



P0421

Warm Up Catalyst Efficiency Below Threshold (Bank 1)

P0421 means the powertrain control module has determined that the warm-up catalytic converter on bank 1 is not cleaning the exhaust efficiently enough during the critical cold-start period. The computer compares the downstream oxygen sensor signal before and after the catalyst to see whether the converter is storing oxygen and reducing emissions as designed, and it sets this code when the warm-up phase efficiency falls below the calibrated threshold.

SYSTEM	CODE TYPE	SEVERITY	FIX DIFFICULTY	AREA
Powertrain	Generic (all makes)	Medium	Professional	Auxiliary emission controls

Symptoms you may notice

- Illuminated check engine light, often with no other noticeable symptoms
- A slight sulfur or rotten-egg smell from the exhaust during cold starts
- Failed emissions inspection due to catalyst monitor not being ready or showing a fault
- Occasional rough idle or hesitation when the engine is cold
- Slightly reduced fuel economy over time as the engine runs richer to compensate
- In rare cases, a flashing check engine light if the converter is overheating or misfiring

Common causes, most likely first

- 1 Aging or degraded warm-up catalytic converter that no longer stores oxygen properly
- 2 Exhaust leaks upstream of the catalyst, allowing outside air to skew the oxygen sensor readings
- 3 A failing downstream oxygen sensor that is slow to respond or contaminated
- 4 Engine misfires or rich running conditions that overheat and damage the catalyst
- 5 Oil or coolant consumption from internal engine wear contaminating the catalyst
- 6 A stuck-open thermostat or faulty coolant temperature sensor preventing proper warm-up
- 7 Damage to the catalyst from physical impact or excessive backpressure



How to diagnose and fix it

- 1 Scan all stored codes and freeze-frame data to confirm P0421 is the primary fault and not a companion code
- 2 Inspect the entire exhaust system for leaks, loose clamps, and cracked welds before the catalyst
- 3 Check the downstream oxygen sensor response with a scan tool to see if it is sluggish or contaminated
- 4 Verify engine coolant temperature reaches normal operating range within a reasonable time
- 5 Perform a vacuum test or use a scan tool to check for misfire counters and fuel trim deviations
- 6 Measure backpressure before and after the catalyst to rule out a restricted exhaust
- 7 Replace the warm-up catalytic converter only after all upstream causes have been ruled out and the monitor still fails

Before you replace the catalytic converter

- A P0421 is frequently set by a small exhaust leak between the manifold and the warm-up catalyst that lets oxygen pulse past the sensor and mimic a failed converter.
- Many technicians replace the downstream oxygen sensor first, but a slow sensor can set this code even when the catalyst is healthy, so always compare sensor switching rates before condemning either part.
- A stuck-open thermostat keeps the engine from reaching closed-loop temperature quickly enough, and the warm-up catalyst never gets hot enough to light off, triggering P0421 without any converter fault.
- Oil or coolant consumption from worn valve guides or head gaskets coats the catalyst with contaminants that cannot be burned off, so fixing the root cause is essential before installing a new converter.
- On some vehicles, a weak ignition coil or spark plug causes intermittent misfires that dump unburned fuel into the catalyst, overheating it and setting P0421 long before the driver notices a misfire.

Can I keep driving with P0421?

You can generally continue driving with P0421 as long as the check engine light is steady and the engine runs smoothly, but avoid heavy loads and prolonged idling until the fault is diagnosed. If the light flashes or you notice misfiring, stop driving to prevent catalyst overheating and further engine damage.

Tools that help

- OBD-II scan tool with live data and freeze-frame capability
- Infrared thermometer to check catalyst inlet and outlet temperatures
- Exhaust backpressure gauge
- Vacuum gauge for engine integrity checks
- Digital multimeter for sensor circuit testing
- Propane enrichment tool or smoke machine for vacuum and exhaust leak detection



Reading P0421

- P** Powertrain: engine, transmission and emissions.
- 0** Generic (SAE) code: it means the same thing on every OBD-II vehicle.
- 4** Auxiliary emission controls.
- 21** The exact fault within that area.

Often seen with

P0128 Coolant Thermostat (Coolant Temperature Below Thermostat Reg · **P0171** System Too Lean (Bank 1) · **P0300** Random/Multiple Cylinder Misfire Detected · **P0420** Catalyst System Efficiency Below Threshold (Bank 1) · **P0431** Warm Up Catalyst Efficiency Below Threshold

See it working

Watch the animated explainer [How a Supercharger Works: Roots Blower in X-Ray](#) on Auto Veteran to see the parts involved moving.

Full guide, related articles and animations: <https://www.autoveteran.tech/dtc-codes/p0421/>

