ZZ502 Big-Block Explainer

A straight-shot tech guide for swapping, tuning, and living with Chevy’s 8.2L street animal.

What it is (and isn’t)

The **ZZ502/502** is Chevrolet Performance’s Gen-VI 502-cid big-block sold as a turn-key street combo (Base/Deluxe). It uses forged internals, aluminum oval-port heads, and a hydraulic roller cam, rated around **508 hp @ 5,200 rpm** and **580 lb-ft @ 3,600** with a dual-plane intake and 870-cfm carb. Don’t confuse it with the 502 HO (lower compression/cam, ~461 hp) aimed at heavy vehicles and regular-gas duty.

Core Specs (ZZ502/502)

Displacement	502 cid (8.2L) — 4.470" bore × 4.000" stroke
Block	Cast-iron, 4-bolt mains, Gen-VI architecture
Balance	External (use the correct balancer and flexplate)
Rotating Assembly	Forged steel crank & rods, forged pistons
Compression	9.6:1 (premium fuel recommended)
Camshaft	Hyd. roller 224/234° @ .050, .527"/.544", 110° LSA
Heads	Aluminum oval-port, ~110–117cc chambers, 2.25"/1.88" valves
Induction (Deluxe)	Dual-plane intake + 870-cfm 4-bbl; HEI distributor

Why it hits so hard

That cam and oval-port combo keeps port velocity up, so the 502 makes **stupid-early torque**—500+ lb-ft by the lower midrange and holds on deep into the 5,000s. It feels fast in real street rpm, not just on a dyno sheet.

Parts you must match

• **Balancer & Flexplate:** It’s externally balanced—use the correct 8-bolt balancer and a **168-tooth flexplate** for one-piece rear main BBCs.
• **Converter pattern:** Verify bolt circle and pilot.
• **Fuel:** Plan for **92+ octane** with 9.6:1.
• **Timing baseline:** Aim **32–34° total by ~4,000 rpm**, then verify on your combo.

Swap & fitment notes (classic A/F-body & trucks)

• **Front drive:** Most kits align around a short-style water pump—match brackets and pulley spacing for radiator/fan clearance.
• **HEI clearance:** Big-cap HEI can fight the firewall/hood—mock it before final wiring.
• **Exhaust:** Choose headers that clear the steering box and frame; 2" primaries fit many

A-bodies with the right pan.
• **Cooling:** Aluminum radiator, proper shroud, 180° thermostat, and either a quality clutch fan or well-spec’d dual electrics.

Tuning that works (street)

• **Carb:** The 870-cfm is a solid start; jet to plug color and altitude. Annular boosters improve throttle response.
• **Timing:** Start **12–16° initial / 32–34° total**. Adjust for fuel and listen for ping; verify with a light.
• **Fuel system:** 3/8" line minimum. Regulated **5.5–6.5 psi** at the bowls. Consider a return-style setup if heat-soak percolates.

Common upgrade paths

• **Valve-train:** 1.7:1 roller rockers, good pushrods, and matched springs keep it clean near 5,800 rpm.
• **Intake/carb:** Single-plane + 950–1000 cfm for track bias (expect some low-end give-up).
• **Cam swap:** Bigger hyd. roller and tight-quench pistons can push **600+ hp NA**, trading idle vacuum and octane margin for gains.

Quick Spec Card (print this)

Power/Torque	≈508 hp @ 5,200 • 580 lb-ft @ 3,600
Compression	9.6:1 (premium fuel)
Cam	224/234° @ .050 • .527/.544 • 110° LSA
Heads	Alum. oval-port • ~110–117cc • 2.25/1.88
Balance	External (match balancer/flexplate)
Fuel	870-cfm 4-bbl (Deluxe); 3/8" line min
Timing	12–16° initial / 32–34° total (baseline)

Built From Pain note

Real-world: big torque magnifies weak links. Budget for converter quality, cooling headroom, and tires you won’t regret in the rain.

Credits & disclaimer

Specs consolidated from common ZZ502 configurations and builder best practices. Always verify part numbers and torque values with current Chevrolet Performance documentation for your specific crate engine.