TECHNICAL RESEARCH GUIDE

Understanding Automotive Brakes: Pads, Rotors, Fluid, and Brake Performance

A plain-English, technically sourced reference for street, performance, and track use

Research checked 16 August 2026

Scope: passenger cars and performance road cars. This is educational material, not a substitute for the vehicle manufacturer's service procedure or a qualified brake inspection.

Executive summary

A brake system turns vehicle motion into heat. The pads supply controlled friction, the rotor absorbs and dissipates much of the heat, the caliper converts hydraulic pressure into clamp force, and the fluid carries pedal force through the system. Good brakes are therefore a matched system—not a single “high-performance” part.

> **Important:** The most reliable upgrade for a healthy street car is often not a larger brake kit. It is fresh manufacturer-approved fluid, pads with an appropriate temperature window, sound hardware, correct rotor thickness/runout, and proper bedding. Larger hardware becomes valuable when repeated stops exceed the thermal capacity of the original system.

Contents

1. How a Braking System Works

When the driver pushes the pedal, the brake booster and master cylinder create hydraulic pressure. In a disc brake, that pressure moves caliper pistons. The pistons squeeze two pads against a rotating iron or carbon-ceramic disc (also called a rotor). Friction at the pad-disc interface makes a torque that opposes wheel rotation.

Step	What happens	Why it matters
Pedal and master cylinder	Pedal force becomes fluid pressure. Modern ABS/ESC can rapidly modulate that pressure.	The hydraulic circuit must be free of air and use the specified fluid.
Caliper and pads	Piston area and pressure create clamp force; pad friction turns clamp force into braking torque.	More pistons do not automatically mean more stopping power; hydraulic sizing and friction determine it.
Rotor and wheel	The rotor absorbs heat and transfers torque through the hub/tire contact patch.	Tires and ABS ultimately set the maximum deceleration on the road.
Cooling interval	Airflow removes heat from the rotor, pads, caliper, and fluid.	Repeated braking is a heat-management problem.

A useful simplified relationship is brake torque ≈ clamp force × friction coefficient × effective rotor radius. It explains why a larger effective radius can reduce the clamp force required for the same torque. It does not predict a car's stopping distance by itself: tire grip, weight transfer, ABS calibration, road surface, and aerodynamic load dominate at the limit.

2. Brake-pad Construction and Friction Materials

A modern pad is a layered component: friction block, adhesive or mechanical retention, steel backing plate, and often a shim. The friction block is a controlled mixture of binders, fibers, abrasives, lubricants, and friction modifiers. It is not simply "hard" or "soft." Engineers tune it for friction stability, noise, wear, pedal feel, dust, rotor compatibility, and temperature range.

The coefficient of friction, μ (**μ)**, is one of the most useful ways to understand a brake pad. Higher μ generally means more braking torque for a given hydraulic pressure—but **a higher number is not automatically better**. Stability, modulation, release, cold performance, and rotor wear are equally important.

Hawk, Ferodo, Pagid, EBC, Carbotech, Brembo, Textar, TMD Friction, and PowerStop all produce premium-quality brake pads with different materials designed for specific needs and applications. Think of brake-pad performance as a curve.

A typical street pad might perform approximately like this: Cold → Excellent → Good → Fade as temperature becomes excessive. A racing pad might behave more like: Cold → Poor → Good → Excellent → Excellent at extreme temperature. That's why the "best" racing pad can be the **wrong pad for street driving**.

During normal street driving, brakes use from 100 to 300 equivalent horsepower to stop a vehicle. An experienced track driver will repeatedly use some 2,500 equivalent brake horsepower in slowing from 150 mph to 30 mph. The brake system story is one about heat generated and dissipated. That 2,500 equivalent horsepower used can translate into brake temperatures of 1,100 degrees Fahrenheit multiple times around a racetrack.

Pad type	Cold performance	High-temp performance	Dust	Noise	Rotor wear	Best application
NAO / Organic	Excellent	Poor–moderate	Moderate	Very low	Low	Normal street driving
Low-metallic	Very good	Good	Moderate–high	Moderate	Moderate	European/performance street
Ceramic	Excellent	Good–very good	Low	Very low	Low–moderate	Premium street vehicles
Semi-metallic	Very good	Very good	High	Moderate–high	Moderate–high	Performance street, towing
Street-performance	Very good	Very good	Moderate	Moderate	Moderate	Aggressive street driving
Track-day	Good	Excellent	High	High	High	Track days
Full race	Poor–moderate	Exceptional	High	High	High	Racing only

The important point is that **there is no single "best" brake pad**. A pad optimized for a race car can actually be worse on a street car.

Common brake-pad nomenclature

Term	What it means	Typical application
NAO / Organic	Non-asbestos organic friction material	Normal street
Ceramic	Ceramic-based friction formulation	Quiet/low-dust street
Low-metallic NAO	Organic material with some metal content	European street/performance
Semi-metallic	Significant metallic content	Performance street, towing
High-metallic	Higher metal content, high thermal capability	Aggressive street/track
Performance Street	Marketing/application category, not a specific chemistry	Fast street driving
Street Performance	Same basic category	Fast street + occasional track
Sport	Manufacturer-dependent term	Performance street
Track-Day	Compound designed for occasional circuit use	HPDE/track days
Race / Competition	High-temperature racing compound	Racing

Choose the pad by duty cycle. A commuter sees cold starts, low noise tolerance, winter moisture, and long life. A mountain-road or occasional-track car needs a higher heat ceiling and more predictable pedal feel. A dedicated track car needs repeatability at temperatures that would quickly degrade a comfort-oriented street pad.

Use case	Sensible pad characteristics	Avoid
Daily street	Fast cold response, low noise/dust, OE-compatible bite.	Race-only pads that require temperature and may be harsh on rotors.
Fast road / autocross	Higher heat margin, firm modulation, street approval where required.	Assuming "ceramic" always means track-capable.
Track days	Known temperature range, matching fluid, correct bedding, spare pad thickness.	Mixing aggressive pads with tired fluid, thin rotors, or unverified clearance.
Competition	Compound selected from logged temperatures and driver feedback; frequent inspection.	Long street intervals, cold/wet use unless specifically validated.

Normal OEM brakes accommodate brake pads that are 10mm in width when new and have brake wear sensors on each brake pad to notify the driver when brake pads need replacement. Generally, if used for track work, brake pads are replaced when they reach 30% or 3mm of remaining material.

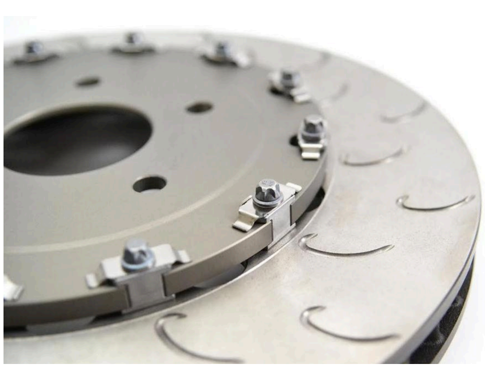
3. Brake-pad Noise

Brake noise is usually a vibration problem. Friction can excite the pad, backing plate, caliper, rotor, and suspension at a frequency that becomes audible. Low-frequency judder or chatter can be felt through the pedal or steering wheel; a high-frequency squeal is often heard but not felt. Grinding is different: it can indicate severely worn material or metal-to-metal contact and deserves immediate inspection.

- Check pad thickness, rotor thickness and runout, loose/worn hardware, seized slide pins or pistons, contaminated surfaces, wheel-bearing play, and backing-plate contact before treating noise as "normal."
- Use shims, clips, insulators, and the exact lubricant only where the manufacturer specifies—typically pad ears/abutments and approved shim contact surfaces. Keep grease off the friction faces, rotor, tire, and rubber parts.
- Uneven friction transfer or disc-thickness variation can cause pedal pulsation. Ferodo notes that a correct transfer layer is part of proper bedding and that overheated stops followed by holding the pedal can leave an imprint.
- A performance pad may squeal when cold or at light pressure even when installed correctly. That is a trade-off, not an automatic defect.

Source note: Ferodo describes squeal as high-frequency vibration and discusses bedding plus hardware as noise controls; see Sources 8–9.

4. Brake Rotors—Materials and Construction



Most passenger-car discs are gray cast iron. It is relatively inexpensive, stable, strong in compression, and provides a favorable friction surface. Internally ventilated rotors use vanes between two faces to pump air through the disc. Directional vanes must be installed on the correct side. Two-piece rotors typically combine an iron friction ring with an aluminum hat, reducing unsprung mass and allowing more controlled thermal expansion.

Carbon-ceramic composite discs offer very low mass, corrosion resistance, and high thermal capability, but they are expensive, have specific pad compatibility requirements, and require careful inspection. They are not automatically the cheapest or best choice for every track-day driver.

Construction	Primary benefit	Watch point
One-piece iron	Cost-effective, robust, broad pad availability.	More heat and mass at the hub; replace at specified minimum thickness.
Vented iron	More cooling surface and airflow than solid discs.	Vane design, airflow, and ducting matter more than appearance.
Two-piece iron/ aluminum	Lower unsprung mass; replaceable ring on some systems.	Hardware torque, ring/hat compatibility, and crack inspection are critical.
Carbon-ceramic composite	Low mass and high heat tolerance; low corrosion.	High replacement cost; avoid damage/thermal shock and use the approved pads.

5. Drilled vs. Slotted vs. Plain Rotors

Modern pads do not normally need holes to “vent gas” in normal road use. Rotor surface features are primarily a trade-off among initial bite, water/debris clearing, pad conditioning, heat rejection, mass, and crack resistance. A plain, properly vented rotor is often the durable track choice. Slots can refresh the pad face; holes reduce local mass and add to ventilation, so their durability depends heavily on disc design and duty cycle.

High-performance rotors are also available with two bolted pieces - the cast iron rotor and aluminum center hat. The two pieces are connected with bobbins, pins, or other hardware and may be determined to be a “floating rotor” if the rotor allows **controlled movement**, particularly radial movement as the ring expands. There may also be a small amount of axial or lateral movement depending on the design.

The advantages of this rotor are lower unsprung weight, better thermal management because it allows the iron ring to expand independently. Further, replacement friction rotors can sometimes be purchased separately.

Surface	Good fit	Trade-off
Plain	Most street cars; many serious track applications.	Less pad-face refresh and less visual drama; not a performance deficiency.
Slotted	Performance street and track, when designed for the application.	More pad wear/noise; can be directional.
Drilled / cross-drilled	OE applications engineered for it; performance street use.	Potential for cracks from cross-drilled holes. When extending to the edge of the rotor the rotor must be replaced. Holes are also subject to brake dust clogging the holes and it must be physically removed.

Source note: Brembo states that drilled and slotted discs are developed and tested for thermal/mechanical stress, while noting slots have superior mechanical resistance under extreme racing conditions. This is component-specific—not a license to drill a plain rotor. See Sources 5–6.

6. Rotor Size and Thermal Capacity

A larger rotor increases effective radius, so it can create the same brake torque with less clamp force. More importantly for repeated stops, a heavier/larger ring generally has more heat capacity. The first-order relationship is $Q = m \times c \times \Delta T$: heat energy absorbed equals rotor mass times specific heat times its temperature rise. Real systems are more complex because pads, wheels, air, and calipers also absorb and shed heat.

Illustrative only: if an iron rotor ring has 2 kg more mass and Iron's effective specific heat is roughly 0.46 kJ/kg·K over a simplified range, that extra mass can absorb about 92 kJ for a 100 °C temperature rise. This is not a vehicle rating; vane geometry, airflow, initial temperature, disc design, and heat split determine the actual result.

- Increasing diameter without appropriate wheel clearance, caliper location, brake balance, ABS validation, and master-cylinder/pedal considerations is not a safe "bolt-on" assumption.
- Brake cooling ducts can be more effective than cosmetic rotor drilling because they direct airflow to the disc's internal vanes.
- A rotor cannot be judged by diameter alone. Thickness, ring mass, vane count/shape, alloy, face area, and air path matter.

7. Brake-fluid Types

Brake fluid must transmit pressure without boiling, remain suitably viscous in cold weather, protect the hydraulic system, and remain compatible with seals. DOT 3, DOT 4, and DOT 5.1 are glycol-ether-based fluids and generally can be compatible when the vehicle manufacturer allows it. DOT 5 is silicone-based and is not a universal upgrade; do not substitute it for a glycol system. Mineral-oil brake systems require their own specified fluid.

Fluid class	Minimum dry / wet boiling point*	General use / caution
DOT 3	205 °C / 140 °C	Older and light-duty glycol systems; follow vehicle specification.
DOT 4	230 °C / 155 °C	Common modern road-car specification.
DOT 5.1	260 °C / 180 °C	Glycol-based high-boiling class; verify viscosity/specification requirements.
DOT 5 (silicone)	260 °C / 180 °C	Not compatible as a casual substitute for DOT 3/4/5.1 systems.

"Dry" is new fluid; "wet" represents moisture-contaminated fluid. Glycol fluids absorb moisture over time, which lowers the boiling margin. Because of the hydroscopic nature of glycol-based brake fluid to absorb moisture, annual brake fluid change is recommended or required for vehicles driving racetrack events. Silicone fluid is not recommended due to its damaging effects to OEM brake system components.

Example product	Published boiling points	Interpretation
Castrol React Performance DOT 4	260 °C dry minimum; 180 °C wet minimum (product data sheet).	Higher than DOT 4 minimum; suitable only where the vehicle spec permits.
Motul RBF 600 Factory Line DOT 4	312 °C dry; 204 °C wet (product data sheet).	A racing-oriented DOT 4; its service interval should reflect use and moisture exposure.
Castrol React SRF Racing	325 °C dry (Castrol product page); product-specific wet value varies by data sheet/market.	Do not infer performance from a name alone; compare the current technical data sheet.

Fluid	Dry Boiling	Wet Boiling	Best Use
ATE Typ 200	536°F	388°F	Street / spirited driving
Motul RBF 600	594°F	421°F	Track days
Motul RBF 660	617°F	399°F	Heavy track use
Castrol SRF	590°F	518°F	Professional racing
Pentosin Super DOT 4	509°F	347°F	European street cars

Source note: Castrol product data identify DOT 4 minimum thresholds and React Performance values; Motul publishes RBF 600 at 312 °C dry/204 °C wet. See Sources 10–13.

8. Brake Fade

“Fade” describes a reduction in braking effectiveness under heat, but the cause matters. Pad fade occurs when the friction material’s coefficient or stability changes at high temperatures. Fluid fade occurs when fluid boils and compressible vapor produces a long or soft pedal. Green fade can occur with new pads that are overheated before bedding (burnishing). Rotor cracking, glazing, tire overheating, and electronic intervention can feel similar but require different remedies.

Symptom	Likely mechanism	First response
Firm pedal, less deceleration	Pad friction loss, overheated tire, or changing surface.	Cool down; inspect pads/rotors/tires; select a suitable compound.
Long/soft pedal after repeated stops	Fluid boil, excessive fluid temperature, or air.	Stop safely; inspect/bleed with approved fresh fluid; find heat source.
Vibration/pulsation	Disc thickness variation, deposits, runout, or hardware issue.	Measure rather than assume a “warped” rotor.
Smoke/odor/new-pad loss	Green fade or severe overheating.	Allow controlled cool-down; inspect for damage and correct bedding/use.

9. Bedding Brakes

Bedding mates the pad and rotor and establishes an even, stable transfer layer. It is not a universal recipe. Pad makers publish specific procedures based on compound; follow the pad supplier first. A common road-oriented approach uses a series of moderate decelerations with time between stops, followed by a no-brake cool-down. Do not park with the pedal clamped after a very hot stop if practical; an imprint can form.

Brake pedal fade will occur during any track burnish procedure and can cause brake pedal travel and force to increase. This could extend stopping distance until the brakes are fully burnished and residual binding compounds are burned away or “out-gassed”. When this procedure is performed, it will not damage the brakes. The brake pads will smoke and produce an odor. The braking force and pedal travel may increase. After the procedure, the brake pads may appear white at the rotor contact.

The following is one method of burnishing the brake pads to get maximum stopping performance. As you will note, the objective is to cycle the brakes through a heating process. Apply the brakes 25 times starting at 100 km/h (60 mph) to 50 km/h (30 mph) while decelerating at 0.4 g. This is a medium brake application. Drive for at least 1 km (0.6 mi) between applying the brakes. This first step may be skipped if there are more than 320 km (200 mi) on the brake pads. Then repeatedly apply the brakes from 100 km/h (60 mph) to 25 km/h (15 mph) while decelerating at 0.8 g. This is a hard brake application, without activating the Antilock Brake System (ABS). Drive for at least 1 km (0.6 mi) between stops. Repeat until the brake pedal travel starts to increase. Depending on conditions, this should take no longer than 25 brake applications. Then cool down: Drive at 100 km/h (60 mph) for approximately 15 km (10 mi) without using the brakes. Then apply the brakes 25 times from 100 km/h (60 mph) to 50 km/h (30 mph) while decelerating at 0.4 g. This is a medium brake application. Thereafter, drive for at least 1 km (0.6 mi) between applications.

- Start with mechanically correct brakes: clean rotor faces, correct torque, free-moving hardware, correct fluid, and adequate pad/rotor thickness.
- Use the compound maker’s sequence. A race pad’s procedure may involve higher temperatures than a street pad; do not copy a track procedure onto an unknown street compound.
- Ferodo’s general road guidance advises moderate initial braking and avoiding hard braking during the first 200 km after pad replacement; specific products may differ.
- After bedding, inspect for even contact and abnormal discoloration, deposits, cracking, or pull.

10. Street vs. Performance vs. Racing Brakes

System goal	Street	Performance / track day	Racing
Temperature range	Cold bite and daily reliability.	Broader stable window; repeatable sessions.	Sustained high heat and precise modulation.
Noise/dust	Low priority for the driver; high priority in design.	Accepted in moderation.	Often secondary to lap consistency.
Fluid/service	Manufacturer interval; inspect regularly.	Shorter intervals based on heat/use.	Frequent replacement and logged inspection.
Hardware	OE-sized, durable, corrosion tolerant.	May add ducts, higher-spec pads/ fluid, two-piece rotors.	Purpose-built calipers, ducts, pad compounds, and strict replacement limits.

There is no single “best” brake setup. A race pad that is excellent at 600 °C may be unpleasant and unsafe in cold morning traffic. Conversely, a quiet low-dust pad can be ideal on the street and fail rapidly in a long downhill or track session. Match temperature capability to measured or realistically expected use.

11. Iron vs. Carbon Ceramic Brake Systems

Carbon Ceramics Brake Systems (Porsche PCCB) use a lightweight large diameter cross-drilled rotor with special brake pads that provide extended life, low rotor wear, and extremely good stopping power when hot. When cold, as in normal street driving, traditional iron rotors and pads will provide a shorter stopping distance. The carbon ceramic braking system is about 5 to 10 times more expensive than traditional OEM iron. In addition, the rotors are relatively fragile if hit or dropped on their edges, will often crack and break,requiring replacement.

	Steel brakes	PCCB
Front rotor	408 mm	~410 mm
Rear rotor	380 mm	~390 mm
Front caliper	6-piston	6-piston
Rear caliper	4-piston	4-piston
Rotor material	Cast iron	Carbon-ceramic
Pad front shape	**4927**	**4927**
Pad rear shape	**4925**	**4925**
Pagid RSL29	Yes	**No — not for PCCB**
Racing pad choices	Good	Much more limited
Street suitability	Excellent	Excellent
Track suitability	Excellent with proper pad/ fluid	Excellent, with correct PCCB pad
Replacement cost	Reasonable	Extremely expensive

12. 2023 Porsche 911 GTS vs. Corvette C7 Brake Systems

This comparison uses the 2023 911 Carrera GTS (992.1) and the C7 Corvette Grand Sport context because the C7 ended after model year 2019. They are not contemporaries; this is a hardware-and-design comparison, not a head-to-head road test. Dimensions below are manufacturer-published unless marked otherwise.

Configuration	Front hardware	Rear hardware	What it means
2023 Porsche 911 Carrera GTS, steel (OEM)	408 mm internally ventilated/cross-drilled gray-iron disc; 6-piston aluminum monobloc fixed caliper. Porsche literature reports 36–38 mm thickness depending on market document.	380 × 30 mm internally ventilated/cross-drilled disc; 4-piston aluminum monobloc fixed caliper.	Large steel system derived from the prior 911 Turbo application; robust choice for frequent use and lower replacement exposure than PCCB.

Configuration	Front hardware	Rear hardware	What it means
2023 Porsche 911 GTS, PCCB (OEM option)	410 mm carbon-ceramic composite ventilated/cross-drilled disc; 6-piston aluminum monobloc fixed caliper.	390 mm carbon-ceramic composite ventilated/cross-drilled disc; 4-piston fixed caliper.	Porsche says higher thermal-load capability, fade resistance, and lower weight. Exact option configuration should be verified by VIN/build sheet.
C7 Corvette Grand Sport, standard (OEM; 2017–2019 context)	371 × 33 mm two-piece slotted steel disc; 6-piston Brembo monobloc fixed caliper.	365 × 25 mm two-piece slotted steel disc; 4-piston Brembo monobloc fixed caliper.	Very substantial steel brakes paired with wide tires and cooling/performance chassis hardware.
C7 Grand Sport, Z07 context (OEM)	394 × 36 mm carbon-ceramic cross-drilled disc; 6-piston Brembo monobloc fixed caliper.	388 × 33 mm carbon-ceramic cross-drilled disc; 4-piston Brembo monobloc fixed caliper.	Track-focused package context; GM paired it with Cup 2 tires and aero/suspension changes.

Source note: Porsche's 2022/2023 GTS press material gives the 408 mm front/380 mm rear steel system and PCCB at 410 mm front/390 mm rear. Porsche's newer product material lists a different PCCB size for the later updated 992.2, so it is not used for the 2023 comparison. GM/Chevrolet technical data give Grand Sport dimensions. See Sources 1–4.

Key interpretation: the GTS steel front rotor is 37 mm larger in nominal diameter than the Grand Sport steel front rotor, but diameter alone does not settle track performance. The Porsche is rear-engine; the Corvette is front-engine with near-50/50 static distribution. Vehicle mass, dynamic axle loads, tire compounds, cooling, ABS/ESC calibration, and pad compound affect heat split and stopping behavior. Both systems are engineered packages, not just rotor sizes.

> **Important:** PCCB is compelling when low unsprung mass, corrosion resistance, and its specific high-load behavior justify the cost. For heavy track use, owners should consider the complete operating plan: approved pads, inspection method, replacement-ring/disc cost, tire selection, and the consequences of accidental damage. A steel system with appropriate pads, fluid, and cooling can be a more economical consumable strategy.

13. How to Select a Brake System

Start with the failure mode, not the catalog. If the pedal goes long after sessions, investigate fluid temperature, air, and caliper heat transfer. If the pedal is firm but deceleration falls, consider pad operating range, rotor temperature, tire heat, and friction stability. If the brakes are noisy but perform well, inspect hardware and accept that the pad may be optimized for a different noise trade-off.

Question	Decision implication
How fast, how heavy, how often, and how long are the stops?	Sets heat load and required rotor/pad/fluid margin.
Street only, mountain road, autocross, or 20-minute sessions?	Determines cold behavior, noise tolerance, and service interval.
What do data and symptoms show?	Rotor paint/temperature strips, pedal condition, pad taper, and tire wear are more useful than guesswork.
Will the new parts preserve balance and fit?	Verify wheel clearance, pad sweep, brake bias/ABS compatibility, hoses, and master-cylinder requirements.
What is the consumables budget?	Price pads, rotors, fluid, labor, and inspection—not just the initial kit.

14. Cost Comparison

The numbers below are planning ranges in U.S. dollars, checked in August 2026. They are not quotes and exclude tax, shipping, and model-specific surprises. Porsche and GM parts catalogs frequently require a VIN to identify the exact brake option. Labor varies sharply by region and service type.

Service / example	Parts or price evidence	Planning note
Typical mainstream axle: pads + two iron rotors	$200–$700 parts; roughly $450–$1,200 installed (estimate).	Vehicle, rotor size, and labor rate dominate.
Performance axle: pads + two-piece/large iron rotors	$700–$2,000+ parts; roughly $1,200–$3,000+ installed (estimate).	Ducting and track pads add cost; replace within stated limits.
Fluid flush	About $20–$120 fluid plus labor; Motul RBF 600 official U.S. listing: $26.20/bottle.	Fluid volume and bleeding procedure vary; ABS service functions may be needed.
2023 911 GTS steel front service	A Porsche parts catalog lists a GTS non-ceramic front rotor MSRP at $937.53 and a dealer price of $578.59; a front pad set is listed at $371.94 on another dealer catalog.	Catalog examples only; confirm side, VIN, and exact rotor option.
2023 911 PCCB front disc	A Porsche parts catalog lists a ceramic front disc at $6,471.43 (dealer listing) and another catalog example at $7,731.46 for a related 2023 911 ceramic application.	Do not use either number as a VIN-specific quote; ceramic replacement cost is materially higher than steel.
2023 911 GTS PCCB option when new	$9,870 shown in a 2023 U.S. vehicle-specification listing.	Historical option price, not a current retrofit price.
C7 Grand Sport steel vs. Z07	Exact current GM retail price requires RPO/VIN lookup. The OEM hardware difference is clear; ceramic Z07 consumables should be budgeted as specialty parts.	Obtain a GM/ACDelco quote before making a purchase decision.

Source note: Price evidence: Motul U.S. store and Porsche dealer parts catalogs, accessed 16 August 2026; see Sources 13–16. The installed ranges are explicitly estimates, not manufacturer claims.

Source Notes and Bibliography

Authoritative sources were prioritized. URLs are included so the reader can inspect the underlying document. Product pages and catalog prices are time-sensitive. Accessed 16 August 2026 unless otherwise stated.

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Technical limitations and terminology

Brake specifications can differ by market, model year, wheel package, and production change. For example, Porsche press material for the 992.1 GTS reports the 408 mm steel front disc with 36 mm thickness in one release and 38 mm in another regional document; this guide therefore treats the 408 mm diameter and caliper count as the stable OEM comparison points and flags thickness as document-dependent. Always use the owner's manual, VIN-specific parts catalog, workshop manual, and approved service information for a vehicle-level decision.