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"Race Parts For Your Car"

Radi-CAL™ Competition Brake System Installation Guide: 2020+ Chevrolet Corvette C8 Rear



13.99.00079

Version 1.2

Warning: Essex Competition kits are for *off-road use only*. The components in these systems are not designed for use on public roads.

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Installation

The brake system on any vehicle is a safety device. It is strongly recommended that any personnel performing brake-related replacement or maintenance operations should be competent and certified, using proper tools and equipment.

Brake to Wheel Clearance

This brake system is compact but the high offset design of some factory wheels prohibits their use without aftermarket wheel spacers and extended wheel studs/bolts. Some aftermarket wheels may fit over the brake kit without spacers but it is up to the consumer to verify that his or her wheels will work with the kit. Essex has wheel templates available for download at www.essexparts.com. ***The customer is solely responsible for verifying wheel fitment.***

Brake Noise, Vibration, and Harshness (NVH)

Brake noise can be caused by many factors. Following the bed-in procedures outlined in this manual will help reduce brake noise to the extent possible, but keep in mind that high performance brake pads do tend to make more noise than typical OEM pads. The customer is solely responsible for any NVH related problems with the brake system (squealing, scraping, vibration, judder, etc.).

Caliper, Bracket, and Hat Finish

Some components of this system are anodized aluminum, and as such are subject to corrosion when introduced to corrosive agents such as brake fluid, road salt, wheel cleaners, certain soaps, etc. Use caution when cleaning and servicing the system components.

What's in the Boxes?

Your brake system is packaged in two separate boxes. With the exception of attachment hardware, driver (left) and passenger (right) components have been intentionally separated for ease of installation:

Box One (Left/Driver)

- Left CP9661 AP Racing six piston caliper (#CP9661-3S4L)
- Left 355mm disc assembly 13.04.20102 using AP Racing J Hook brake disc #CP7177-211GC or left 378mm disc assembly 13.04.20132 using AP Racing J Hook brake disc CP5772-2086GA
- Anodized aluminum caliper mounting bracket assembly with studs (#13.03.02082 - 355mm; or 13.03.02098 378mm)
- Four 12mm washers for the above studs (#10.02.00009)
- Four 12mm jet nuts for the above studs (#10.02.00008)
- Four M12x1.75x50 hex head caliper bracket mounting bolts (attaches caliper bracket to upright) (#10.02.00057)
- Four M12 washers for the above bolts (#10 10156)
- One tube of Loctite 271 (red)
- One pair of rear Spiegler stainless steel brake lines (13.02.10900), including rubber caps for sealing off brake hard line
- Parking brake spacing kit ***(355mm kit only)***: four steel offset caliper pins, four caliper widening spacers, four M12x1.75x55mm bolts, four M12 washers and one 5 lobe to 15mm wrench adapter









355mm kit only

Box Two (Right/Passenger)

- Right CP9661 AP Racing six piston caliper (#CP9661-2S4L)
- Right 355mm disc assembly 13.04.10102 using AP Racing J Hook brake disc #CP7177-211GC or left 378mm disc assembly 13.04.10132 using AP Racing J Hook brake disc CP5772-2086GA
- Anodized aluminum caliper mounting bracket assembly with studs (#13.03.02082 - 355mm; or 13.03.02098 378mm)

Required tools

Torque wrenches capable of 115in/lbs to 105 lb.-ft.
Breaker bar- OEM caliper bolt and wheel removal
22mm socket- Wheel lug nuts
Long flat head screwdriver, small pliers-brake line clip
T30 Torx-Disc retaining screw
18mm box wrench or socket/ratchet-OE caliper
19mm box wrench and/or socket/ratchet-caliper bracket to spindle bolts
13mm, 14mm, 17mm flare wrenchs-brake line removal/installation
10mm wrench - brake line bracket screw
6mm hex key wrench/socket- Caliper bridge bolt
14mm socket- Caliper stud nuts, banjo bolt
7/16"11mm box end wrench- Caliper bleed screw
15mm box wrench - parking brake pin bolts, parking brake caliper body bolt tool
Small pick - parking brake pin boots
Bearing greese - parking brake pins
Rags
Scotchbrite or small wire brush-cleaning hub faces
Brake fluid cleaning solution
Small Funnel- Brake fluid
Eye protection
Gloves
2 or 3 500ml bottles of brake fluid- Essex recommends AP Racing PRF brake fluid
Pair of jack stands- If you can't figure this out, drop the other tools and walk away!

Note on brake ducts and backing plates

Essex cannot verify fitment or compatibility of our system with third-party brake duct systems, so please fit and use them at your own risk. ***Do not bolt anything between the caliper bracket and the upright, do not remove or add anything between the hub and spindle and do not space between the hub and disc***. The caliper bracket and hat were precisely designed to bolt directly OE attachment points and align without any shims, spacers, etc. If you are bolting a brake duct to the upright, please attach it on the back side of the upright. Also, please make sure that you are maintaining enough thread engagement on the bolts holding the caliper bracket to the upright.

Installation procedure

Step 1-***IMPORTANT** DISCONNECT BATTERY NEG (-) Terminal

- Open the front storage area and remove the plastic side/fender panels by prying gently. Then remove the cowl cover at the base of the windshield.
- Using a 10mm wrench, disconnect the negative battery terminal.
- Failure to disconnect the battery before working on the brake system will throw a code and put the car into limp mode, limiting top speed and requiring a flash from the dealer to correct. **Do not skip this step.**

Step 2-Wash both brake discs with soap and water (if purchased from Essex with burnished discs, skip this step)

If you have purchased this system with burnished discs, you may skip this step as the discs are 100% ready to run. If the discs are unburnished, they are coated with a water soluble rust inhibitor that must be removed prior to use. Use soap and water to clean them. Dish detergent works well. The discs will start to rust immediately (as they do when you wash your car), so please don't be alarmed when that occurs.

Step 3-Lift and secure vehicle, remove wheel(s)

- Apply the parking brake and chock the front wheels.
- Put a shop towel under your driver windshield wiper. Don't remove it until the job is done and you've torqued your wheels properly.
- Put on your gloves and eye protection.
- Slightly loosen rear wheel lug nuts, but do not remove.
- Lift the rear of the car on a flat, clean, and stable surface per manufacturer recommendations.
- Secure the vehicle on two jack stands, or one if you'd like to install one side at a time.

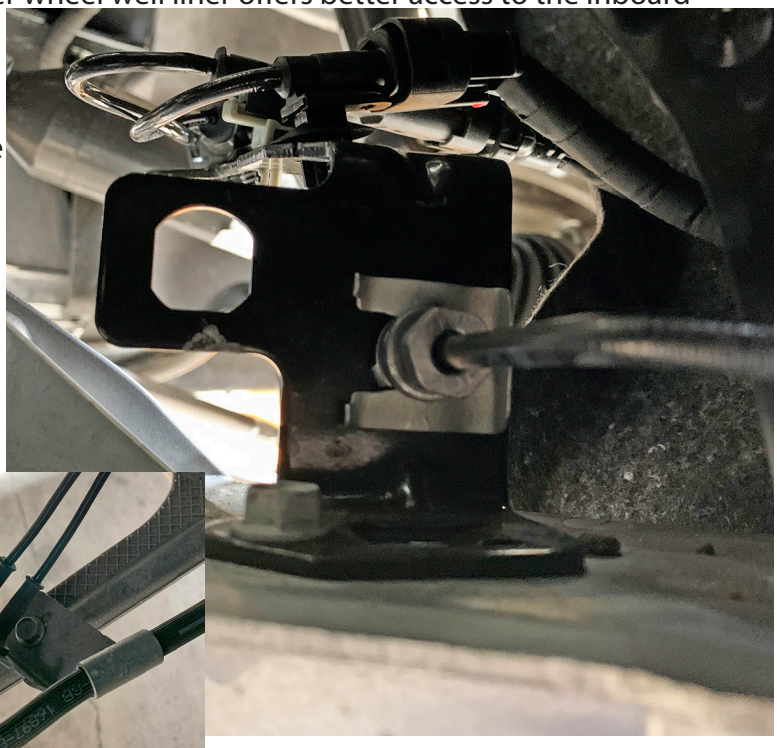
Never leave your vehicle supported with only a floor jack. ALWAYS USE JACK STANDS.

- Remove rear wheel(s).

Step 4-Detach hard line brake connection

Warning- Brake fluid is corrosive, flammable, and will damage painted and anodized finishes. Clean up all spills immediately.

- Before removing the OEM brake line, take careful note (or a picture if necessary) of the routing. The Spiegler brake line included with our system will be installed in the exact same orientation.
- Locate the two black rubber plug/caps included with the brake lines.
- Crawl under the car and locate the hardline connection through the access hole above the rear subframe. For some customers, removing the inner wheel well liner offers better access to the inboard hardline connection. You may want to place a rag under the connection to catch fluid that will leak out.
- Using your 13mm line/flare wrench, loosen the factory brake line from hard line connection.
- Slide the tube nut back and cap the hard line tubing with one of the provided black rubber caps to halt brake fluid loss from the system.
- Pry off the clip holding the soft brake line to the bracket and plug the end with other plug/cap to prevent spillage.
- Using a 10mm wrench, remove the screw holding the brake line bracket to the lower control arm





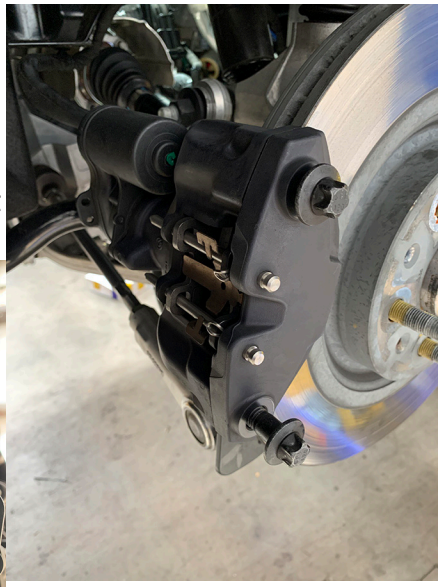
Step 4 - Remove OE caliper

- Using a punch, remove the two caliper pad pins, the anti-rattle clip and remove the pads.
- Use a 18mm socket/wrench to remove the rear caliper bolts.
- Carefully lift the caliper off the disc and set aside.

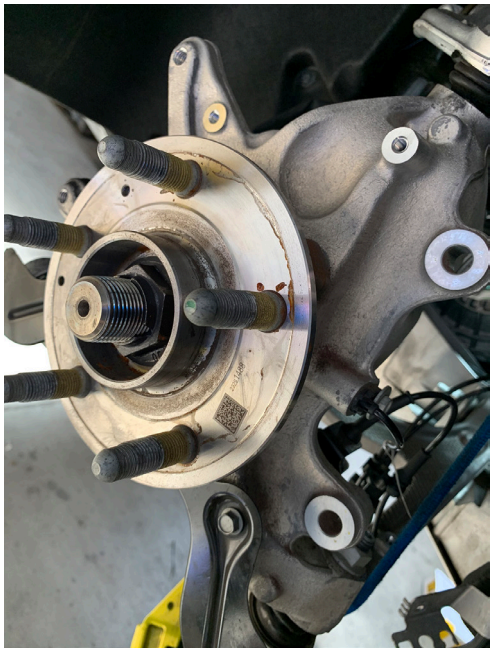


Step 5 - Remove OE Parking Brake

- Using a pick or small screwdriver, remove the clips and pad retaining pins from the caliper. Remove the pads and anti-rattle clip.
- ***355mm kit only*** - Use the included 5-point tool adapter to break loose the caliper body bolts on the outboard side of the caliper (see picture). Its much easier to do while the caliper is still on the vehicle. They do not need to be fully removed at this point.
- Locate the electrical connection on the back of the caliper, slide the red safety tab out and push to release the connector from the caliper.
- Using a 15mm wrench, loosen the 2 caliper pin bolts on the inboard side of the caliper and remove the caliper from the car.







Step 6 - Remove OE brake disc

- Remove T30 torx screw. Depending on age/rust level, you might want to soak in some penetrating lubricant to prevent stripping.
- Remove OEM disc from hub.
- Using some scotch brite or wire brush, cleaner (WD-40 works well) and rags, clean the hub face and flange to remove any rust and provide a nice clean and flat surface for your new discs to seat.

Step 7 - Install Essex caliper bracket

- Apply one small drop of red Loctite™ 271 (red) to the threads of the hex head bolts included with our system (#10.02.00011). Please be aware that excessive use of red loctite will make removal extremely difficult.
- Using a 19mm wrench/socket and the supplied washers (#10.02.00010), attach the caliper bracket to upright in the orientation shown (Driver/Left side shown). The left and right caliper brackets are identical for this application. Make sure that the bracket sits flat against the machined face of the spindle.
- **Torque to 70 lb-ft.**





Step 8 - Install AP Racing J Hook racing brake disc

- Install the AP Racing Heavy Duty J Hook 2-piece disc over the wheel studs. To ensure proper airflow and cooling, make sure the discs are on the proper side of the car per the pics below. The J Hook slot pattern and internal vane design can both be used as reference points. Use factory screws to retain disc.

Ex: Driver side/left hand brake disc:



Ex: Passenger side/right hand brake disc:



Step 9 - Install AP Racing CP9661 brake caliper

- Verify that you are putting the proper caliper on the correct side of the car. The smallest piston should be the first piston in the direction of disc rotation. There is an arrow next to the hydraulic infeed that also indicates forward disc rotation.
- Using a 6mm hex wrench, remove the pad retention bolts and blocks from the top of the caliper.
- Slide caliper onto bracket studs making sure it seats flat onto bracket.
- Using a 14mm socket and the supplied washers (#10.02.00016), secure the caliper to the caliper bracket with the jet nuts (#10.02.00008). Visually inspect that the caliper is centered on the disc. **Torque to 40lb-ft**.

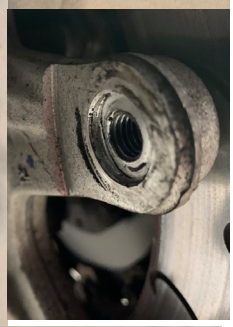
Step 10 *(355mm disc only)* - Install offset parking brake pins and widening spacers



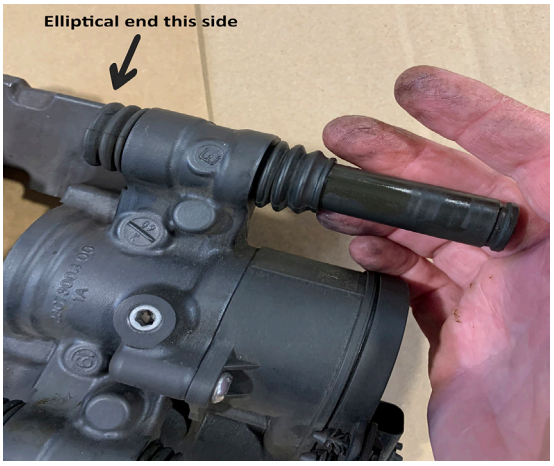


- Using the included tool adapter, completely remove the caliper body bolts that were loosened earlier.
- Install 2 of the included spacers that match the body profile using the provided/longer bolts (10.02.00079) and washers (10 10156). You will torque these bolts after the caliper is reinstalled.
- Using a pick or small screwdriver, lift out the inner rubber boot flange from the groove in the OE caliper pin.
- Next, push the pin out of the other side of the caliper body. Repeat on the other pin.
- Using some bearing grease, lightly lubricate the new offset pins.
- **NOTE #1**: One side of the pin is machined into an ellipsoid in order to fit into a counterbore in the rear upright. Be sure this feature is facing towards the outboard side of the caliper (to mountin recess of upright).
- **NOTE #2**: The new pins are offset, meaning the the holes that the bolts go through are not centered. Its important to locate the new bolt holes as low as possible to move the caliper out from hub center.
- To install the pins, remove the outer rubber boots from the caliper. Install the narrow end of the rubber boot over the ellipsoid end with the wide end of the boot facing away from the pin. Lift the small end of the boot flange over the first groove and onto the main body of the pin. You want the wide end of the boot to hang off the pin. as shown
- Install the flange of the wide end of the rubber boot into the caliper. Push the pin through the caliper body and slip the other boot end into the groove.
- Repeat on the other offset pin.
- Reinstall the pads, pins and anti-rattle clips.











Step 11 - Reinstall parking brake caliper

- Reinstall parking brake caliper over the AP racing disc wiht the OE bolts and torque to **35lb-ft.**
- Using a 19mm socket, torque the new parking brake caliper body bolts to **70lb-ft**.
- Plug the OE harness into caliper and slide the red safety back into place.

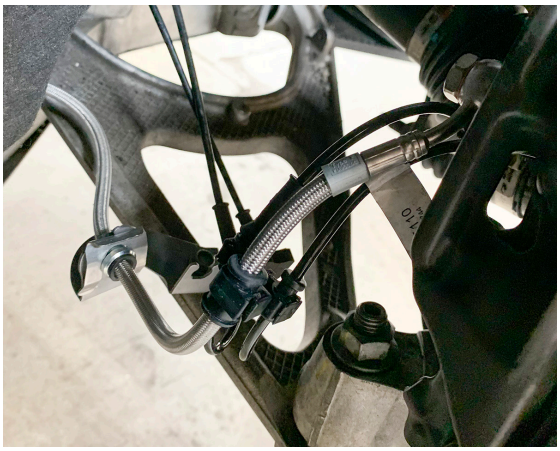
Step 12 - Install Spiegler Stainless brake line



- **Note on C8 Z07, ZR1 / ZTK & Grand Sport**: This kit is supplied with stainless-steel braided brake lines which bring a host of benefits, as with any application. However, on C8 carbon-ceramic equipped cars specifically , some customers may experience smoother, or less, ABS intervention if OE rubber lines are retained. After extensive testing, it was determined that the factory brake control unit was tuned to a very narrow parameter set and that the full AP by Essex BBK with Spiegler SS lines is stiffer than factory tuning expects. Using an 11mm box wrenchand pliers, remove the OE crush washer and banjo bolt from the OE factory brake line. Install the OE brake line onto the AP caliper using the Spiegler banjo bolt and crush washers.
- The Spiegler brake line will follow the same route as the OE brake line.
- Install the banjo bolt on the end of the brake line with a copper crush washer on both sides of the line banjo fitting. Hand-thread the bolt into the inlet port on the caliper and lightly tighten temporarily.



- Remove the rubber cap from the hard line on the car, and insert the brake line into the bracket. Hand-tighten the hard line fitting into the Spiegler line. Use the 13mm and 17mm wrench to tighten the connection. Do not overtighten. Just make sure the connection is snug and leak free. Re-install OE retaining clip.
- Secure included bracket to the lower control arm and clip mid-line bushing to the bracket with the supplied clip. It may be necessary to slide the bushing on the line to better line up with the bracket. Some soapy water or other dissolvable lubricant can be used to aid in sliding the rubber bushing.
- See picture for approximate line routing (left shown).
- Turn the steering wheel lock-to-lock, and make sure the brake line is not touching anything, binding, or rubbing. If necessary, slightly loosen the banjo bolt at the caliper, and adjust the routing of the line until there is no interference.
- If line seems twisted, use the supplied plastic blocks and a pair of pliers to twist fitting so that the line is not overly twisted. See brake line packaging for instructions.
- **Torque banjo bolt to 18-22 lb-ft.**



Step 13 - Install brake pads (DO NOT SKIP THIS STEP)

- Slide the included AP Racing brake pads into the calipers.
- Make sure the pads sit flush or very slightly above the top edge of the disc and do not over hang by a large amount or sit low on the face.
- If you do not install your pads during this step, you will potentially have a big mess on your hands when you attempt to bleed your brakes!
- Using a 6mm hex wrench, reinstall the pad retention blocks or the optional pad tension kit and **Torque to 115in-lbs (13.1Nm).**

Step 14 - Repeat steps 4 thru 13 on the other side of the vehicle

Step 15 - Bleed the brake system

For use with our system, Essex recommends AP Racing R3 brake fluid or AP Racing R4 brake fluid. Both are always in stock and available through Essex and our distributors. We recommend purchasing three bottles (standard 500ml size) of your preferred fluid to complete the installation.

The goal of bleeding the brakes is to remove all of the old fluid from the system, replacing it with your new fluid. With a single brake fluid reservoir (which your car has), fluid in the front and the rear of the car will mix. You therefore need to bleed all four corners of the car. The caliper bleeding sequence is to start with the corner of the car furthest from the master cylinder (mc), and work your way closer to the mc: Passenger rear, driver rear, passenger front, driver front. The proper bleeding sequence is the lower bleed screw, followed by the upper bleed screw. Use a 7/16" or 11mm box end wrench on the caliper bleed screws, and an appropriate bleeder bottle and tubing (available through Essex).

When loosening and tightening the bleed screws during this process, just snug them and do not over-tighten. The final torque value on your last tightening of the **bleed screw should be 150 lb-in.**

- Make sure brake pads are secured in all calipers.
- Open the top of your brake fluid reservoir, and make sure it is mostly full. At no point during the bleeding process should you allow the level of brake fluid to go below the minimum level marking.
- Have some rags and brake cleaner handy, and place a drip pan or cardboard below the caliper you are bleeding.
- Position your box end wrench over the lower bleed screw on the passenger rear caliper, followed by the hose from your bleeder bottle.
- With a friend behind the wheel and working the brake pedal, loosen the lower bleed screw and have your friend pump the brakes to the floor to flow some of the old brake fluid out of the system.
- You should see some air bubbles flowing through the bleeder hose. Once you get mostly fluid, have your friend hold the brake pedal to the floor, and snug the lower bleed screw back up.
- Check the fluid in your reservoir, and refill to the max line if necessary.
- Move to the upper bleed screw. Tell your friend, "pressure." S/he will pump the pedal 3 times slowly and hold pressure to the brake pedal on the last pump. Loosen the bleed screw. The pedal will slowly drop to the floor as fluid flows out of the bleed screw. When the pedal hits the floor your friend holds it there, and tells you, "down." Tighten the bleed screw. Repeat this process until no more air bubbles are flowing out of the caliper. On your friend's final press, close the bleed screw when his foot is half way to the floor.
- Check the fluid in your reservoir, and refill to the max line if necessary.
- Move to the next caliper in the prescribed caliper order above, continually checking the fluid level in your reservoir. It will drain quickly, so keep a close eye on it.
- When you are done bleeding, wipe up any brake fluid on the calipers, lines, etc. with brake clean and rags. It will destroy the finish of any painted surface it touches.
- Fill your fluid reservoir to the max line and tighten the cap.
- Have your friend apply pressure to the brake pedal, while you examine the connections at all corners of the car for leaks.
- Due to the internal fluid passages in the Radi-CAL™ calipers, air can sometimes get trapped inside the caliper. We recommend doing a quick re-bleed of the calipers after the intial test drive to be sure all of the air is bled out.
- For maximum performance, routine bleeding of the brakes before track use will ensure fresh fluid is always present in the calipers.

Please note: After bleeding the system, there can remain a small amount of residual brake fluid inside the bleed screws and/or around the threads. As the calipers heat up, this fluid will force its way out and may look like the calipers are leaking. This is perfectly normal and will go away after a short time. If you experience a spongy/sinking pedal or continue to see fluid leaking after a day or so then re-torque the bleed screws to the proper 150 in/lbs.

Step 16 - Install wheels

- Check wheel clearance before tightening. At times adhesive wheel weights inside the wheel barrel could potentially come into contact with your calipers. A minimum of 2.5mm clearance on all sides is required.
- Torque your wheels to manufacturer's recommendation.

Step 14 - Reconnect Battery and Safety check

- Reconnect negative battery terminal and install cowl and side panels.
- Drive the car at low speeds in a safe location to ensure proper functioning of the brakes.

Step 18 - Bedding and preparation

Properly preparing your new brake pads before heavy use is extremely important. Please visit www.essex-parts.com/learning-center for detailed bedding information in both written and video format.
The goal of bedding-in your brake pads and discs is to mate them together properly and prepare them for heavy use. When prepared properly, or bed-in, your pads will transfer a thin layer of material to the disc face (transfer layer). The pads in your caliper will then actually ride on that thin layer of pad material you've put down on the rotor, rather than rubbing directly on the iron rotor face. A good transfer layer is going to give you superior brake pedal feel, less noise, superior pad wear, and lower the chances of cracking your discs.

Important Notes- PLEASE READ!

First, make sure you have a safe location to perform a proper bed-in. You need a stretch of asphalt with long straights, good visibility, and no potential obstructions. Make sure you are in a position to safely, legally, and repeatedly hit the necessary speeds to perform the bed-in procedure. A controlled racetrack is the best place to perform this procedure. AP Racing and Essex in no way suggest or condone speeding or breaking the law in your car, nor do we take responsibility for any damage or injury that occurs as a result of using our product or these procedures. You are performing the bed-in procedure at your own risk. For complete details, please read the Disclaimer of Warranty located on the previous page of this document.

Bed-in Procedure:

During these procedures, it's critical that you never come to a complete stop with your foot on the brake pedal. If you have brake ducts on your car, you may want to block them off to allow your brake system to heat up easily.
The procedure outlined below is a generic procedure for most types of mild race pad. Please check your pad manufacturer's recommended bed-in procedure.

1. Accelerate to approximately 60mph and then decelerate down to 5 mph. If your car has ABS, you should try to hold the brakes at a point just before ABS intervention.
2. Once the car slows to 5mph, immediately accelerate back up to about 60mph, and brake again to roughly 5mph.
3. Repeat this series of stopping and accelerating 8 to 10 times. Again, do not come to a complete stop with your foot on the brake pedal.
4. Cool the brake system down by cruising at 45mph+ for 5 to 10 minutes.
5. Visually inspect your discs. They should be a blue/grey color (instead of shiny silver), and have an even layer of pad material across and around the entire rotor face.
6. If the pads don't have a layer of pad material on them, perform another series of stops in the manner outlined above.

For more details, photos, theory discussion, and video instruction on bedding-in brakes, please visit essex-parts.com/learning-center

Thank you again for choosing Essex and AP Racing. If you need any assistance, please call customer support at 704-824-6030 Mon-Fri 8am-5pm, or email support@essex-parts.com

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