WA Technology

Install "Low Dust" Brake Pads on C8 Z51,

Includes pad Install on C7 GS & C7 Z51 (undated September 2022)

This "How Too" Install PDF Focus is on the C8. Since it has similar double sided "brake tape" holding pistons to front pads as my early 2014 Z51, those details are included. Note, you'll *need low dust pads* or like the ~6-month experience with my 2014 Z51 you'll be cleaning brake dust from the wheels every few hundred miles. If I didn't, the dust not only looked bad it was pitting my black wheels! *Forum Posters state C8 Z51 brake dust is as bad as the C7 Z51, C7 Grand Sport and C7 Z06!*

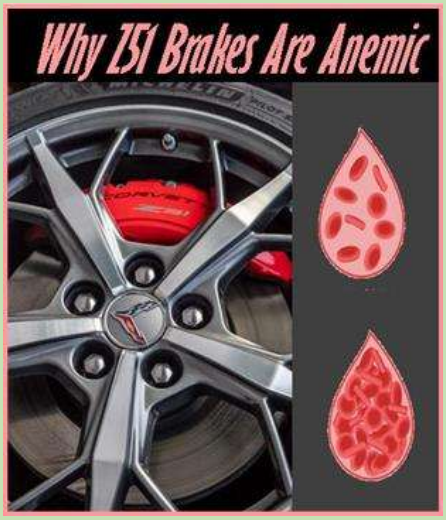
My 2017 Grand Sport install is also covered briefly. It's simple since NO "Brake Tape" on the pads! BUT since I started with PowerStop Z26 pads and tossed them at ~900 miles, it includes an Appendix with info from the research done to define the likely reason for their inferior performance with ambient temp pads. Since some make comments that all my Pad information is about Carbotech, the Appendix now includes information about Hawk (*another quality Pad*) as well as some cheap pads available. Your car your choice but this many picture/long caption How To Install PDF info fits whatever pad you choose.

I INSTALLED THE C8 PADS WITHOUT REMOVING THE CALIPERS* (*which is shown in the following detailed Pics/Captions.)* Another method with the CALIPERS IN PLACE worked for two members is posted on page 14. For a straightforward install without the risk of damage to piston "Dust Boots" *SUGGEST REMOVING THE CALIPERS BY SAFELY LIFTING C8 HIGH ENOUGH!

The high percentage of C8s sold (~60%) as Z51's, *need low dust pads.* In March 2022 *Big Lebowski,* Corvette Forum member, posted pics of what he did to replace the front pads by removing the calipers without a Lift. Using his method, (*presented here in pics*) the following procedure should work fine and safely:

1. **To remove the front calipers (*no tape, so not needed in the rear)* the car must be lifted about 20 inches from the ground to the lower caliper bolt. That will require jacking ~13 to 15 inches from the GM oval frame lift location to have a 20 inch long wrench reach the lower caliper bolt.**
2. **However, DO NOT WORK ON THE CAR only supported by jacks. Must have Jack Stand support for safety.**
3. **Therefore, could use *Big Lebowski's* simple jack stand method. He lifted both sides, removed tilted wheels and used a flex head Breaker Bar to loosen the Caliper Bolts. He was prepared to use a flex head Torque Wrench to achieve the specified 155 ft-lb caliper tightening torque.**

The Z51 Brakes Are A Bit Anemic!



Was concerned about the 'small brakes' in the C8 Z51 before I placed my C8 Hold-A-Spot order in July 2019 soon after the launch. I was comparing with what Porsche was introducing, finally, a 6 cylinder Cayman ME! The C8 Z51 stops fine BUT not like my 2017 Grand Sport with larger rotors and 6 piston front brakes. Brakes are not nearly as large as what Porsche offered on the 2020 Cayman 718 GT4 with about the same weight distribution. Wondered why?

There is good test data for the Porsche and Ferrari ME 488 with about the same size NOT larger tires, which showed they stopped significantly faster!

This is a pic showing the test data:

2020 Porsche Cayman 718 GT4 Steel Rotors	2020 Corvette C8 Z51 Steel Rotors	2020 Ferrari 488 Pista Carbon/Ceramic	My 2017 Corvette C7 Grand Sport Steel Rotors
Front: 15.0" 6 Piston Rear: 15.0" 4 Piston	Front: 13.8" 4 Piston Rear: 13.0" 4 Piston	Front: 15.6" 6 Piston Rear: 14.1" 4 Piston	Front: 14.6" 6 Piston Rear: 14.4" 4 Piston
Pilot Sport 4S	Pilot Sport 4S	Pirelli P Zero	Pilot Super Sport ZP
Front: 235/35/20	Front: 245/35/19	Front: 245/35/20	Front: 285/30/19
Rear: 295/30/20	Rear: 305/30/20	Rear: 305/30/20	Rear: 335/25/20
FstLp 70 to 0 = 142' GT4 RS, Cup Tr = 132'	GM 60 to 0 = 108'; 97* R&T 70 to 0 = 149'	FstLp 70 to 0 = 124'	MotTrd 60 to 0 = 90' C&D 70 to 0 = 136' **

**Although GMs states 108', several Mag tests showed 97'. ** C&D Grand Sport w/Cup 2 Tires & Carbon Ceramic Rotors = 129'. Min stopping distance is dependent on tires, driver, track surface/temp, Brake Size etc. Unlike some comments, tests show it's NOT ALL TIRES!*

Jason Fenske, *"Engineering Explained,"* interviewed the GM engineers that developed the C8 Z51 brakes and found out WHY!

Jason states: GM engineers said there is nothing about ME physics that should have the C8 taking longer to stop than the C7. After you start braking it switches to a front brake bias but with more uniform tire loading. It should stop faster than the C7 that has 75+% braking on the front tires.

So why is it taking ~8% longer to stop than a C7 Z51?

The GM engineers said if they used bigger brakes, in panic type stops any small steering wheel input makes the back end "very twitchy" and it wants to kick out! He added: Understeer is safer if you're inexperienced and don't know what you're doing behind the wheel. (*Jason's words not mine!)*

This link provides full details and covers the larger brakes you can install: http://netwelding.com/C8_Big_Brakes.pdf

For the C8, Best, Safest to Remove the Front Calipers:

OR, as I did, the center caliper brace and then pads with the *"Caliper in Place"* BUT that is risky and more difficult!

Pic right is from a video that showed what was done from a lift to remove the caliper first. It has the big advantage as no "dust boot damage risk." However, the bolts have a 155 ft-lbs torque spec. There are two 20mm hex head bolts and require room for a breaker bar and torque wrench.

Considering the difficulty and risk of nicking the Piston Dust Boots I would have removed the Calipers!

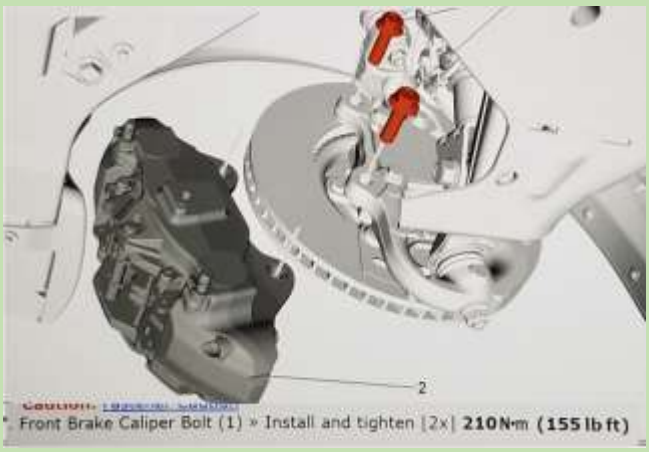
A Forum Post by "George Vee" (*who has a drive on lift*) showed he still needs a special cross bar device (*expensive*) to support the car at the lift pads to remove the wheels.

Then a March 2022 post by *Big Lebowski* showed and inexpensive safe method using a jack stand and dealing with the two 155 ft-lb Torque requiment bolts.

In addition, will need a suitable support to hold the caliper so the brake line does not have to be disconnected. (*OR another "pair of hands."*)

George Vee provided this information sheet from the service manual. Note the bolts are about in the center half of the caliper. Can also see the lower caliper bolt being removed in the top pic on this page where a center post lift was used.

Suspect it will require more than the 155-ft-lb torque to loosen. My ½ inch drive breaker bar and a 6-point 20 mm socket would work. Same with my 20 inch long 150 ft-lb torque wrench (*that can supply 155 ft-lbs*) when reinstalling.



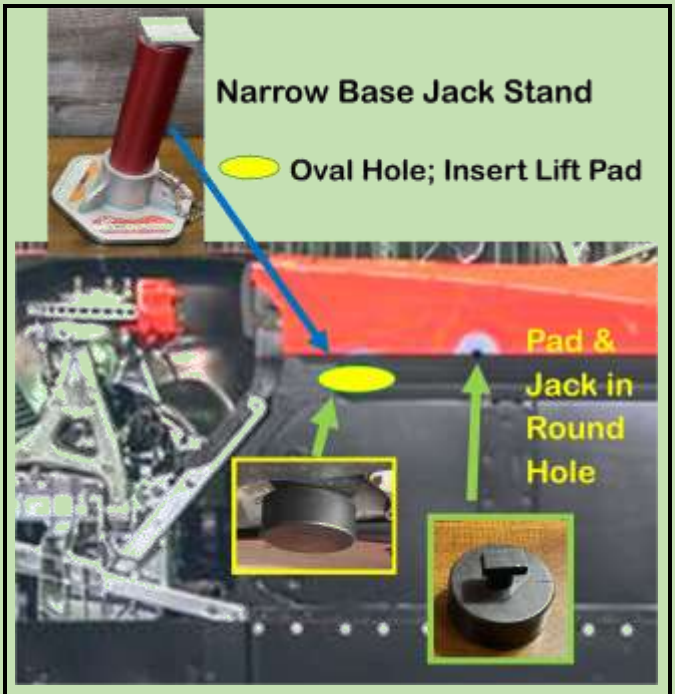
Corvette Forum member *Big Lebowski* used and interesting safe method of Jacking the front so he could remove the caliper. He used BIG Red jack stands (*left in pic)* that have a small profile base. However the low 10 inch minimum hight (to max 17 inches) Jack Stand I recently bought from Walmart for ~$10 should work about the same.

This is how *Big Lebowski* lifted the front. It was safe and since the front has only 40% of the car weight jacking up at the round hole a few inches to the rear is not an issue.

This approach is only needed for the Front pads *as the rears DO NOT HAVE TWO SIDED TAPE*. My caliper in place method worked fine and would be fine for all C8 rear brakes.

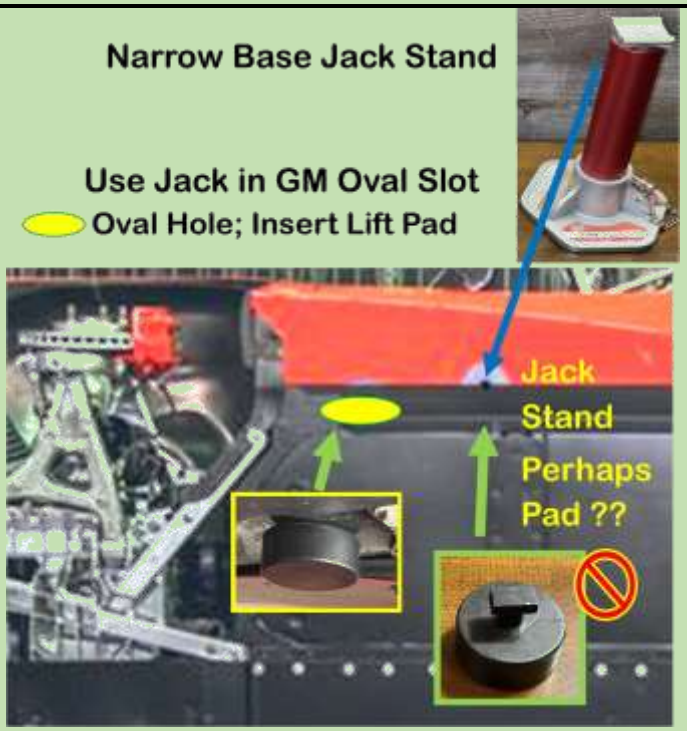
As the next pic shows you can reach the caliper bolts to remove and install with the specified 155 ft-lbs even with a low lift but need swival head wrenches.

Note "Big" modified the Tab on a Jack Pad to fit in the GM round hole versus the oval slot.



However, lifting just enough to access the caliper required turning the wheels and using a Flex Head Breaker Bar and perhaps a Flex Head Torque Wrench (*read expensive.) "Big"* found he was able to use his standard torque wrench but just barely fit.

Pic is from a video where a Flex Head Breaker Bar and Torque Flex Head Wrench were used. BUT I won't provide the Link as this person did it WITHOUT a jack stand and had his head between car and wheel with only a Jack supporting! *Don't Do That!*



Could reverse the jack and jack stand positions and eliminate the need to modify a jack pad to fit the round hole.

A Jack Pad Tab is not needed for jack stand support so it can just be placed on the frame near the round hole. Could use small wood block etc., to protect the frame!

As I generally do, would keep the jack(s) in place with light holding force as *"belt and suspenders!"*

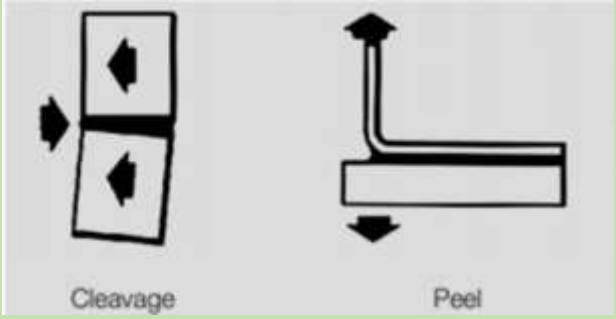
Expect ~13 to 15 inches from car frame to floor should be sufficient to get a standard, none-flex head Breaker Bar and Torque Wrench to fit.

FWIW, the Tab on the jack pad helps assure the jack saddle WILL NOT slide off the frame as the jack is raised. The lip on the Jack Saddle along with the Jack Pad Tab helps pull the jack into the car as it lifts.

I even welded a higher lip on my large jack as the original saddle was essentially flat. That was no doubt to have the long reach heavy jack (95 lbs) have a low minimum lift access! With its heavy weight the jack was not moving in, AS IS REQUIRED.

Once the caliper is removed from the rotor you can separate the pads from the strong doubled sided brake tape (*commonly used in Europe to reduce vibration and noise*.)

Pic is why removing the caliper makes it easier and safer to break the tape hold. The double sided "brake tape" used to hold the pads to the caliper pistons is strong in tension and shear BUT not in "Peel" or what is called "Cleavage." Need room to use this separation mechanism. No room with rotor and pads in place!



Once the caliper is off the car put a screwdriver in center between a pad and caliper and pry. It will "Peel" away from the tape in "Cleavage" as without rotor there is pleantly of room. Then my suggestion, 1) reinstall the caliper, 2) insert new pads, 3) put in pad holding screws, 4) bolt caliper center brace and spring. That's all that is needd if replacing the pads when they wear!

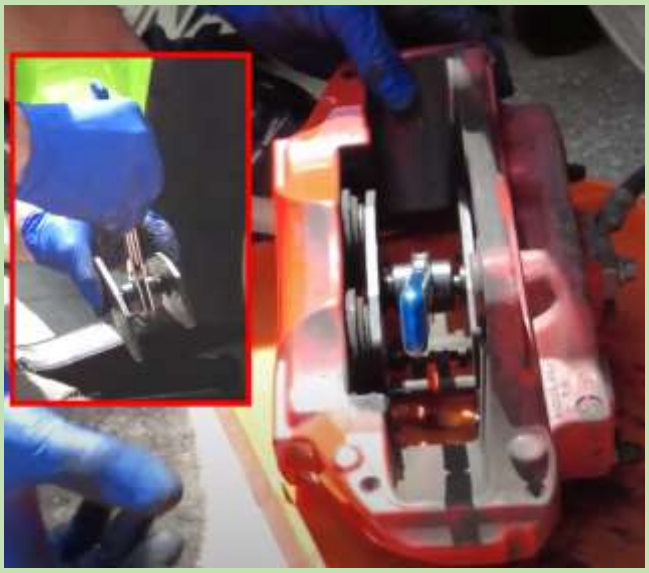
Note, *Strake* a Forum member, stated putting the caliper back with new pads in place was not easy. He recommends removing the caliper brace bolt and installing the caliper *without* pads and add those after it is bolted back in the car.

Also, if planning to install new pads with the with the caliper removed, you will need a brake piston spreader (*like that shown right*.) Must press all pistons at the same time. Press on one piston and fluid pressure will push other pistons out!

However if you follow my suggestion and the first steps of what I did to change pads with the caliper in place, you can avoid using a special tool! First remove the spings and side pins.

Unlike trying to remove the pads from the strong piston to pad tape (*very difficult*) it's safe and easy to put a stiff paint scaper (and after screwdriver tips) between the old pads and rotor and push the pads back.

You'll also see in my install I found small clamps on the pad ears to caliper worked for me. Avoids the need for a special piston spreader.



18M-RS3

Some Combo Jack Pad/Jack Stand Options

Forum member, *Strake* used two of these Rennstand sold by Safe Jack combo jack pad and jack stand. He jacked both sides at the same time.

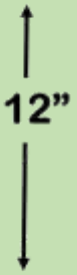
The car is lifted with the top section attached to the jack then the sides are added while the jack is in place.

Rennstand says there 18M-R33 model can lift to over 16 inches, which will be more than enough to remove the caliper bolts.

It sells for $125/each but you will need the jack pad that fits the C8 oval slot, which is extra.

***Strake* posted a pic of his rear lifted but you can see that after jacking you insert the RENNSTAND legs and can remove the jack. So, you are jacking and using a jack stand in the same location.**

However, it does cost $250 plus the C8 jack pad costs for two.



There is a similar product to RENNSTAND called JackPoint that operates in a simiar way. You jack up the car then insert the “JackPoint” base. BUT it’s a fixed height limited to about 12 inch lift and cost $325 each.

Note they both, JackPoint and RENNSTAND, require the proper jack pad that fits their device AND the C8 oval slot.

My Install With Caliper In Place

This is what I did to install Carbotech 1521 low dust front pads in my C8 Z51. Brembo used a special, small bolt head on the C8 as used on a Porsche Cayenne and Audi Q7. A special 10 point, 9mm socket is needed. I bought on Amazon.

It was thought perhaps it was a high torque bolt. Its small and screws into the brace. In fact, the cross brace does not require high pretention. It's only loaded in tension with brakes applied!

The difficultly with the front pad removal is its use of strong 2-sided tape holding the pistons to the pad backing plates, as did my early C7 2014 Z51. *There is a video showing it's deceptively easy* to: 1) push the pads back with a trip tool and just pull the pads out and 2) pull the pad metal backing plates with finger pressure! *NO WAY did that work! It gave me a FALSE idea it would be easy before I started!* Fortunately, my experience with an early 2014 Z51 with two sided "Brake Tape" allowed me to continue the install and getting the pads out *but it was not easy!*

Trim Tool Separates Pad Backing Plate & Pulls Out Easily

Finger Pressure Pulls Backing Plate Away From Piston

This Pic shows a front pad removed with a 1-inch-wide paint scraper used to separate the pads from pistons. This approach is risky as you could damage a Dust Boot. More details follow.

Before starting with whatever method chosen, GM recommends the battery be disconnected. **The C8 uses what GM calls *eBoost* that is a pressurized brake fluid pump system to boost brake pressure. The amount is based on the Driving Mode. Less for Touring, Max for Track. Can be ~3000 psi.**

Note: If this step is not done, the pump could inadveratrly activate, for example when the door is opened. If pads are out of the caliper the pistons will come out, brake fluid all over- NO FUN!

To access the battery, first must remove the plastic trim from each side of the Frunk. Suggest doing only with your fingers. Even then the sides pull out NOT up. Some reports of clips breaking, be careful.

Then you can lift out the large center plastic cover from the rear. Some comments about difficulty with the two yellow pins in the front. Again, use your fingers and pull those straight up grabbing the panel from the side.

Once the sides are off the rear plastic tray comes out being held by two large pins on the front edge and several clips in the back, it just lifts out. Note the large brake fluid reservoir. As some recommended I loosened the cap to relive any pressure when the pistons are pushed back. Not sure it was needed.

The negative terminal was removed from the battery, by loosening the 10mm nut.

As mentioned, IF not disconnected, with pads removed there is a chance the pump might activate inadvertently. That would push the pistons out the caliper and brake fluid all over! NO FUN!

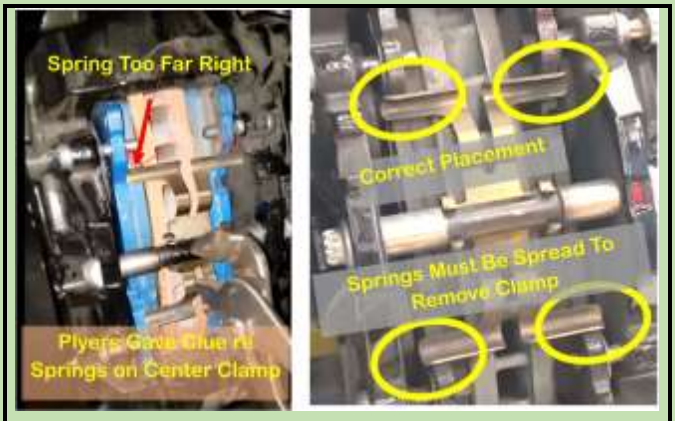
First install wheel chocks on the opposite side to be lifted. I changed brake pads only on one wheel at a time.

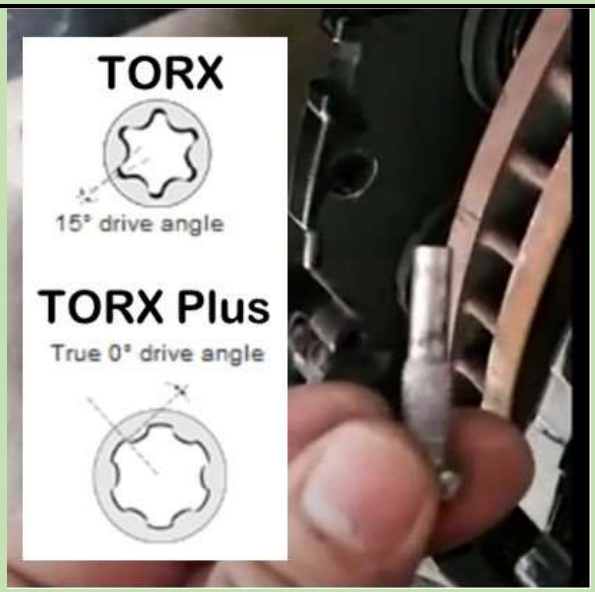
The next step in the install is safely jacking the C8. I used a jack pad inserted in the GM specified oval frame slot.

I removed the wheel and for safety, used one of my ~7-inch-high wheel stanchions under the front spindle. Could use a stack of wood or other material like a concrete block.

When removing the top spring be sure you note its exact position. The ends are centered and on the metal pad backs NOT on the pad.

An install video showed one of the sides incorrectly NOT on one pad. An observant Forum member posted a pic from the video. The plyers and spread clamps gave a clue they must "spread' to remove the clamp bolt. They can be closed after the install.

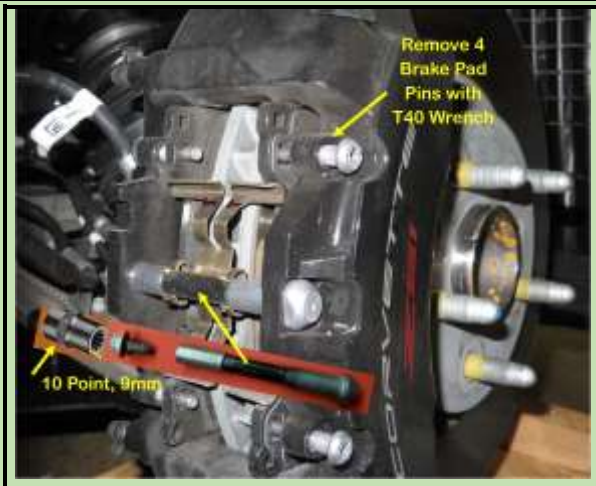




The C8 front pads use 4 pad retaining pins. They are threaded into the caliper and have a strong form of Loctite.

One report said they were T40P (Plus.) After purchasing a T40P wrench, found mine were NOT, just T40 Torx bolt heads. Be sure to use a "quality" T40 wrench and if a 3/8-inch drive, suggest using a 3/8 to ½ inch drive adapter and a ½ inch drive ratchet! You must keep the wrench perpendicular to the bolt head to avoid rounding the internal shape.

Note, Member RKCLR reported the pin torque is 18 ft-lbs.



The 4 thread pad pins that keep the pads in place are easily removed.

The center caliper clamp is also easily removed using the special brake wrench that fits the unusual 10 point, 9mm socket. It's the same one used on some Porsche's and Audi's. I bought on Amazon.

Tried several methods to push pistons back. (*That was an incorrect deceptive video that showed a plastic trim was used. It said it was a Z51 BUT perhaps the brake tape was omitted by mistake at Brembo! Or he was lucky and had a bad batch of tape!)* Found small clamps easiest.

A wide stiff scraper between the *pad and the rotor* can also be used to push the pistons back into the caliper. It's a safe method UNLIKE TRYING TO SEPARATE THE PAD FROM PISTON as no piston Dust Boots involved.

Note on my C7 Grand Sport pad install used a 1/16 inch thick paint scraper to push the pistons back into the calipers

However even with front pads moved away from rotor, no way they were lose enough to move or be removed even with vise grips etc. The pads were attached very strongly to the metal backing plates and the plates strongly to the pistons!

One thing that helped push the paint scraper though the tape hold, was after pushing the pistons back, I tapped the pads back from the pistons. I think that helped loosen the tape grip. I used a 1-inch-wide paint scraper and hammered to break the tape grip! See details in the 2014 install with wider paint scraper.

The critical issue with the C8 front pads and the use of very strong two-sided brake pad tape holding the pads to the pistons is the Dust Boot size. They are large and protrude slightly past the caliper surface. They are also closely spaced.

Therefore, you must avoid nicking them when leveraging the pads away to break the tape grip. There is little space between the Dust Boots.

Pic left is on a C8 Z51. The red caliper pic is what I remember for my 2014 Z51.

I was successful but NOT EASY. If the dust boot is damaged (which you could see with a mirror and flashlight when the pads are removed) would need to remove the caliper to replace a dust boot!

There is a Loctite type material on the 4 threaded pins. I installed with Blue Loctite from a stick applicator.

As mentioned, there is no way the backing plates could be removed from the pads and be reused. Had tried to remove them from my 2014 Z51 to see how they were attached, and they only bent! Did not do anything more with the C8 pads as no need. But with the effort required just to insert the 1-inch-wide scraper it was held very tightly.

Subsequently to see how they were attached and IF breaking them lose would be safer than from the pads, I found a large amount of strong adhesive was used. Would not be easier or possible!

As I did with my 2014 Z51 Carbotech pads used Permatex high temp brake pad lub on the pad backs and a small amount on sides of the metal pad back that slides in the caliper. DO NOT apply to the pad sides, only the metal backing.

Carefully look at the top spring and install exactly as it was initially. It much be center and on both pad metal backs.

In order to get the center clamp bolt out, you'll have to bend the holding clips slightly. Once installed, you can bend back with plyers.

Jacked up the rear as the front. Used the wood stanchion under the rotor as a safety precaution in case the jack slips.

Changing those pads is very easy. NO tape! Two pins hold both pads in place.

Just tap out using a 5/32-inch drift. The flat end of a 5/32 drill bit also works. Then insert the new pads with a small amount of brake lub on the pad backs and metal sides and replace the pins.

I used Lug Nut Extensions sold by Reverse Logic. They make reinstalling the wheel easier. Great product.

I also bought a Titan 22mm lug wrench and a 1 ½ inch long 1/2-inch drive Extension. Was the perfect length to have two hands on my 150-ft-lb torque wrench as it cleared the fenders!

Taken19's Method Calipers in Place

Taken19 **Forum Member posted his method and said it only took about 10 minutes to remove the pads with the caliper attached. His C8 Z51 had 6200 miles, which may have helped provide some extra room between the pad and rotor. Also like the video that showed *"How Easy"* it was- NOT for me- the double sided tape may vary in strength.**

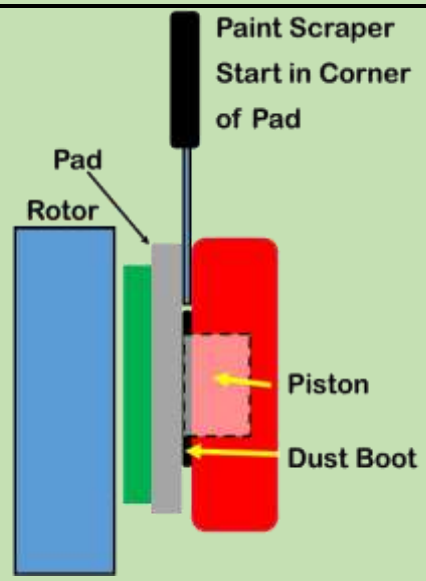
He used an interesting approach:

NOTE: Taken19 Recently Posted what he did to install with calipers in place:

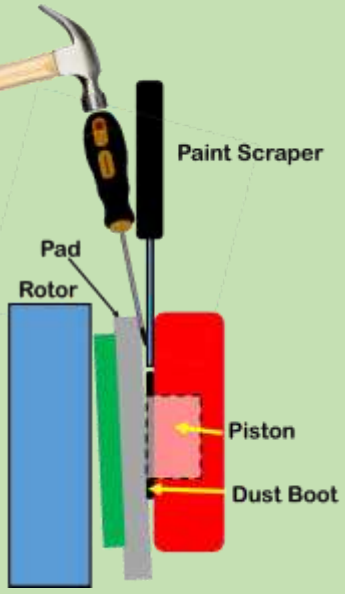
He removed the spring, pins and cross brace.

He then used a 1" wide paint scraper starting at a corner between the piston and brake pad. It was tapped in with a hammer about a 1/8" in acting as a shield to protect the dust boot.

(*This is different from what I did, which was to hammer the paint scraper past the dust boot over the piston through the two sided tape. That is risky as the dust boot can be damaged!)*



My Thought:
Might Also Try
Twisting the
Screwdriver to
Break the Tape Hold



Taken19 Forum Member **used a flat head screwdriver to wedge between the piston and paint scraper. A few light taps and the pad popped off from the double sided brake tape. The flat paint scraper protects the dust boot and the screwdriver wedged down pretty easy to release the tape.**

Note: Forum *Member RKCLR* reported using *Taken19* members method and it worked for him.

Installing Carbotech 1521 Pads on My September 2013 built, Six Month Old 2014 C7 Z51. Mid 2014 C7s Stopped Using Tape.

After safely jacking and using wheel chocks, the next step is to simply drive out the two pins that hold the pads in place. Note these are the same as used on the rear C8 calipers and pads.

Note the pins are NOT screwed into the caliper. They are held with pressure line a roll pin! Details below.

After taping them in the ~1/16 inch they protrude, used drift pin of the correct size, 5/32 inches, which was long enough to get the spring clip retainer out of its recess.

Note the small vise grip used to fully remove the pin. Also note the position of the Cross Spring; it goes back in the same way.

If you don't have a 5/32-inch diameter drift pin, you could use a 5/32-inch diameter drill bit to drive the pointed end of the pin into the caliper. That end sticks out about 1/16 inches so a larger drift pin or small hammer will get it flush with the caliper surface. Then use the drift or round drill end to drive it though the outside of the caliper. It does not take much force.

The pins will have brake residue stuck to the exposed surfaces, as noted in the pic. It came off easily with some 400-grit sandpaper.

The Cross Spring helps keep the pads away from the rotor and reduces any rattle when they are not activated. The front and rear are different shapes. Just put them back the way they came off.

Where I was expecting a threaded end on the pin, the C7 uses these split rings to provide tension to retain them. Like a roll pin, they have a larger OD than the recess they slip into. Great for racing to make a quick pad change (once the OEM pads with their sticky tape are removed and replaced with true racing pads!)

NOTE: See page 20 for a tip on installing the pins

The Tough Part! Removing The Pads, Stuck to the Pistons with Very Strong, Double Sided Tape!

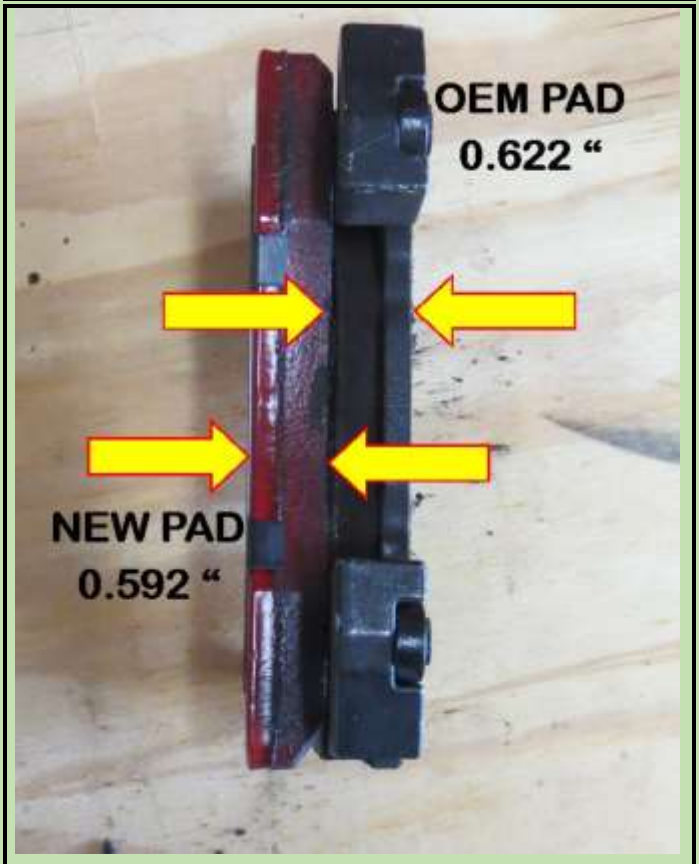
Tried a forum idea of making a thin knife by grinding a sharp edge on the back edge of a hacksaw blade. It was going very slow. Even tied the fine-toothed edge-no faster. May have worked but this approach was much quicker!

Used a stiff paint scraper and a hammer! Ground a sharp edge to one side, like a chisel. Inserted the flat side toward the back of the old pad and hit the top of the handle with a hammer. A few blows separated the sticky tape. It did take some significant force with the hammer.

Suggest getting a stiff scraper as short as possible. It may even be advisable to cut the handle down to gain room for a hammer blow. This was especially needed on the driver's side. I approached this piston-pad area from an angle on the driver's side rather than simply straight down as was possible on the passenger side. You can feel when it starts to separate. Some of the tape that stuck to the backing shim on the brake pad is seen in this pic.

I cleaned the empty cavity, using mostly rubbing alcohol. I used a small amount of Brakleen on a rag, as someone on the forum suggested since it will eat paint! Washed quickly with alcohol and also put some on a stiff bottle type brush used for cleaning wheels. I quickly squirted alcohol over the whole area. This alcohol bottle came with a small flip lid cap and a small hole that when the bottle was squeezed created a fine stream. Bought a 2-quart package from Sam's Club for ~$4.

Using large quantiles of Dawn dish soapy water and alcohol were the most effective in getting most of the residual brake pad material cleaned.



Was planning to use the wide paint scrapper between the existing pads and the rotor, if needed, to push the pistons back. With two pistons, you must push both back at the same time or you'll push one out when the other is pushed in!

It was not an issue as the new pads were slightly thinner than the removed old pads! If needed there are special tools available if you're replacing well warn pads, google.

(A Forum Poster suggested two screw drivers could be used before the old pads were removed. They would be wedged between the pad and rotor to push the pistons back. If the pads were worn and thinner than the new pads, a good approach.)

These are the backs of the old pads and the pair of new Carbotech pads. Note the OEM pads have wear indicator springs on both front and rear pads (they make a noise if they hit the rotor.) The Carbotech pad only has them on one pad that I put on the front.

The OEM pad has added weights on the top of the pad. The way they are designed they look like a vibration damper (See Appendix, Tadge recently said they were just that!). They are apparently there to reduce vibration and noise. No such weights are on the Carbortech pads (although I believe they now use them for some models.). Both OEM and Carbotech front pads had shims on the back to reduce noise. The OEMs were attached with tape or glue and the Carbotech mechanically held on with clips.

What Brake Lub to Use?

Found this Permatex product, available in various sizes. Here is a description:

"Permatex Ceramic Extreme Brake Parts Lubricant is a 100% synthetic lubricant containing ceramic solids for extreme performance under the most critical braking conditions. A purple, non-melting formula, this premium lubricant is Permatex's longest lasting, most temperature resistant way to silence brake noise such as squealing and chattering. Excellent for sliding surfaces operating in wet or dry conditions from -65 degrees Fahrenheit to 3000 degrees Fahrenheit. This product assures that critical brake parts remain lubricated throughout brake pad life. Resistant to corrosion and contaminants, it will not wash out."

Decided the Permatex was what I would use on the back of the pads, but GM recommends their product be put only on the pad sides. Found it for a discounted $0.83 per package versus a list of $3.14. Bought one package but it was just barely enough for the front pads! Should have purchased four! Fortunately had a small tube of the same high temp moly lub product. I used it for the rear pads.

The Permatex Lub was probably needed even more on the rear Carbotech pads as they do not incorporate any anti-squeal shims. Could have used it on the sides but from the very thick consistency it appears ideal for the back.

Bought My Pads from Forum Advertiser: Adam@Amp'dAutosport.com

You can email or visit Adam on his website or call; he gives a discount to forum members.

Adam suggested using sandpaper to remove some of the old pad material from the rotor. Others recommended a Scotch-Brite pad. Found this 60 grit Norton sanding pad. It worked fine and quickly. Followed the advice of moving it 90 degrees to the surface as shown. Made several passes after cleaning the surface with a rag sprayed with Brakleen followed quickly with alcohol.

Did not use a great deal of force so the 60-grit pad was just cleaning the surface rather than scoring the rotor. The pad did pick-up material as can be seen in this pic. Not sure how effective it was but the rotors looked clean when finished. Did the inside the same way, was only able to access in one area. Rotated the disk as I moved the pad perpendicular to the axial.

After jacking the rear, moved the liquid catch pad and the WeatherTech cover from our old SUV we recently traded and that catches air-conditioned condensate in the garage! Kept the tiled floor clean! Used the same soapy water and it was easy to quickly remove the two pins. Note to be able to turn the rotor get at all spots, front and back it needs to out of gear and the parking brake disengaged. Use tire stops front and rear on the front tires before jacking.

Unlike the front, there is no sticky tape holding the rear pads to the pistons. Protected the caliper with a rag and with a large screwdriver wedged on the pad edge that loosened it sufficiently to have it pull straight out with little force.

On OEM Rear Pads, Both Have Backing and One Anti-Squeal Shim

Carbotech Pads Have No Anti-Squeal Shims Or Wear Indicator

Note the OEM pads have anti-squeal shim as did the front pads. There was also a wear indicator spring on the outside OEM pad.

The Carbotech rear pads had neither. Tried to remove the anti-squeal shim from the old pad but it was glued very tightly (or attached someway.) It bent while trying. Would not have used them but wanted to see how tightly they were attached.

The Permatex Brake Lub was put on the pad backs and GM type lub on the sides and after cleaning the caliper cavity, like the fronts, the pads and pins were simply inserted.

Bedding Fundamentals

Bed-in consists of heating a brake system to a temperature to allow the formation of a transfer layer. The brake system is then allowed to cool without coming to rest, resulting in an even transfer layer deposition around the rotor circumference. The procedure uses hard braking 4 to 6 times so rotor face is evenly covered with brake pad material.

Because the adherent temperature range for brake pads varies widely (typically 100°F-600°F for street pads and 600°F-1400°F for race pads), each bed-in needs to be application and pad specific.

The key to a successful bed-in is to bring the pads up to their adherent operating temperature in a controlled manner and keep them there long enough to start the pad material transfer process. Different brake system designs, pad types, and driving conditions require different procedures to successfully accomplish the bed-in.
Note: Adam recently said Carbotech found users were overheating the 1521 pads probably using race pad bedding procedures. See my comment right.

The only difficult part is finding a safe road to do it!

Info from Carbotech: *Proper Bedding Instructions for the Bobcat 1521's.*
Note Adam said Carbotech found users were overheating the 1521 pads when bedding, causing glazing! They now recommend not doing it. If you have a noise issue, I'd suggest you use this less aggressive procedure they had published previously for 1521 pads.

1. Brake from 60mph to 30mph (not 10 to 15 mph used for some race pads.)

2. Repeat step # 1, 5 to 6 times.

3. Let your brakes cool for about 2-3 minutes while driving.

4. Allow the brake pads and discs to cool down to ambient temperature (driving about 30 minutes without stopping).

NOTE: Proper bedding of pads & rotors will result in greater performance and longer pad & rotor wear.

I followed this older Carbotech procedure noted above. It is different than their other brake pads suggested for racing pads.

When finished all stops were smooth, straight and felt like the old OEM pads.

FWIW: *DID NOT BED THE C8 PADS. Did stop aggressively 3 or 4 times from ~65 to 30 mph. Car stops perfectly straight and fine. If after 500 miles I do not have any noise, as now, won't bother!*

Installing Brake Pads on 2017 Grand Sport:

As mentioned, initially installed PowerStop pads as they were very cheap. After 900 miles and several times passing-up the road I turn on when a car was waiting to enter the highway, I had enough! Never did that with the Carbotech 1521's on my 2014!

WHY I TOSSED POWERSTOP BRAKE PADS

Need Good Confident Hard Braking With Cold (ambient temp) Pads

Most performance brake pads are designed to stop great when hot. My situation is a bit unique; I live on a narrow, twisty 25 mph speed limit road that exits onto a 4-lane divided highway. After blending into ~70 mph traffic, in ~150 yards I make a right turn onto another rural road, often with traffic coming up fast behind. I made that turn very quickly with my C7, Z51 having no issues with the Carbotech 1521s stopping at least as good as with the OEM pads. The PowerStops required more pedal force and did not provide confidence achieving high "g" braking. Particularly an issue if there was a car stopped waiting to enter the highway as there was little space!

Similar issue returning home, if the brakes are cool, leave 65+ mph traffic and make a right-hand turn to our 25 mph limit narrow road! (Red Line in Pic.)

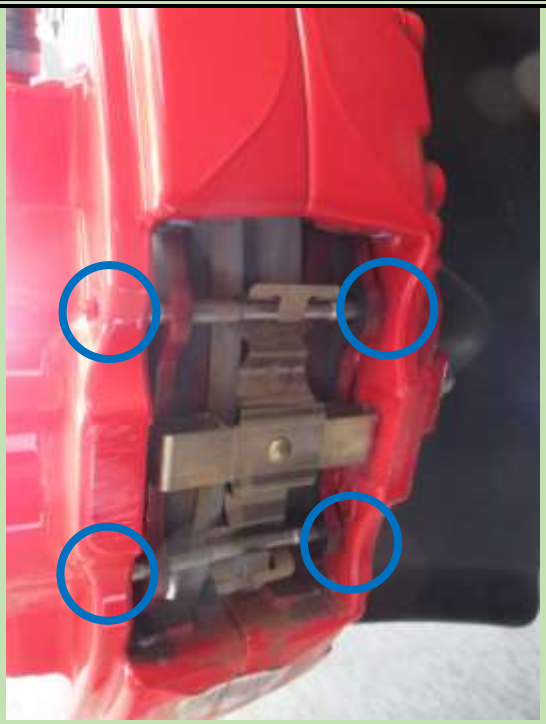
Experience with Carbotech Pads: **The day after the install and bedding, tried the cold pad stop, while the PowerStop were fresh in my mind. Definitely better and more confident.**

After three years, the Carbotech pads are even better than my C7 Z51! They should be the pads are larger! Stops very predictably compared the cold PowerStop pads. I'm very confident using very hard braking as there is no risk. Braking is very predictable.

These are the tools assembled to install the Carbotech brake pads. Key items are a 5/32 drift, jack pad, and Ceramic brake lub. Planned to use the pail to catch the alcohol I would use to clean the rotors. Also bought 3M 60 grit sanding pads. Had several items to clean the brown material from the rotor slots depending on how difficult it was. A torque wrench is essential.

These are the width of the pads on the Grand Sport:

OEM Brembo = 0.625 Thick
Carbotech 1521 = 0.630Thick
With Carbotech replacing Powerstop needed 0.013 inch more space. A stiff 0.06-inch-thick paint scraper placed between the Powerstop pads and rotor, pushed the pistons back for the extra space to make the new pads slip-in!



See Page 19 For a Tip on Seating Pins When Reinstalling

This is the rear pad. Punch out the pins with a 5/32 drift if you have one. If not the solid end of a 5/32 drill bit works fine.

Just keep track of the way the parts came off and put them back the same way. I put "up and top" with a Sharpie on the spring in case there was a question about which end went where!

Note: Bedded the pads using and old Carbotech recommended procedure:

1. Brake hard from 60mph to 30mph.

2. Repeat step # 1, 5 or 6 times.

3. Let your brakes cool for about 2-3 minutes while driving, without stopping.

4. Allow the brake pads and discs to cool down to ambient temperature (driving about 20 to 30 minutes without stopping).

Was planning to use the wide paint scrapper between the existing pads and the rotor, if needed, to push the pistons back. With two pistons, you must push both back at the same time or you'll push one out when the other is pushed in!

It was not an issue as the new pads were slightly thinner than the removed old pads! If needed there are special tools available if you're replacing well warn pads, google.

Appendices Covering Several Braking Subjects:

Installing Brake Pad Pins:

In September 2018 a poster asked how to get the brake pad pins "seated' in a Grand Sport or Z06 where plastic brake cooling ducts make it difficult to get a hammer with a drift behind the pins. He said he could get his flush in the rear, but they needed to be recessed another 1/32 inch to be seated.

Of interest, another poster included a video of a brake pad install. It showed a small amount of pin protrusion on the outside of the caliper with the OEM pads and more with the same pins after the new pad install.

I recalled using a hammer and making them flush but did not recall recessing.

YouTube Video of PowerStop Pads showed and interesting Pin protrusion in the beginning of the video left and final install right.

Note the difference. In addition in the video the installer used a hammer to make the pin flush but in that view the pins DID NOT PROTRUDE.

Decided since it was time to rotate tires, I would check my brake pad pins.

Found the pins only protruded in the front by about 0.02 inches. They were flush with the rear not recessed.

Cut a short ¾ inch long drift from the end of a drill bit with a Dremel tool.

Held it with a pointed nose small Vice Grip and struck with a ball peen hammer. 3 or 4 short blows were sufficient.

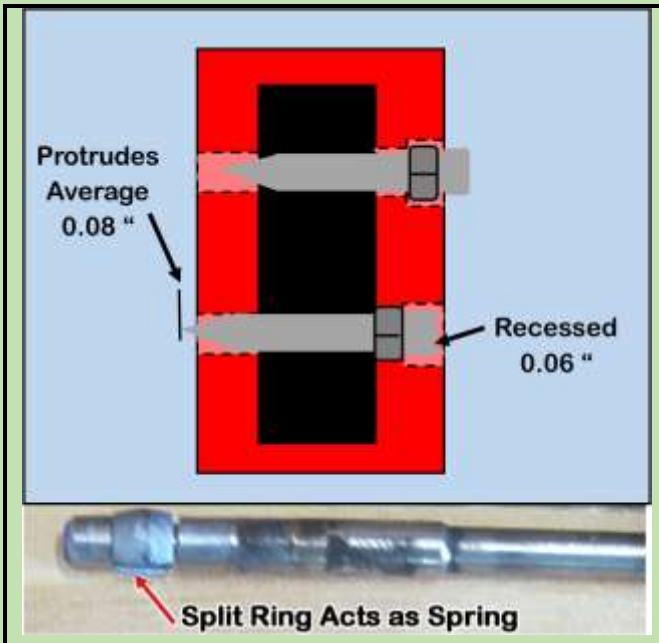
Found I could recess the back of the pin about 0.06 inches and they then protruded about 0.08 inches in the front.

Were they not holding prior? They were, as the spring, roll pin type section that holds them in place was inside the hole in the caliper.

Is it better to have them fully seated? *SURE!*

Would the average mechanic bother to made and use a small punch to recess the pins? Doubt it! *But why not do it right!*

Note, the spring section is higher in the center of the lose ring, so it would provide the needed friction with minimum contact. Also, there no horizontal loads on the pin.

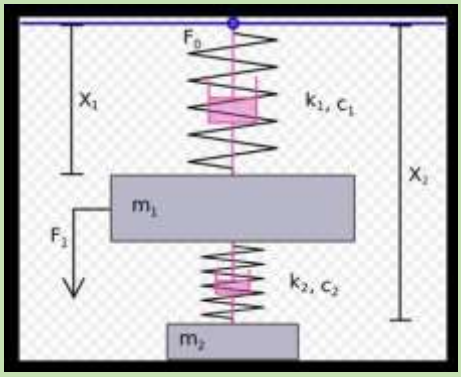


The Z51 Pads: Mass Damper

The Carbotech 1521 nor PowerStop pads included the mass dampers that are on some of the OEM pads. However, my OEM Z51 pads that had them squealed like a "stuck pig" at low speeds before I bedded them! My Carbotech or Powerstop pads never made any noise. But I bedded both when installed. In a December 2015 "Ask Tadge" Forum post he mentioned in a warranty subject for performance equipment being offered for the C7 that some items would have limited coverage and why.

For the kit to fit Z51 brakes on a base car he stated, *" the mass dampers were removed from the stock Z51 pads in order to fit inside of the base Stingray wheels. Mass dampers are used to tune the system for brake noise, and therefore this kit is not warranted for noise performance. The remainder of the factory warranty is intact."*

NOTE: Understand the Z51 Carbotech Pads now include the Mass Dampers, although I have not experienced any noise in two years of use without them!



The mass required for a specific application can be calculated. In some cases, a dual system with an additional damper is installed to stop vibration of the main mass damper!

I recall years ago using this approach to stop a copper water pipe from vibrating and making noise in our basement! It worked.

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FUN FACT

Other practical applications of mass dampers include stopping wind caused vibrations in high tension power lines.

A unique application is this 776-ton mass damper that reduces the sway caused by earthquakes in a 101-story building in Taipei! It hangs from a steel structure that is tied to the building beams.

Role of Copper in Brake Pads:

Rotor (Left) After a Year Using Powerstop Z26 Pads:

A forum poster *Wecker3* installed Powerstop pads and operated for a year. He stated: *"Yes low dust and no noise but they turned my rotors brown."* He posted the picture left. He said it was not caused by rust etc. and I could only remove it with sandpaper. Someone suggested it was possibly caused by copper and another possibly iron being deposited from the pad's material..

Friction Material in Brake Pads:

How the components in the friction material shear, break and interact during braking can determine a pad's friction level, noise and wear characteristics.

A brake pad may require up to 20 different raw materials. Some raw components are abrasive, while other components lubricate. Some components, like structural fibers and resins, hold the pad together, while other components tune the friction levels through various temperature ranges.

A friction material has many different components. Kevlar fibers, for example, help to give the brake pad structure under high temperatures. Copper is a durable metal that can dissipate heat quickly. That's the primary reason why flakes of copper have been mixed with other ingredients in many ceramic brake pads. The faster the pads dissipate heat, the cooler they run and the better they resist brake fade. That improves pedal feel, stopping distance and braking safety.

Typical Brake Pad Materials:

Non-metallic materials - these are made from a combination of various synthetic substances bonded into a composite, principally in the form of cellulose, and sintered glass. They are gentle on rotors, but produce a fair amount of dust, thus having a short service life.

Semi-metallic materials - synthetics mixed with varying proportions of flaked metals. These are harder than non-metallic pads, more fade-resistant and longer lasting, but at the cost of increased wear to the rotor/drum which then must be replaced sooner. They also require more actuating force than non-metallic pads in order to generate braking torque.

Fully metallic materials - these pads are used only in racing vehicles and are composed of sintered steel without any synthetic additives. They are very long-lasting but require more force to slow a vehicle while wearing off the rotors faster. They also tend to be very loud.

Ceramic materials - Composed of clay and porcelain bonded to copper flakes and filaments, these are a good compromise between the durability of the metal pads, grip and fade resistance of the synthetic variety. Their principal drawback, however, is that unlike the previous three types, despite the presence of the copper (which has a high thermal conductivity), ceramic pads generally do not dissipate heat well, which can eventually cause the pads or other components of the braking system to warp. However, because the ceramic materials cause the braking sound to be elevated in frequency beyond that of human hearing, they are exceptionally quiet.

Types of Friction

There are two types of friction when it comes to brakes:

Abrasive friction is the wearing of the pad and rotor to change forward motion into heat. This type of friction involves the breaking of bonds of both the pad material and the disc's cast iron when the caliper pushes them together; however, both components experience wear. Semi-met pads and some non-asbestos organics (NAO) use this type of friction.

Adherent (or adhesive) pad material forms a very thin transfer layer of pad material on the surface of the rotor. The two surfaces are the same materials and generate friction by breaking or shearing the bonds in the pad.

Ceramic and some NAO pads use this type of friction. The transfer layer is bonded to the rotor's surface and cannot be washed away by water or wheel cleaners. The only way to remove it is with a brake lathe or abnormal heat.

The layer is always being worn and replenished by the brake pad during braking, so these pads produce dust. And, while adherent friction is easier on rotors, the pads become the primary wear component.

With this type of pad, it is critical to machine the rotor with the correct surface finish and follow the recommended break-in procedure so the transfer layer can be established.

With both types of friction, it is critical for the rotor to have minimal runout. Abrasive friction materials will wear away at high spots, creating disc thickness variation and pulsation. Adhesive (adherent) friction material could deposit the friction material unevenly and cause brake judder.

Bad Stuff

Some pads use copper for cooling as noted. It is now considered harmful to the environment while its effect on the environment was not fully realized until a few decades ago.

Two states have legislation limiting its overall content in brake pad formulations. The main focus of new laws in Washington state and California revolves around protecting the environment. Studies have shown 35 to 60% of the copper in water run-off is caused by brake dust! Much of the dust that is emitted into the air is

blown onto areas next to the road or is washed into the storm drains when it rains. Most storm drains flow directly into creeks, rivers and marine waters without wastewater treatment. Copper can hurt and kill small marine animals and even render some fish without a sense of smell. The C8 uses "copper free" pads.

Marine Invertebrates

Invertebrates, which represent more than 95% of the known species on Earth, are animals without backbones. They are diverse, interesting, colorful, and unusual, marine life. In invertebrate marine life, copper alters their biochemical and biophysical properties even at very low concentrations. Water with even 0.018 ppm copper can be toxic to some invertebrates. In California and Washington, brake pads in 2025 must have less than 0.5% copper.

Benefits of Copper: **Copper performs several important functions: It adds structural integrity to the brake pad material, reduces fade so that brakes remain effective through extended braking events, transfers heat efficiently, and helps brakes be more effective in cold weather. Copper also has properties that help prevent brakes from squeaking and shuddering.**

Brake pad manufacturers are finding other materials to provide those braking properties. For example, Stainless Steel Swarf (*small chips, turnings of SS***) can replace copper with similar performance. Some have already introduced "copper free" brake pads, including Bendix, Bosch, Brembo and Hitachi who state: *"we have developed "copper free" brake pads with a stable friction coefficient by substitution of materials that perform the thermal conductivity and lubricating priorities with improvement in the change in friction surface.***

My Experience With Iron Contamination:

Iron contamination of the brake pad raw materials could be a cause of the brown rotors.

While managing a Welding Materials and shielding gases R&D Lab in Ohio I passed an open pit mine of a material we used in some of our welding fluxes. It was near the Drag Strip I passed often in Thompson Ohio; it was sand! That company had various grades they sold at different prices. The highest grade was sold to folks making silicon computer chips; it had very low iron content. Iron is a contaminant in the silica sand. In welding, it can influence the flux performance, so we purchased a low residual content product that had guaranteed by a supplied chemical check, low iron. We paid more than the "sand" they sold for concrete, which contained iron an turned it a brown color.

When I passed this very large open pit mind you could see areas of pure white sand and the more common brown sand. We purchased product with a guaranteed maximum iron and other unwanted containments. As the plant did with all steel welding wire that was received, they checked the chemistry of the sand and other ingredients. That is the cost required to make a quality product. In fact, we were delivering some of these products to weld 10-inch-thick Nuclear power vessels and Nuclear submarines.

A quality product must start with quality, consistent materials. Could the brown rotor stain on Powerstop Z26 pads be caused by raw material contamination?

Data Supporting My (and Others) Findings Of Inferior Cold Pad Performance with PowerStop Z26 Pads Versus Carbotech 1521

This is a CAUTION About PowerStop Z26 Pads I Tried On My Grand Sport because they were "cheap." Then I provide details of why I removed and tossed them after 900 miles and installed Carbotech 1521 Pads that worked great!

This issue is mostly a concern for the average Corvette owner who may not be a "gearhead" or Track their Vette or understand stopping differences with brake pads designed for racing versus street pads. Like the OEM pads, which *must stop well when cold (50 to 75F and not a minimum of 200 F.* I bought PowerStop pads for my Grand Sport because of the "cheap price!" That is after having excellent stopping performance with the OEM Brembo pads on my C7 Z51 for ~6 months followed by 3 years of the same excellent bite and even better pedal modulation with Carbotech 1521 ceramic street pads *when they are "cold" (ambient, ~50/75 F.)* Something I face every day. *This summarizes my research defining why I had foolishly wasted $125!*

Pad Brand/ Model *	Min Temp	Max Temp	Max Temp Rotor Color
Carbotech 1521 (Street Pad)	50 F	900 F	Faint Red
Carbotech XP8 (Race Pad)	200 F	1250 F	Cherry Red
Carbotech RP2 (Race Pad)	250 F	1450 F	Bright Red
Carbotech XP24 Race Pad	400 F	2000 F	Yellow
PowerStop Z26 (Street Pad)	~250F**	1500 F	Bright Red

**Data from Company Websites.*

** PowerStop Only Provides Max Temp Extrapolating From Other Available Data the Min Temp is Probably ~250F or Higher.

Carbotech Excellent @ Ambient Temp "Cold Pads" PowerStop Fair

Both Good @ Max Street Temp ~800/900 F

Race Pads Best @ Track/Race Temps ~1400 to 1500 F

Graphic left summarizes the reason I found that causes the inferior cold pad PowerStop performance to the OEM and Carbotech 1521 pads. See Appendix for more details.

Carbotech and HAWK (*and no doubt other quality brake pads*,) provide Min and Max temperatures for their race and street pads. NOTE PowerStop only provides (*or provided when I did investigation*) the Max temp data. Carbotech Street pads have a minimum excellent stopping temperature of 50 F. One of their race pads is 1450 F Max, however, its Min pad temp for best braking is raised to 250 F.

My comments about Carbotech 1521 ceramic pads versus PowerStop are strictly based on my experience! I have no affiliation with the company or any brake company! I paid for my Carbotech pads for my Z51, Grand Sport and C8.

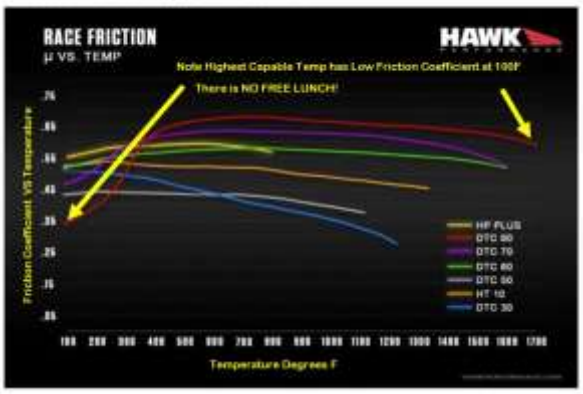
Carbotech mostly make race pads and list over 60 brands of high-performance cars, open wheel racers etc., including Ferrari, Porsche etc. They have 7 different compounds depending on the type of racing and one for Street use Carbotech 1521. The info below is taken directly from their website.

These details about each Carbotech compound with operating temperature range of provide the perspective of why there are so many pad compounds from not only Carbotech but other quality US pad manufacturers like from Hawk, etc.

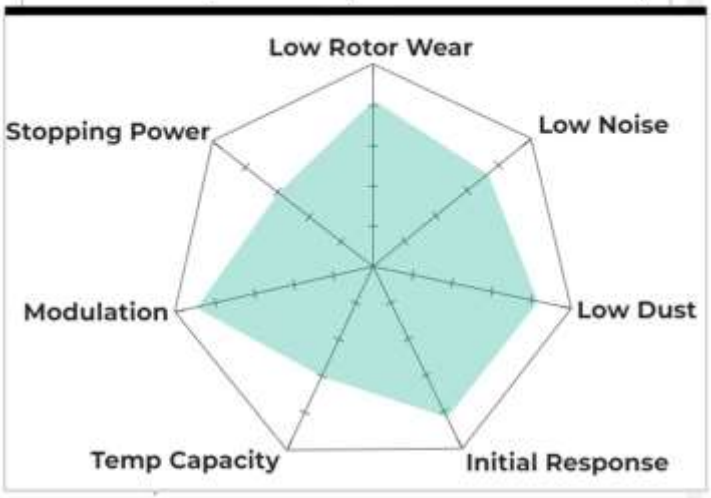
Details of Various Pad Selection Options

Hawk is a quality brake pad source. Many use their pads when Tracking and Racing. This graph presents the friction coefficient at various pad temperatures. Note, like all quality pads, those with max high temp capability have low friction coefficient ~100 F capability, In this case going from ~0.60 coefficient of friction at 1500 F down to 0.35 at 100F.

Hawk Race Compound Chart



Hawk Compound LTS (Street Pad Low Dust)



Code:	Y
Optimal Range:	100-700 F optimal temperature range
Min/Max:	100-700 F operating temperatures
Torque:	Low torque

- Strong & balanced initial bite, hot or cold
- Greater fade resistance
- Ferro-Carbon friction
- Low dust output
- Excellent pad & rotor life
- All Hawk Performance compounds are not compatible with carbon ceramic rotors. Hawk pads are designed to work with Iron/Metal rotors.

This is a Hawk LTS Low Dust Street Only Pad Data. They Have Several. (*Note I have no direct experience with Hawk pads but folks report they work well.)*

It shows an operating range from 100 F to 700 F. To perform optimally at 100 F the max temp is limited.

You'll also not a key feature Modulation is very good. When braking for an Apex it's NOT min stopping distance that is critical but how easy it is to modulate the brakes to have confidence you're braking as hard as possible to the lower speed BUT not actuating ABS! Braking confidence is critical.

BTW, the price of these pads is similar to Carbotech 1521 pads.

This is Hawk Racing Pad Data.

Note, as expected, it is NOT a low dust pad. It has an operating range of 400 F to 1600 F. To have optimum braking the pads must be at a minimum of 400F. Not an issue when Tracking or Racing BUT if on a highway with traffic going 70 mph would be!

If you have been driving on an Interstate, for say ~15 minutes without braking, the pads could be below 100F. If traffic suddenly stops in front and you must apply the brakes aggressively it would not stop as fast as the Street Only pads noted above.

Like other quality pads Hawk supplies that optimum temp range for all their pads.

Semi Metallic (Premium)

For 2021 C8 Corvette with Z51 Option

Semi Metallic (Premium) Brake Pads

Brake Performance Premium Semi Metallic Brake Pads are manufactured to give you improved noise-free braking in all driving conditions using the same positive-molding process utilized by Original Equipment suppliers. We are so confident about the quality and performance of our products that we offer the best warranty anywhere!

Incredible Stopping Performance In All Weather Conditions.

Guaranteed Original Equipment Fit that Meets All Safety Standards.

The Highest Friction Level and Highest Temperature Fade Resistance.

Manufactured for Low Dust Performance Keeping Wheels Cleaner.

Includes Shims To Eliminate Vibration and Unwanted Noise.

~~90 Day Warranty Against Defects In Materials and Workmanship.~~

Exhaustive Dynamometer Testing and Fleet Vehicle Tested.

There are many cheap pads available even for the C8 Z51 as these by Brake Performance. As noted for both front and rear the total price is only $134.

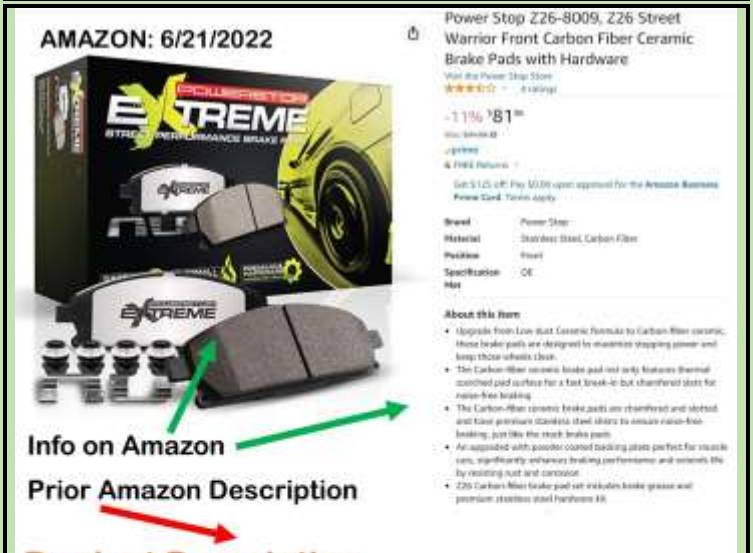
Key marketing words are "Highest Friction level and Highest Temperature Fade Resistance." BUT no actual temperatures given.

Carbotech for their many pads available shows the Min and Max temp. For 1521 street ONLY pads the range is 50 to 900 F. They are also low dust.

Note the Autocross AX6 pads also have a 50 F Min temp as may be waiting in line for your turn, no chance to warm the pads! Their max temp is higher BUT they also note they are NOT low dust!

Carbotech Race Pads	Use/ Feature	Min Temp	Max Temp	Max Temp Rotor Color
Carbotech 1521	Street Low Dust	50 F	900 F	Faint Red
Carbotech AX6	Autocross	50 F	1000 F	Faint Red
Carbotech XP8	Track Day	200 F	1250 F	Cherry Red
Carbotech XP10	National Champ	250 F	1475 F	Bight Red
Carbotech XP24	Excellent Bite	400 F	2000 F	Yellow

If rotors are Glowing Bright Red get racing pads, but warm them up to stop well.



Note, as I have mentioned. the Power Stop Z26 pads I installed worked fine when hot! It was when at room temp I (*and the 6 others quoted*) had issue with performance. That was an unsafe issue for me so tossed at ~900 miles after giving them a chance to improve, testing many times as I turned into a rural road.

Power Stop Z26, I (*and 6 others I quoted with similar issues posted the same inferior room temp issues on a forum*) had inferior room temp pad performance. I tossed at ~900 miles because of a possible safety issue every time I leave the stop sign at the end of my street Power Stop has only one temperature data point. They state they resist fade to 1500 F. They have no room temp or 100 F performance listed.

Carbotech for a 1475 F max temp pad (XP100) has a min temp of 250 F. Hawk DCT-70 racing pad has a max 1600 F and a min suggested of 400F.

There is no magic pad material that covers a range from 50/100F to 1500 F with great coefficient of friction at both temps.

Note one forum member noted he had poor cold temp performance with Carbotech- BUT he is the only one.

Know some like the performance with the cheap Power Stop pads. Fine if aware more force is needed with cold pads. YOUR CAR YOUR CHOICE ON PAD SELECTION.

BUT YOU PAID A PREMIUM FOR A Z51. BRAKE PADS ARE NOT A PLACE TO ECONOMIZE, IMO!

The Following are the Various Pad Compounds Available for Carbotech; Taken From Their Website:

Carbotech™ 1521™
The Carbotech™ 1521™ is our high-performance street compound. The 1521™ compound is known for its release and modulation, along with unmatched rotor friendliness. 1521™ is also a very low dusting and low noise compound with an excellent initial bite. This compound's excellent linear torque production provides incredible braking force without ABS intervention. Carbotech™ 1521™ operating range starts out at ambient and goes up to 900°F (480°C.) 1521™ is suitable for ALL street cars, perfect for your tow vehicle or fleet vehicle. Carbotech™ 1521™ is NOT recommended for ANY track use.

Carbotech™ AX6™
The AX6™ is specifically engineered for Autocross applications. A high torque brake compound delivering reliable and consistent performance over a very wide operating temperature range of 50°F to 1000°F + (10°C to 537°C+). The advanced compound matrix provides an excellent initial bite, high coefficient of friction at lower temperatures along with very progressive brake modulation and release characteristics. Many drivers use the AX6™ for street driving as well, even though Carbotech™ doesn't recommend street driving with AX6™ due to possible elevated levels of dust and noise. AX6™ is NOT recommended as a race compound in most applications.

Carbotech™ XP8™
A high torque brake compound with a wide operating temperature range of 200°F-1250°F+ (93°C to 676°C+). Carbotech™ XP8™ is the first of our racing compounds. Good initial bite at race temperatures, high coefficient of friction, excellent modulation and release characteristics. Extremely high fade resistance and very rotor friendly. Perfect for track day use with any tire and can still be driven safely to and from the track. Carbotech™ does NOT recommended XP8™ as a daily driven street pad due to elevated levels of dust and noise. Carbotech™ XP8™ is a great compound on the front & rear of most open wheel and sports racers.

Carbotech™ XP10™
When Carbotech™ unleashed the XP10™ to the general public it immediately gathered multiple regional, divisional, and national championships. The XP10™ has a very strong initial bite with a *coefficient* of friction and rotor friendliness unmatched in the industry. Fade resistance is in excess of 1475°F (801°C). XP10™ still maintains the highly praised release, excellent modulation and rotor friendliness that have made all Carbotech™ compounds so successful. Carbotech™ XP10™ is not recommended as a daily-driven street pad due to possible elevated levels of dust and noise.

Carbotech™ XP12™
Another highly successful XP™ series compound with an excellent initial bite, torque and fade resistance over and above the XP10™ compound. XP12™ has temperature range of 250°F to 1850°F+ (121°C to 1010°C+). The XP12™ has that excellent Carbotech™ release and modulation that has made all other Carbotech™ compounds so successful. The XP12™ is more rotor aggressive than XP10™ but compared to the competition the XP12™ is still very rotor friendly. XP12™ is NOT recommended for use as a daily driven street pad due to possible elevated levels of dust and noise.

Carbotech™ XP20™
The latest iteration of the highly successful XP™ series of compounds. XP20™ is a step up from the highly successful XP16™ compound. With an extremely aggressive initial bite, linear torque curve and excellent fade resistance the XP20™ is another major step in progression of the highly successful XP™ series line of compounds from Carbotech™. XP20™ has a temperature range of 275°F to 2000°F+ (135°C to 1093°C+). Carbotech™ XP20™ maintains our tradition of having the outstanding release and modulation that has made all other Carbotech™ compounds so successful. Carbotech™ XP20™ is NOT recommended for use as a daily driven street pad due to possible elevated levels of dust and noise.

Carbotech™ XP24™
XP24™ is the pinnacle compound of the extremely successful XP™ Series of compounds engineered by Carbotech™. It has the same fundamentals as other Carbotech™ formulations. XP24™ has even more initial bite, more overall bite, and more torque along with the most linear torque curve we have ever offered. The thermal characteristics are of the highest Carbotech™ offers along with one of the highest coefficient of friction ratings offered by anyone in the braking industry. This compound is the longest wearing compound Carbotech™ offers as it was originally engineered for endurance applications at the highest pro racing levels. This revolutionary new compound has been extremely successful with open wheel, closed wheel, sprint and endurance applications. XP24™ has a temperature range of 400°F to 2000°F+ (204°C to 1093°C+). Carbotech™ XP24™ is NOT recommended for use as a daily driven street pad due to possible elevated levels of dust and noise along with the necessary heat required to work properly.
Carbotech™ RP2™
The RP2™ compound was engineered for endurance racing based on our highly successful XP™ Series formulations. RP2™ has strong initial bite, a little less modulation than our XP12™, but still maintains the rotor friendliness of our XP™ series compounds. RP2™ has great fade resistance with a temperature range of 250°F to 1450°F+ (121°C to 787°C). RP2™ is as rotor friendly as our XP™ series compounds. Carbotech™ RP2™ is NOT recommended for use as a daily driven street pad due to possible elevated levels of dust and noise.

Another Quality US Brake Pad Company Hawk, Also Has Race Pad Compounds and Publish Brake Pad Temperatures

Hawk, another quality US pad manufacturing also lists the operating range of their many race pad compounds. There are SAE (Society of Automotive Engineers) tests and reputable brake pad companies provide the data. There is no magic that allows wider ranges, therefor the 1500F max PowerStop lists will NOT give great stopping with room temp pads. Don't know what the OEM Brembo pads max temperatures are, could not find that BUT many avid trackers by higher temp racing pads- scarifying cold pad performance NOT needed on the Track.:

Hawk DCT-80 (500F to 1700F)
Hawk DCT-70 (400F to 1600F)
Hawk DCT-60 (400F to 1600F)
They have 5 other compounds Hawk DCT -50, DCT-30, DCT-10, DCT-9012, DR-97. One Hawk Street Pad at TireRack cost about the same as Carbotech 1521 Street Pads.

PowerStop Z26: Company Description (as of ~2017) :

Power Stop extreme pads are made for high performance street drivers who demand shorter stops under the most demanding conditions. The Z26 brake torque is consistently higher than OE pads with outstanding thermal stability. Power Stop Extreme Performance pads are best suited for high horsepower cars and big wheel upgrades. The Z26 friction compound is a carbon fiber and ceramic hybrid that resists fade to 1500 degrees. With Z26 pads, you can count on superior pad bite without dusty wheels.

***My Note:* PowerStop does not publish a Min temp for good braking. DOT requires pads to be labeled for cold and hot performance, albeit the DOT cold pad temp is 250 F. Typical of things like Government tire wear numbers at best these are indicators, but PowerStop pads do have low and high rating, although as stated for DOT labeling the cold pad test is made at 250 F, it also does cover pedal modulation, initial bite etc. More details below:**

SAE Test for Cold and Hot Brake Pad Performance:

SAE J866A test procedure provides a uniform means of identification that is used to describe the initial frictional characteristic of any brake lining.

The D.O.T. uses a two-character code (e.g., EE, FF, GG, HH, etc.) to a specific friction formulation characters represent the coefficient of friction when a 1" square piece of friction material is subjected to varying conditions of load, temperature, pressure and rubbing speed on a test apparatus specified in SAE J866A, known as the Chase machine.

The coefficient of friction measured by the Chase test describes the relationship between the two forces acting on the friction material. A clamping force is exerted on the friction material, resulting in a frictional or resistance force. A low coefficient of friction means that very little of the clamping force is transferred into resistance force. On the other hand, a high coefficient of friction means that given the same level of clamping force, a higher resistance force is generated by the brake pad.

D.O.T. requires these codes be placed on the edge of the friction material of every brake pad by government regulation. The first letter is a grading of the Cold Friction (C.F.) made at 250 F and the second letter is a grading of the material at 600 F. Each letter grade can actually have quite a range of C.F. But a difference in the letter grade from medium to hot temperature could be an indicator of fade. The letters can be in any order. Therefore, FE pads fade when hot, and EF pads would not grab when cold. Also, you should know that Steel on Steel has a C.F. of 0.25!! So, EE pads have only marginally more torque than no pads at all! Therefore, FF pads are usually considered the minimum for a high-performance pad. My PowerStop pads said GG. But as I said it's NOT that meaningful and the D.O.T. required number does not say how well a pad stops when at room temp. That is important on the first stop of the day or when on the highway where the brakes have not been used and are at ambient AND traffic comes to a stop in front of you! It does also not define what some call initial bite or pedal modulation linearity, how it stops versus pedal pressure.

Pad Brand/ Model *	Min Temp	Max Temp	Max Temp Rotor Color
Carbotech 1521 (Street Pad)	50 F	900 F	Faint Red
Carbotech XP8 (Race Pad)	200 F	1250 F	Cherry Red
Carbotech RP2 (Race Pad)	250 F	1450 F	Bright Red
Carbotech XP24 Race Pad	400 F	2000 F	Yellow
PowerStop Z26 (Street Pad)	~250F**	1500 F	Bright Red

Data from Company Websites.

** PowerStop Only Provides Max Temp Extrapolating From Other Available Data the Min Temp is Probably ~250F or Higher.

With all that said, how can we estimate the low temperature performance of PowerStop pads. We can assume they have no magic and the physics in China is no different than the US! Then looking at the US Carbotech data with some of their pads as well as the Hawk data, which is similar, we can "Extrapolate" (*def.: to predict by projecting past known data***) from the Carbotech and Hawk published data. As shown in the figure, it's probably 250 F or higher.**

In Addition to My Cold Pad Performance Observations

Other Corvette Forum Posters said similar things to what I observed about PowerStop Z26 brake pads, these are their full posts:

Z06NJ CF Senior Member

Initially you will feel that you have to step harder to make them brake the same as OEM. That's because all you know up to that time are the OEM brakes. However, with time, it becomes like muscle memory. Now I just brake like normal and don't even think about it. But I'll never forget the 1st day I got them installed and I was driving home, I was like "WTF's going on here...I'm gonna end up rear ending somebody" LOL But you get used to them.

village idiot CF Senior Member (*frequent poster and knowledgeable avid Tracker*)

I put the Power Stop Z26 pads in and I seriously regret it. Braking power and bite sucks compared to OEM. It was actually kind of dangerous- not because the braking system is inadequate but because I wasn't used to it. It was a big enough change from street to race pads for the track, but this is going to make it far more pronounced. Not sure I'd do it again if I had the chance.

fugly CF Senior Member

PowerStop Z26 Stopping Power is Not as good as the OEM brake pads (Z51). After 20k+ miles on the OEMs, I was tired of the brake dust. Put on the Z26s a few weeks ago. I was playing racer boy to make a left turn light and then braked hard. Noticeable difference. A little unnerving, actually. But I'm sure I will adjust to the extra braking that is necessary.
I hope, though, that in emergency braking situations, when ABS kicks in, the difference in pads won't matter...? I'd hate to think that I am increasing my (and others') risk in order to cut down on brake dust. I realize now how good those OEM pads are (for the street, anyway.)

tome CF Senior Member

I have had both (Carbotech and PowerStop Z26 pads) on two different C7's and I certainly feel the Z26 aren't even close to Carbotech and OEM on initial bite. Plus, the Z26 do require a more aggressive pedal.

nikeair042 CF Senior Member

I didn't go with the Extreme, i just went with the regular ones. Got them off amazon for like $85. Produce almost zero brake dust which is a blessing. Performance, it's not as good as the Brembo's. Anyone who tells you different is lying or they have no sense of performance. The initial bite of the Brembo's is incredible. With the PowerStops, it takes a bit more pressure. I wouldn't use these on the track at all. But if you are daily driving, going to car shows, maybe a drive through the mountains, these are perfectly acceptable. And changing the pads is beyond easy. I have no browning. I would say buy em and forget about the brake dust.

I had Carbotech pads on my Z51. The performance felt similar to the Brembo's, very similar. But the dust was still an issue. It dusted less than the Brembo's, but it was still more than I wanted.

lakemg CF Senior Member

I've been rocking the Z26 pads for a few years now and no issues. I notice that when cold, they don't bite quite like the stock Z51 Brembo pads, but I could still cause any passenger to face plant the dashboard with the Z26 pads, if they didn't have their seat belt on. I'll happy give up a little bite for the reduction of dust.

Reinforcing A Carbotech 1521 Feature I Find Very Important; Very Linear Pedal Modulation:

Info Copied From Carbotech Website

Carbotech Performance Brakes began 26 years ago and is the world leader in Ceramic friction materials. It was over eight years ago that Carbotech started building brake pads out of Ceramic, Kevlar, and Carbon for street, autocross and racing applications. Carbotech is the only brake pad manufacturer in the world with a complete line of Ceramic compounds for street, autocross, and track use. Carbotech-Ceramic™ compounds are known for their unsurpassed release & modulation, while maintaining very consistent torque control characteristics.

Our competitor's brake pads perform like an "on/off" switch. Brake pads that perform like an "on/off" switch are upsetting the balance of the car by violently throwing all that weight forward (not to mention that you don't get any modulation with an "on/off" type of brake pad). You don't realize how much it upsets your car until you have tried Carbotech Performance Brake pads. That's because you have the ability to modulate your pedal with our ceramic/Kevlar compounds. That's a huge advantage to any driver, especially a driver who has a good feel for their car. The more you can modulate your brakes the more car control you have under braking. The more control a driver has under braking gives the driver an edge in the braking zone and the first part of a corner. Control which in the end helps you attain faster and more consistent lap times. Go Deep™

Research & Development is not just a company philosophy; it's a way of life for Carbotech. R&D at Carbotech is a 365 day a year job. Continuous improvement is a cornerstone in Carbotech's solid foundation we have built because great compounds are not engineered overnight. You'll find that no one else in the industry releases new compound formulations like Carbotech consistently does. We don't believe in finding a good compound and resting. We are constantly improving an already great compound while at the same time continuing R&D on new compounds. Continuous improvement, with no end in sight. We strive in constantly improving our existing compounds as new technologies and materials come to market. In fact, the 1521™ compound is arguably our most successful compound, and it continues to gain enormous popularity among the performance industry. But we didn't rest on its success. We recently improved the 1521™ compound to be even quieter and smoother when applying and releasing the brake pedal while keeping its outstanding performance right on target.

XP24, has a Max capable pad temp of 2000 F (*that is very hot with the rotors glowing a bright yellow*) BUT the Min for good braking raises to 400F. Like Race tires it will take a few laps to get them both up to maximum performance temperature. No problem for racer or Tracker but not for folks who must stop with cold pads after a long highway drive when the traffic suddenly stops in front!

Many Forum Posters have purchased the Chinese PowerStop pads because they are cheap and are happy with the performance. They may have learned to deal with the inferior cold pad stopping compared to the OEM Brembos. They may not have observed or noticed the difference.

A number of other Forum Posters have observed the same as I. A few have been willing to post their experience (posted their comments on page 36,) although I have PMs from some who read posts but will not post themselves on certain forms because it opens them up to criticism. *Frankly doesn't bother me!* I've done the research presented here and now understand the issue better than I did before I bought and tossed them! The following are some of my observations and information found on the subject.

Here is What Worked For Me!

Loved my Z51 2014 Stingray! Braking was as exciting as the acceleration. However, the dust created by the high-performance OEM Brembo pads required cleaning the wheels several times a week after two or three ~40-mile round trips to town! Installing ceramic pads solved the dust problem. If the dust was not removed it not only looked bad it was also pitting my black wheels!

Was not going to tolerate waiting ~6 months to replace the pads with the new Grand Sport as I did the 2014 Z51; bought ceramic pads ready to install on my Grand Sport and C8 when the cars were home from the Courtesy Delivery Dealer ~30 miles away.

Carbotech Ceramic Pads (Actually a Ceramic Kevlar, Carbon Composite per their website.)

With all the positive forum comments about the performance and low dusting of the "Made in US" Carbotech 1521 Ceramic Street Pads and the fact that I do not track, they fit my C7 Z51 needs. Here are some published characteristics:

"Carbotech 1521 pads are a high-performance street compound with very low dusting, low noise, and excellent initial bite." **The latter is very important for street pads while race compounds are often required to be hot to achieve maximum braking force. *This compound's excellent linear torque production provides incredible braking force without ABS intervention. The pads provide good release and modulation and are rotor friendly. The operating range is from ambient to* 900 F. *It has excellent linear torque production providing incredible braking force."***

PowerStop Extreme Z26 Pads

Would have purchased Carbotech 1521's for the new Grand Sport but the PowerStop pads were significantly cheaper and forum members said were low dust. Would have preferred using what I knew worked and for this critical item, "Made in the USA" but the cost difference was just too great so thought I would try. I did, for 900 miles than removed them and replaced with Carbotech 1521s!

My Observations

The Carbotech in my 2014 C7 Z51 stopped at least as good as the OEM pads when cold and when hot. I washed my wheels only when I washed the car and what dust was there (I estimate ~80% less) did not pit my wheels! Not the case with Powerstop! They were low dust but required more pedal force and were not as liner in stopping power versus pedal force. The other benefit with Carbotech 1521s, was they had the same or better initial bite than the Z51 OEM pads.

I have a unique need to brake aggressively with cold pads every time I leave my home. I merge into 65+ mph traffic and soon after turn onto another rural road. No shoulder to slow down so from ~65 mph apply the brakes aggressively so cars/trucks behind don't have to brake when I turn. However, if there is a car on that narrow rural road waiting to merge into the highway traffic, leaves little room! A number of times with Power Stop pads I was not confident making that turn so passed it up and had to go to the next right-hand turn. Had never had to do that or felt that way for 3 ½ years with my Z51 and OEM or Carbotech 1521 pads!

Trial Was Over! Bought Carbotech 1521 Brake Pads!

Detailed install info is presented for the Carbotech pads since the early 2014 C7 Z51's had a double sided, high temperature tape used between the front pads and the pistons. It made the removal of the OEM pads more difficult.

Investigated the C7 pad replacement, which I thought would be a snap since these are fixed calipers and with the Vette's racing heritage should have quick pad replacements. Remove two pins, slip out the old pads, clean the caliper, and slip in the new. The rear pads were exactly that way. If you have a 2015 the same with those front pads. But we "lucky" folks with early 2014's have to deal with the use of high temperature, very strong, double sided tape holding the pads to the pistons! This tape is often used in Europe to reduce noise chances.

This *"Picture Install Info"* is designed for the occasional DIY person who, like myself, doesn't have frequent experience changing brake pads.

It was ~6 months before replacing the 2014 OEM C7 Z51 pads with Carbotech 1521 pads so spent time removing the residue brake pad material from the rotors. With only 30 miles on my Grand Sport brakes before installing the Powerstop Z26 pads nothing was needed. When replacing the Powerstop pads with Carbotech 1521's on the Grand Sport with only 900 miles so little cleaning was needed.

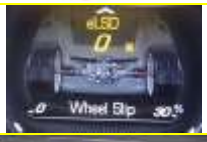
With the Grand Sport experience, was no choice but Carbotech for my C8! After 20 months they perform great! Never passed up my daily cold pad braking turn!

WA Technology

"59" C8, 2017 Grand Sport & 2014 Z51 Stingray Mods or Info Available As PDFs:

59 PDFs discuss improvements or info about a C8, 2017 Grand Sport, 2014 Z51 Stingray function and/or esthetics. Some are minor and others, like the installing "Low Dust Brake Pads" on C8 & C7s, have detailed information.

Below are the PDF's available. Click on picture or Blue PDF link or copy and paste the PDF link (Blue type) into your browser. Or email me at GUttrachi@aol.com **and state the title desired, shown in Yellow:**

C8 Install High Wing ***How To Remove Rear Bumper- Install Wing*** **http://netwelding.com/C8_High_Wing.pdf**	
C8 Bigger Brakes ***C8 Brakes Are Anemic Compared to Other MEs*** **http://netwelding.com/C8_Big_Brakes.pdf**	
C8, C7 eLSD vs Positraction ***eLSD is a Modern Dif; Positraction is from 1960s*** **http://netwelding.com/eLSD _VS_Posi.pdf**	
C8 FWD Hybrid ***WFWD Hybrid Provides More Power & MPG*** **http://netwelding.com/C8_FWD_Hybrid.pdf**	
C8 Edge Red Engine Cover ***Engine Cover Matches Valve Covers*** **http://netwelding.com/Engine_Cover.pdf**	
C8 Engine Compartment Lights ***Multicolor Lights Remote operated*** **http://netwelding.com/Engine_Lights.pdf**	
C8 Side Skirts & Splitter ***Install C7 Carbon side skirts & splitter on C8*** **http://netwelding.com/Side_Skirts.pdf**	

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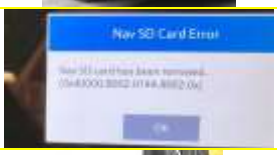
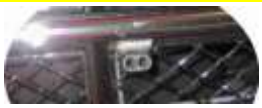
C8 Z51, GS/C7 Z51Ceramic Brake Pads ***Performance Vettes have dusty brakes. These help!*** **http://netwelding.com/Ceramic_Pads.pdf**	
C8 Low Restriction Air Intake ***Low Restriction Air Filter Why & How To*** **http://netwelding.com/C8_Air_Intake.pdf**	
C8 & C7 Splitter & C8 Condenser Mesh ***Mesh Protects AC Condenser & Splitter Install*** **http://netwelding.com/CF_Splitter.pdf**	
C8 NAV SD Card Removed Error ***Error When SD Card and Reader Are Fine*** **http://netwelding.com/NAV_SD_Card.pdf**	
C8/GS/C7 Splash Guards ***GM splash guards. ACS Best Front Guards for GS.*** ***http://netwelding.com/Splash_Guard.pdf***	
Jacking a C8/GS/C7 Vette ***Safely jacking either front only or back & front*** ***http://netwelding.com/Jacking_A_C7.pdf***	
C8 & C7 Plates & Frame; **Must Meet South Carolina Law** **http://netwelding.com/License_Plate_Frame.pdf**	
Change GS/C7 Oil ***WHY change your own oil and C7 Lifting Methods*** **http://netwelding.com/Changing_Oil.pdf**	
C8/GS/C7 Mirror Proximity Alarm ***Limit switch alarm warns when close to door frame*** **http://netwelding.com/Mirror_Proximity_Alarm.pdf**	
Jacking Pads for C8/GS/C7 ***Manual says Jacking Pads 2 1/2-inch max OD..*** **http://netwelding.com/Jacking_pads.pdf**	
C8/GS/C7 Radar Power ***For C7 tapped rear fuse panel. For GS tapped mirror*** **http://netwelding.com/Radar_Detector_Power.pdf**	
C8 & C7 Wheel Chatter/Hop ***Why sharp, low speed turns with cold tires causes the front tires to chatter/hop.*** ***http://netwelding.com/Wheel_Chatter.pdf***	
C8/GS/C7 Wheel Locks ***Wheel locks, help protect your expensive wheels.*** **http://netwelding.com/Wheel_Locks.pdf**	
Deer Whistle Installed on C8/GS/C7 ***Do they work? Plus Install Info*** ***http://netwelding.com/Deer_Whistle.pdf***	

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C8 & C7 Splitter Protector ***Scrape Armor Protection for Splitter*** **http://netwelding.com/Splitter_Protectors.pdf**	
C8 & C7 Cargo Area ***Rear cargo area storage device and rear protector*** **http://netwelding.com/Rear_Cargo_Area.pdf**	
C8 Coilover Tower Covers ***Prevent water from filling Cast aluminum cavities*** **http://netwelding.com/Tower_Covers.pdf**	
C8.R Info & GS Rear Diffuser (Fits Any C7) ***Rear Carbon Flash Composite Diffuser*** **http://netwelding.com/Rear_Diffuser.pdf**	
GS/C7 Belt Rattle ***Passenger seat belt rattles against the seat back.*** **http://netwelding.com/Eliminate_Rattle.pdf**	
Aluminum C7 Chassis and Weld Repair ***The C7 aluminum chassis. Includes weld repair info.*** **http://netwelding.com/Aluminum_Chassis.pdf**	
Manage GS/C7 Spilled Gas & Door Lock ***Protect when filling gas. Preventing door lock failure.*** **http://netwelding.com/Manage_Spilled_Gas.pdf**	
GS/C7 License Plate & Cargo Lights ***LED license plate light & cargo area bulbs*** **http://netwelding.com/License_Plate_Light.pdf**	
GS/C7 Door Panel Protector ***Black plastic protector prevents scuffing of door*** **http://netwelding.com/Door_Panel_Protector.pdf**	
GS/C7 Improved Cup Holder ***A solution to the cup holder spilling*** **http://netwelding.com/Improved_cup_Holder.pdf**	
C7 Carbon Fiber Grille Bar ***Install genuine carbon fiber grille bar overlay*** ***http://netwelding.com/CF_Grille_Bar.pdf***	
Replacing C7 Battery ***Tricks for installing battery!*** **http://netwelding.com/Battery_Issues.pdf**	
GS/C7 Window Valet ***Lower Windows With FOB Helps Latch Hatch*** **http://netwelding.com/Hatch_Latch.pdf**	

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GS/C7 Blind Spot Mirror ***Smaller rear and side windows cause C7 blind spots. Small "blind spot mirrors" help*** **http://netwelding.com/Blind_Spot.pdf**	
GS/C7 Skid Pad Protector ***After the air dam, the aluminum "skid pad" hits*** **http://netwelding.com/Skid_Pad_Protector.pdf**	
GS/C7 OnStar Lights ***Rear view mirror OnStar LED's, at a quick glance, look like a police car flashing light! This is a fix.*** **http://netwelding.com/OnStar_Lights.pdf**	
GS/C7 Skip Shift Eliminator ***Skip Shift Eliminator install with suggestions on jacking a C7.*** **http://netwelding.com/Skip_shift_Eliminator.pdf**	
GS/C7 Catch Can & Clean Oil Separator ***What is Coking and how to reduce the potential*** **http://netwelding.com/Catch_Can.pdf**	
GS MGW Flat Stick Shifter ***The MGW shifter shortens throw and is more precise*** **http://netwelding.com/MGW_Shifter.pdf**	
GS/C7 Round Shift Knob ***A round shift knob shortens throw on OEM shifter*** **http://netwelding.com/Shift_Knob.pdf**	
GS/C7 Stingray Sill Plate ***Stingray sill plate replaces original.*** **http://netwelding.com/Sill_Plate.pdf**	
GS/C7 Nylon Bra ***Nylon Bra Stops Bugs. Fits with Stage 3 Winglets*** **http://netwelding.com/Nylon_Bra.pdf**	
GS/C7 Clutch Fluid Change ***Clutch fluid after 3000 miles gets dirty*** **http://netwelding.com/Clutch_Fluid.pdf**	
C7 Carbon Fiber Hood Vent ***Replaces Plastic Hood Vent*** **http://netwelding.com/Hood_Vent.pdf**	
GS/C7 Cold Air Intake ***Low Restriction Air Filter & Duct*** **http://netwelding.com/Cold_Air_Intake.pdf**	
GS/C7 Soler Modified Throttle Body ***For Improved Throttle Response*** **http://netwelding.com/Soler_Mod_TB.pdf**	

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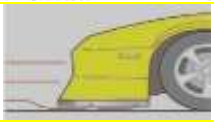
Garmin GPS for GS Cubby ***Garmin Mounts in GS Cubby & Apple CARPLAY*** **http://netwelding.com/GPS_In_Cubby.pdf**	
GS Splitter Stage 3 Winglet ***Stage 3 Winglets Integrate with Spats*** **http://netwelding.com/Stage_3_Winglets.pdf**	
C7 Removing GM Plastic Film ***How To Remove The Rocker Panel Film*** **http://netwelding.com/Rocker_Panel_Film.pdf**	
GS 2LT to 2.5 LT ***Red Upper Dash Pad Like 3LT*** **http://netwelding.com/Red_Dash_Pad.pdf**	
Jake Emblem/Decals for GS ***Jake Symbols Support GS Racing Image*** **http://netwelding.com/Jake_Emblems.pdf**	
Rusty GS/C7 Muffler ***Why the C7 muffler rusts way to turn matte black.*** **http://netwelding.com/Muffler_Rust.pdf**	
GS Engine Compartment Mods ***Cosmetic Additions in Engine Compartment*** **http://netwelding.com/Engine_Compartment.pdf**	
GS Vitesse Throttle Controller: Fits All C7s ***Adjustable Throttle-by-Wire Control*** **http://netwelding.com/Throttle_Control.pdf**	
Boomy Bass Solution ***Use Presets to Adjust Bass etc. Tone/Balance*** **http://netwelding.com/Boomy_Bass**	
GS/C7 Air Dam, Functions ***Why Missing from Z51, Some GS & Z06*** **http://netwelding.com/Air_Dam.pdf**	
Rusty GS/C7 Muffler ***Why the C7 muffler rusts way to turn matte black.*** **http://netwelding.com/Muffler_Rust.pdf**	
Engineering a ProStreet Rod ***How Our '34 ProStreet Rod Was Designed and Built*** **http://netwelding.com/Engineering%20Street%20Rod%203-08.pdf**	
Motorsports Welding Article ***Wrote a 5 Page Article for AWS March 2018 Journal*** ***Covers NHRA and NASCAR Chassis Design*** **http://netwelding.com/Motorsports_Welding_2018.pdf**	

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