

# 2009 Corvette ZR1: Service Guide, Unique Characteristics, Dealer Service Information for 2009 Chevrolet Corvette ZR1

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**Models:** 2009 Chevrolet Corvette ZR1 (RPO ZR1, LS9, MH3, FE5)

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Welcome to the 2009 Chevrolet Corvette ZR1. This bulletin is intended to provide the Dealership Service Staff with important information needed to properly service this vehicle. There are important messages for Service Management, Pre-Delivery and Inspection Department, Service Advisors and Technicians. It would also be very beneficial if this information was shared with the Sales Department to share with the ZR1 customers.

## Powertrain Engine

The heart of the ZR1 is the 6.2L supercharged engine (RPO LS9) that develops 638 horsepower. The supercharger has a distinctive noise. During engine idle some slight engine noise will be observed. The noise is a combination of injector pulses, upper engine valve train noise as well as supercharger noise. The noise is slight but it will be more noticeable than on the regular Corvette Z06.

## Transmission

The 6.2L engine is mated with a six-speed manual transmission (RPO MH3).

## **Clutch**

The clutch system on the ZR1 uses a new dual disk system which is significantly different than the regular Corvette or Z06. The regular clutch has a self-adjusting feature that allows the pedal effort to be consistent through the life of the clutch. The ZR1 clutch will not self-adjust and the pedal effort will increase as the clutch wears. The pedal effort is higher on a ZR1 and will get progressively higher as the clutch wears. This is a normal condition and worn clutches should not be replaced under warranty unless a defect in workmanship or material is observed. Clutch wear is generally accepted as the owner's/driver's responsibility. When servicing the clutch, a special tool is required to align the two clutch plates before it is reconnected to the driveline. Failure to use the tool to align the clutches will make it difficult to install the driveline and may cause damage to the clutch and/or driveline

## **Rear Differential**

Differential chatter has been addressed in all 2009 and past model Corvettes by using Dexron® LS gear lube. With the increased front tire size on the ZR1, some customers may believe they are hearing differential chatter or hop but in fact are hearing the front tires squawk. When the wheels are turned, especially when the tires are cold, the wide profile tires may slip and jump. It should be explained to customers that it does not damage the tire and is considered normal for tires this large. The noise may resonate under the car to where it appears the sound is coming from the rear of the car. Technicians can usually demonstrate the noise is tire-related by duplicating the tire noise first on coarse pavement and then finding a patch of smooth pavement and add a little water under the tire to reduce the friction.

## **Additional Oil Tank**

The ZR1 uses an additional oil tank to provide more oil when the car is being driven aggressively. This new tank will also be used in all 2009 Z06s as well. It does not require any additional attention except to note the oil capacity is increased from 7.5L (8 qts) to 9.9L (10.5 qts). Checking the oil is completed in the same manner as with the Z06. The oil should be at operating

temperature with the engine shut off and the car parked on a level surface. Wait at least five minutes for the oil to drain from the engine but no longer than 15 minutes and check the oil in the reservoir. Also, remember when draining the oil on any Z06 or ZR1 there are two drain plugs in the oil pan as well as the oil filter.

## **Chassis**

### **Brakes**

The brakes are one of the first things to attract attention. The rotors are ceramic and they will last most owners the life of the car. If the car is used aggressively on the track, they will wear and this is not a warrantable item. Technicians **MUST BE AWARE** the rotors are hard and the edges will chip if they are struck with the wheel when the wheel is removed and installed. If the edges of the rotor are chipped, the rotor must be replaced. Each vehicle will be shipped with one set of rotor protectors. These are the blue foam pieces. These should be used at the dealership and presented to the customer when they take delivery of the ZR1. If the dealership wants an additional set, they may be purchased from GMSPO. A 25.4 mm (1 in) foam pipe insulator can be used if no protector is available. These can be purchased at most home improvement stores such as Lowes® or similar sales outlets. The protector should be slid over the top of the rotor before the wheel is removed. It can be passed from the back of the wheel or through the wheel spokes and pushed over the rotor. This will provide protection in case the wheel is dropped during removal or installation.

Unlike the regular brakes on Corvettes, the brake pads do not have a wear sensor that will rub against the rotors when they are in need of replacement. The ZR1 uses an electric sensor and the words "Replace Brake Pads" will appear in the Driver Information Center (DIC) when they are worn enough to require replacement. It is recommended that the rotors be checked at each pad replacement. The rotor must be weighed to determine if they are worn. Certified Corvette ZR1 dealerships were sent a scale and calibration weights for this process. The procedure is described in GM's Service Information.

The ZR1 has a braking system to equal the performance of the drivetrain. The entire brake system is designed to bring the car to a safe and sure stop. To attain the level of braking necessary, there are a few bits of information you should know.

**Noise and Dust:** Under certain weather or operating conditions, occasional brake squeak, squeal, or other noise might be heard with the vehicle's performance braking system. This brake system is designed for superior fade resistance and consistent operation using high performance brake pads. Brake noise and brake dust are normal and do not affect system performance. Brake components should not be replaced to address noise and dust concerns.

Customers and dealership personnel must be advised to **NEVER ALLOW WHEEL CLEANER, TIRE CLEANER, or BRAKE CLEANER TO CONTACT THE ROTORS.** Ceramic rotors will absorb any material that comes in contact with them. Only soap and water should be used to clean wheels and tires. Any product that is applied to the rotor surface will cause damage to the surface and is not covered under the GM warranty.

For 2009, the brake controller for all Corvettes has changed from Delphi to Bosch so controllers and wheel speed sensors are not interchangeable from past years. The new Bosch control system requires an "Active" Wheel Speed Sensor (Active WSS) in the hub bearings. The bearing is a carryover design except the rear half shaft spline has been changed on the Z51, Z06 and ZR1 to increase the number of teeth (up to 33 from 30) on the shaft and rear bearing hub. The haft shaft spline on base Corvettes will remain with 30 teeth. These new bearings use the existing carryover sensor cap with carryover design of the pigtail and connector.

## **Tires**

The tires for the ZR1 are unique to this vehicle. They are "run flat" or "Zero Pressure" Michelin tires. Follow the tire manufacturer information in the car if a customer or dealership needs assistance.

## Body

### Paint and Body Panels

The appearance of the ZR1 has some notable differences. The splitter (chin spoiler) is made of carbon fiber and is very hard and brittle. Little nudges can happen when the driver finds a low curb or traveling up or down an incline which will cause an abrasion or break in the structure. All of the exterior carbon fiber panels have a clear coat to protect them from UV light. If the clear coat protection is scratched, or rubbed away, the panel beneath is no longer protected. When unprotected carbon fiber is exposed to UV rays, the color will lighten significantly causing it to appear white or bleached. The delivering dealership will install the splitter and it should be inspected before the car is sold to the customer for any cuts or abrasions. Any cuts, nicks or abrasions will not be covered by the GM warranty. Carbon fiber can have rough and sharp edges. Caution must be used when handling the splitter and the rocker extensions and when washing the car after the parts have been installed.

Looking at the side of the car, you will notice the roof and roof halo bar are carbon fiber. These parts have a special clear coat to protect against UV fading and degradation. Customers should be advised that deep scratches cannot be repaired with regular clear coat. If a deep scratch occurs, the panel must be replaced. Replacement parts will come with the clear coat applied. Dealers should be aware that even though the carbon fiber looks smooth and glossy, there are small micro depressions where the clear coat has sunk to fill the space in the fiber weave. When waxing or polishing the carbon fiber panels, a wax or polish that is black in color is recommended. If a polish or wax dries to a white or light colored haze, the residue may fill the small depressions and it will be difficult to remove it. This is not a product concern but some owners may note that after waxing the part has small white dots. This is likely to be a wax residual in the pores of the fiber. This is especially true on the underside of the hood. Since the underside of the hood is not subjected to UV light it is not clear coated and tiny pores in the fiber are open. If customers wax or polish this surface they may note white specks in the paint. Advise them the white specks are residual wax and must be removed

with a wax or polish remover.

Another noticeable feature on the ZR1 is the raised clear panel in the center of the hood. This is a polycarbonate surface and it has a very thin UV coat applied. This prevents the panel from crazing under the UV rays of the sun. Special attention should be given to the panel if the hood is being painted or buffed. Replacement hoods are currently being serviced with the clear panel attached. In the case of a collision repair, the paint facility must take care not to scratch the lens, not to apply any paint or solvent or use polishing or buffing equipment on the clear panel.

**Notice: DO NOT allow any solvent or paint to come in contact with the clear hood insert as this will damage the UV coating.**

**Important: Never use wax, polish or spray cleaner on the clear panel in an attempt to remove any scratches as the protective coating may be removed.**

## **When A ZR1 Is In For Service**

### **General Information**

Inspect the ZR1 when it is received at the dealership or when it is presented for service by a customer. The ZR1 is the most expensive vehicle Chevrolet has ever offered for sale. In many cases, the customers that purchase this car will see it as a major investment and it will require the utmost respect.

Anytime a ZR1 enters the dealership for a repair, submit a field product report to GM. While the warranty system will be constantly monitored, a well-documented field product report will provide valuable information quicker and allow engineering and manufacturing to react quickly to any issues that are found.

When technicians, porters or sales staffs are moving the ZR1, care must be taken so as not to contact parking curbs, sidewalks or other obstructions due to

the overhang of the front splitter. The sales staff should point this out to new owners as well before the ZR1 is driven off the lot.

When a ZR1 comes into the dealership for service, make sure the service writer walks around the car with the owner and notes any damage on the wheels, tires or body panels. Most owners believe the dealership has the responsibility to properly care for their investment. There should be no surprises when the ZR1 is returned to the customer-- so have the service writer walk around the car with the customer before it is removed from the dealership. A couple of minutes spent inspecting the car when it comes into the dealership and before it leaves the dealership can save the dealership from the wrath of an angry customer that believes the dealership may have damaged the car.

When the car is in the service department think about who has the ability to drive and/or test drive the car. Many of the people in the dealership will have no idea how powerful and fast the car is and how quickly it can go out of control if care is not taken. A strict policy of who can drive the ZR1 and where they are allowed to drive the ZR1 should be implemented before the first car ever arrives at the dealership. The ZR1 is the most powerful production car GM has ever produced; it is extremely fast and extremely complicated. The individuals that purchase this vehicle will have very high expectations from the car, the dealership and the technician that works on it. These owners will be extremely particular. To the owners, this is a long term investment and they will need to be handled in a very special manner. Make sure there is a process in place in the entire dealership that recognizes this investment and appreciates the owners that purchase them.

General Motors designed and produced the ZR1 to be driven on the roads. While the car is capable of awesome displays of power and speed it was not designed to be "raced". All of the restrictions that are currently in place for all of GM's products are in place on the ZR1 as well. There are several notations in the warranty booklets that explain that GM may deny warranty coverage if the vehicle or part has failed due to abuse, neglect, improper or insufficient

maintenance or modifications not approved by GM. This includes common "upgrades" customers may make such as wheels, tires, suspension, brakes, air induction and engine calibrations. Please ensure this is covered with the owner when the vehicle is delivered. The ZR1 will perform well in a track environment; however, it was not designed, built or sold as a "track car." If an owner elects to use the car in such a manner, it is outside the intent of the warranty as supplied by General Motors and any damage as a result may not be covered by the GM warranty. Explaining this to a customer before the car is sold may prevent misunderstandings later.

## **Hoisting and Lifting the ZR1**

The ZR1 is lower at the front once the dealership installs the front splitter and the side rocker extensions. Care must be taken when driving the ZR1 on or off a hoist or alignment rack. The front splitter adds approximately 76 mm (3 in) of additional front overhang and 38 mm (1.5 in) less front clearance when installed. Due to the low ride height of the splitter and the rocker extensions, this vehicle will not clear most floor obstruction or clear the ramps on lifts and racks without causing damage to the panels. GM recommends the use of ramps to lift the car before driving onto lift devices. Your dealership can construct their own by taking a 3 ft long piece of 2 x 12 lumber with a 45 degree cut on both ends. The dealership will need four of these. Depending on the height of your lift devices some dealerships may need to add an additional 2 X 12 approximately 457 mm (18 in) long and connected in the center to provide additional lift. A 2 X 12 will provide approximately 38 mm (1.5 in) of lift to the vehicle.

There are premade ramps available in the aftermarket that will accomplish the same result and one company that provides such ramps is "Race Ramps" and they can be obtained directly from

<http://www.raceramps.com/store/shopexd.asp?id=82> or from similar supplier. The August 2008 "Tech Link" magazine has the dimensions required to clear the splitter and rockers once they are installed. The ratio of height to length to safely clear the front splitter is 8.5 to 1.

Example: In order to clear the front splitter when driving on a lift or alignment rack, the front wheel must be 216 mm (8.5 in) away for every inch of height to the surface of the rack. If the dealership rack sits 254 mm (10 in) above the floor, the ramp must extend 2159 mm (85 in) from the rack to clear the splitter.

Once the ZR1 is safely centered and ready to lift, remember to use the lifting pucks that have been essential for all Corvettes since 1997. Due to the low ground clearance of the rocker extensions, lifting a ZR1 without the pucks will cause the rocker to crack. There is insufficient clearance with many lift arms to lift the car without contacting the rocker extension. Unlike regular SMC panels, the rocker extensions are produced from carbon fiber and they will not withstand any crush. Crushing a rocker extension is the likely outcome unless the lifting pucks are used and installed properly.

**Important: Once the ZR1 has been lowered to the floor remember to check for clearance after the ground effects have been added and before the car is driven off the hoist or lift.**

## **Underneath the ZR1**

Once under the car, there are some differences you are likely to notice.

The additional heat exchanger at the front of the car, in front of the AC condenser, is the cooler for the supercharger. It also has its own cooling system. The pump is located behind the front fascia and access can be gained from under the car without removing the fascia. The supercharger cooling system has a separate filling process and it must be followed to properly bleed any air from the system if it is ever opened (refer to the bleeding procedures outlined in SI).

The engine oil cooler is attached to the right side of the oil pan just ahead of the oil filter. It is about 76 mm (3 in) thick and 127 mm (5 in) long. This cooler is only used on the ZR1.

Customers or technicians may notice that the half-shaft on the left side of the differential has a larger diameter than the right side-- this is by design. The left side shaft is not interchangeable with the right side of the ZR1 or other Z06 models.

## **Pre-Delivery Inspection**

When a new ZR1 is received at the dealership, the front splitter and rocker panel extensions will be shipped inside the car. The dealership must inspect the car when it arrives to ensure that all equipment is with the car as theft from transit is not unheard of. The carbon fiber parts are very expensive and can be a target for thieves. If a part is missing when the vehicle is received, it must be recorded on the delivery receipt. Make sure the person designated to check in the vehicle when it is received from the carrier understands what is supposed to be shipped and received with the car. Missing parts cannot be claimed under warranty. The contents in the car should be:

- Left and right side rocker panel extensions and mounting hardware
- Front splitter and attaching components
- Front "A" arm brake cooling deflectors
- Rear wheel flares and attachment hardware
- Four rotor protectors

The instructions for installing the rocker extensions and the front splitter are included with the parts in every car. It is **VERY IMPORTANT** to follow these directions exactly. Any deviation from these instructions may result in damage to the carbon fiber components which would be extremely costly for the dealership.

## **100% Parts Return**

For the first part of the 2009 model year every part replaced on the ZR1 will

be on parts returned for engineering root cause analysis. Remember to include a copy of the Warranty Parts Center (WPC) Part Return Request AND the repair order (copy that includes all technician comments) when returning the parts so proper credit can be provided when the parts arrive at the WPC.

There are several parts that will be on parts restriction during the introduction. The LS9 engine, all carbon fiber body panels and all brake components will be restricted. If one of these components are required to be replaced, approval must be obtained from the Product Quality Center (PQC) prior to replacements.

Online URL:

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