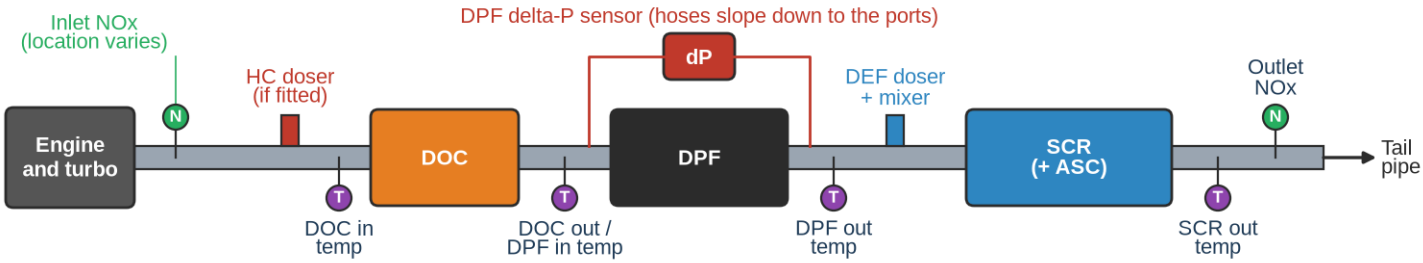
DPF Regeneration Cheat Sheet

Diesel particulate filter: regen types, delta-P and EGT tests, and a step-by-step diagnosis. Values are typical only.

Typical aftertreatment layout and sensor locations



Generic layout. Order, sensor count and locations vary by OEM and model year; some systems use in-cylinder post injection instead of an HC doser. Check the service information.

Tools needed

- Scan tool with live data, regen history, and parked or forced regen routines
- DMM and back probes; hand vacuum/pressure pump for delta-P hose checks
- Wheel chocks, fire extinguisher, heat-rated gloves, respirator for soot or ash work
- Service information: soot model or delta-P spec, regen procedure and resets

Safety

Exhaust parts reach about 550 to 650 °C (about 1,000 to 1,200 °F) at the DPF during regen. Exhaust gas at the outlet is also very hot.

Parked or forced regen: run it outdoors or with an approved exhaust extraction setup, away from buildings, grass, fuel and other combustibles. Chock wheels, set the parking brake, stay with the vehicle and keep people and hoses clear of the outlet.

Do not regen a filter loaded past the OEM limit. An uncontrolled burn can crack or melt the DPF. Follow the OEM tree (it may call for removal and cleaning).

Let parts cool before removing sensors or hoses. Wear a respirator when handling soot or ash.

Step-by-step procedure

1. **Interview and history.** Duty cycle, idle percent, short trips, regen count (completed vs interrupted), soot and ash load, fuel, oil and coolant use, recent repairs.
2. **Full scan and save the report.** Diagnose air, EGR, fuel, injector and sensor circuit codes before DPF codes. They are often the root cause.
3. **Visual.** Exhaust leaks ahead of the DPF (soot trails), cracked, melted or plugged delta-P hoses, hose routing that sags and holds water, EGT sensor wiring, oil in the charge piping (turbo).
4. **Sensor plausibility, key on, engine off, cold.** Delta-P near 0 (or at the OEM key-off value). All exhaust temps should read close to each other and to ambient.
5. **Delta-P at a fixed rpm, warm.** Compare to the OEM soot model or spec. Low: cracked DPF or a hose off. High: soot or ash load. Where DPF outlet pressure is read, a high reading there points to a restriction after the DPF (such as the SCR).
6. **Run a parked or forced regen** once the preconditions are met. Watch DOC in, DOC out, DPF out temps, delta-P and soot load. DOC out should rise well above DOC in once dosing starts; delta-P and soot load should drop by the end.
7. **Find why it loaded up.** Injectors (contribution, cutout, leakoff), EGR (stuck valve, coolant from a leaking cooler), turbo (oil from seals, low boost), DOC face plugging, sensors (delta-P, EGT), HC doser, and duty cycle.
8. **Repair and verify.** After a DPF clean or replacement, run the ash/soot reset in the service routines, then a parked regen. Recheck delta-P at a known rpm, rescan all modules, and follow up on regen frequency.

Soot vs ash and notes

- **Soot** burns off in a regen. **Ash** (from oil additives) does not; it needs DPF cleaning or replacement. Ash intervals are often 200,000 to 400,000+ miles on heavy-duty, much less with high idle time or oil consumption (rule of thumb; follow the OEM interval).
- Cleaning or replacing a DPF without finding the soot source is a comeback.
- Common codes: SPN 3251, 3719, 3936; P2002, P2463, P244A/P244B, P2458.

Readings and what they mean

Reading	Likely meaning
Delta-P low for the load	Cracked or melted DPF, hose off or cracked, plugged port. Not "clean"
Delta-P high after a full regen	Ash load (ash does not burn) or a plugged DPF
No DOC temp rise during regen	Not dosing (HC doser, fuel supply), DOC face plugged or below light-off, or an EGT sensor fault
Frequent regens	Duty cycle, soot source (injectors, EGR, turbo), oil or coolant use, or a sensor reading high

Regen types and inhibits

- **Passive:** soot burns at highway load with no added fuel. **Active:** the ECM adds fuel (post injection or HC doser) so the DOC heats the DPF while driving.
- **Parked:** driver starts it from the dash switch when requested. **Forced (service):** started with a scan tool for diagnosis or after repair.
- **Common preconditions (vary by OEM):** engine warm, parking brake set, neutral, zero vehicle speed, no throttle, PTO off, no inhibiting codes (EGT, delta-P, doser), inhibit switch off. The scan tool lists the active inhibits.
- DOC light-off typically needs DOC inlet above about 250 to 300 °C.
- **Never remove, bypass or reprogram out the DPF.** Fix the cause of the soot.

Always verify against the OEM wiring diagram and service information for the vehicle.
Learn a structured diagnostic process with Mechanic Mindset training.