark Plugs	GM 12680072
.....	AC Delco # 41-985
Spark Plug Gap040"
Firing Order	1-8-7-2-6-5-4-3

Information may vary with application. All specifications listed are based on the latest production information available at the time of printing.

SERVICE PARTS LIST

Part Number	Qty	Name
12696105	8	ARM ASM,INTAKE VALVE ROCKER
12681275	8	ARM ASM,VALVE ROCKER
19242906	1	BALANCER,CRANKSHAFT
12623967	1	BLOCK ASM,ENGINE
11588723	12	BOLT/SCREW,CRANKSHAFT RR OIL SEAL
11515756	1	BOLT/SCREW,CRANKSHAFT POSITION SENSOR
11588715	4	BOLT/SCREW,ENG COOLANT AIR BLEED PIPE
11515767	4	BOLT/SCREW,ENG LIFT BRACKET
11516424	8	BOLT/SCREW,IGNITION COIL
11562426	8	BOLT/SCREW,IGNITION COIL
3531733	8	BOLT/SCREW,PCV BFL
12560961	16	BOLT/SCREW,VALVE ROCKER ARM
12577215	8	BOLT/SCREW,VALVE ROCKER ARM
12580353	1	BRACKET,IGNITION COIL (RH)
88958738	1	BRACKET,IGNITION COIL (LH)
88958745	1	BRACKET,IGNITION COIL (LH)
10166344	16	CAP,VALVE SPRING
12611424	8	COIL ASM,IGNITION
12602540	2	COVER ASM,ENG COOL AIR BLD PIPE HOLE
88958737	1	COVER ASM,VALVE ROCKER ARM (LEFT)
12632146	1	COVER ASM,VALVE ROCKER ARM (RIGHT)
12637683	2	GASKET,VALVE ROCKER ARM COVER
12630223	2	GASKET,WATER PUMP
12600254	1	HOSE,ENG COOL AIR BLEED PIPE
12639250	1	HOUSING ASM,CRANKSHAFT RR OIL SEAL
12561513	1	KEY,CRANKSHAFT BALANCER
10166345	32	KEY,VALVE STEM
12694769	1	PIPE ASM,ENG COOL AIR BLEED
11610259	1	PLUG ASM,CYL HD CORE HOLE
9427693	1	PLUG ASM,ENG BLK OIL GALLEY

Part Number	Qty	Name
12573460	1	PLUG ASM,ENG BLK OIL GALLEY
11588949	2	PLUG ASM,ENG BLK OIL GALLEY
11610259	1	PLUG,CYL HD CORE HOLE
11588949	1	PLUG,ENG BLK COOL DRN HOLE
11602951	1	PLUG,ENG BLK COOL DRN HOLE
12602048	2	PLUG,ENG COOL AIR BLEED
12667039	1	PLUG,OIL LEVEL INDICATOR TUBE
12680072	8	PLUG,SPARK
10238852	16	ROD ASM,VALVE PUSH
12585673	1	SEAL ASM,CRANKSHAFT FRT OIL
89060436	1	SEAL KIT,CRANKSHAFT RR OIL
12602541	2	SEAL,ENG COOLANT AIR BL PIPE (O RING)
12585673	1	SEAL,ENG FRT COVER
12482062	1 Kit of 8	SEAL,EXH VALVE STEM OIL
12482063	1 Kit of 8	SEAL,INT VALVE STEM OIL
12591720	1	SENSOR ASM,CAMSHAFT POSITION
12703627	1	SENSOR ASM,CRANKSHAFT POSITION
12713265 Ivory stripe	16	SPRING ASM,VALVE
12554211	10	STUD,IGNITION COIL BRKT
12600936	2	SUPPORT,VALVE ROCKER ARM PIVOT
19242908	1	WASHER,CRANKSHAFT BALANCER
12627501	1	WIRE ASM,CAMSHAFT POSITION SENSOR
12579355	2	WIRE ASM,IGNITION COIL
19351569	8	WIRE ASM,SPARK PLUG



CT525 CRATE ENGINE

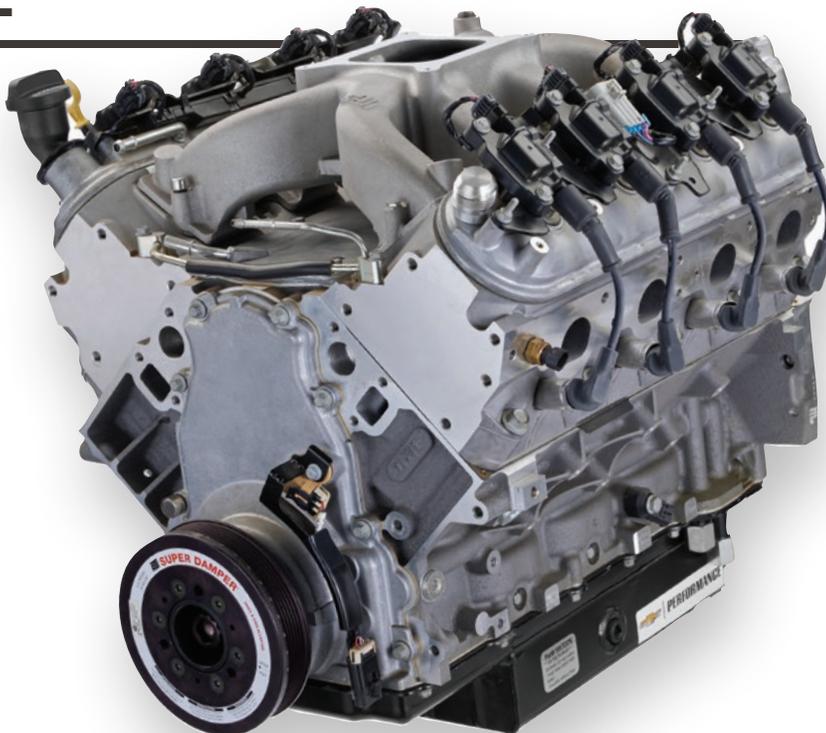
19432720 

533 hp

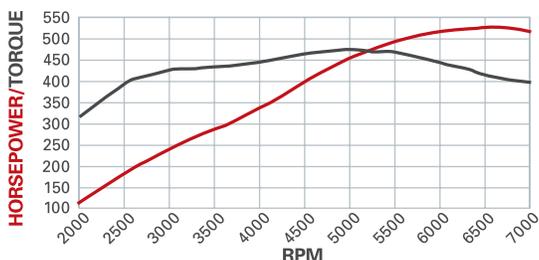
@ 6,600 rpm

477 lb.-ft.

@ 5,200 rpm



DYNO CHART



High-RPM LS Performance with Forged Pistons

Chevrolet Performance's deep-breathing, high-revving CT525 6.2L crate engine is assembled with strong forged pistons designed to support its performance capability and enhance its durability.

The CT525 is based on the LS engine family and is similar to the 6.2L LS3, but we've adapted it to circle track racing with a carbureted intake manifold, 6-quart racing oil pan and more. It's a combination rated at 533 horsepower at 6,600 rpm and a strong 477 lb.-ft. of torque at 5,200 rpm, per Chevrolet Performance testing. The engine assembly comes with coil-on-plug ignition and an SFI-certified balancer. All that's needed to complete the assembly is a carburetor, starter and our LS/LSX ignition controller (P/N 19355863)—all available from Chevrolet Performance.

INSTALLATION NOTES

- Use LS/LSX ignition controller P/N 19355863 (not included)
- Requires addition of carburetor, starter, fuel system, exhaust system and front accessory drive system
- The 6-quart circle track oil pan is designed to clear most GM rear-steer chassis with stock engine location
- The engine is designed for circle track racing only. It is not intended for street use
- The CT525 **does not** include a water pump or factory exhaust manifolds
- Chevrolet Performance Circle Track racing engines include anti-tampering seals installed

TECH SPECS

Part Number:	19432720
Engine Type:	LS-Series Gen IV Small-Block V-8
Displacement (cu in):	376 (6.2L)
Bore x Stroke (in):	4.065 x 3.62 (103.25 x 92mm)
Block (P/N 12673475):	Cast aluminum with 6-bolt, cross-bolted main caps
Crankshaft (P/N 19431873):	Nodular iron
Connecting Rods (P/N 12649190):	Powdered metal
Pistons (P/N 19418214):	Forged aluminum
Camshaft Type (P/N 88958770):	Hydraulic roller
Valve Lift (in):	.525 intake / .525 exhaust
Camshaft Duration (@.050 in):	226° intake / 236° exhaust
Cylinder Heads (P/N 12675871):	LS3 rectangular port; aluminum as-cast with 68cc chambers
Valve Size (in):	2.165 intake / 1.590 exhaust
Compression Ratio:	10.7:1 Nominal
Rocker Arms (P/N 12696105 int):	Investment-cast, roller trunnion
Rocker Arms (P/N 12681275 exh):	Investment-cast, roller trunnion
Rocker Arm Ratio:	1.7:1
Recommended Fuel:	Premium pump
Maximum Recommended rpm:	6,700
Reluctor Wheel:	58x
Balanced:	Internal



This Chevrolet Performance Racing Crate Engine is purpose-built for racing only, and has no warranty.



Chevrolet Performance **does not** utilize any used or remanufactured parts in this crate engine, except for the starter, alternator and power steering pump.



This part is intended for competition use only.



PERFORMANCE

CIRCLE TRACK CRATE ENGINES



Engines shown from left:
CT400, CT350, CT525

Engineered for Winning

There's more to capturing the checkered flag than horsepower. Week after week and season after season, you need lasting performance—and that's exactly what you can depend on with Chevrolet Performance Circle Track crate engines. Each is built with *brand-new* parts and our 350 engines feature blocks with four-bolt mains—a strength-enhancing feature you won't find on most used blocks. Trust Chevrolet Performance to deliver the durability you need to chase your racing dreams!

NOTE: Engines may not come with all the parts shown in photo. See your dealer for more details.



PERFORMANCE

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