Aftertreatment Derates Cheat Sheet

Inducements and derates: read the reason and timer, find the root fault, repair and verify the clear. Values are typical only.

Derate workflow: fix the cause, not the flag



An inducement or derate is how the engine control module (ECM) protects emissions compliance. It clears when the root fault is repaired and verified.

Tools needed

- Scan tool that reads the engine and aftertreatment modules (ECM and aftertreatment control module, ACM)
- Access to inducement data: reason, stage, timer, and fault history
- Diesel exhaust fluid (DEF) refractometer, graduated container, digital multimeter and back probes
- Service information and the original equipment manufacturer (OEM) troubleshooting tree for each code

Safety and compliance

A derated truck may lose power or speed on the road. Advise the driver to get to a safe place before the next stage.

Parked regen safety applies when a regen is part of the repair (see the diesel particulate filter (DPF) sheet).

Never delete, bypass, emulate or reprogram emissions equipment to clear a derate. It is illegal tampering under the Clean Air Act and does not fix the truck.

Step-by-step procedure

1. **Interview.** When it started, lamps and messages, any speed limit seen, recent DEF fills (wrong jug, unknown source), recent repairs.
2. **Full scan of all modules. Save the report before clearing anything.** Record every active and inactive code, Failure Mode Identifier (FMI) and occurrence count.
3. **Read the inducement data.** In the aftertreatment or engine module, note the inducement reason (which fault), current stage, and the time or distance to the next stage. Write it down.
4. **Find the root code.** Suspect Parameter Number (SPN) 5246 is the inducement flag, not the cause. FMI 3, 4, 5, 6 point to circuits (meter work). FMI 0, 1, 15 to 18 mean the system is out of range (test the system first).
5. **Fix upstream first.** Air, exhaust gas recirculation (EGR) and fuel faults often set aftertreatment codes downstream.
6. **Test the system.** Use the selective catalytic reduction (SCR) and DPF sheets: DEF quality, dosing test, nitrogen oxides (NOx) sensor compare, differential pressure (delta-P), regen.
7. **Repair per OEM** and do the required resets or relearns.
8. **Clear and verify.** Some derates clear only after a successful parked regen or monitor rerun. The DEF quality sensor needs fresh DEF and time to update. Confirm the inducement is inactive, power is back, and the code stays gone on a road test.
9. **Check software.** Look for OEM inducement software updates or campaigns. How a truck derates depends on its calibration.

Reading the inducement screen

- Look for: inducement active (yes/no), the reason or triggering fault, the current stage or level, and time or distance left before the next stage.
- Also note fault history and occurrence counts. On some systems, a fault that returns soon after a clear escalates faster.
- Screen names vary by OEM and scan tool. Write the values down before any repair or clear.

Common triggers and first checks

Trigger	Typical codes	First check
Low or empty DEF	SPN 1761	Level, sender, fill with fresh DEF
Poor DEF quality	SPN 3364, P207F	Refractometer; fresh DEF, allow update time
Dosing or pressure fault	SPN 4334, P2047	Dosing test, filter, lines, heaters
NOx sensor fault	SPN 3226, 3216, P2201	Power, ground, Controller Area Network (CAN), compare readings
Low SCR efficiency	SPN 4364, P20EE	Air, EGR, fuel codes first; DEF; sensors
Soot overload or delta-P	SPN 3719, 3251	Regen history, delta-P, soot source
Disconnected or tampered part	Varies by OEM	Connectors, harness, missing parts

Notes

- Inducement stages, timers and speed limits depend on engine type, model year and software. Environmental Protection Agency (EPA) guidance from August 2025 let OEMs update inducement software. Read the truck, do not assume.
- DPF overload can also derate (example: Detroit SPN 3251 FMI 0, 1 or 16 sets a 25% derate).
- Clearing codes without a repair does not stop an inducement; it returns.
- For fleets: an ignored regen lamp becomes a tow. Track DEF use.

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