

Catalytic Converter Failures

If a catalytic converter needs replacing, one of the problems below most likely contributed to its failure.

Engine Tune-Up Required.

A number of problems could occur to the catalytic converter as the result of an engine that is out of tune. Any time an engine is operating outside proper specifications, unnecessary wear and damage may be caused to the catalytic converter as well as the engine itself. The damage is often the result of an incorrect air/fuel mixture, incorrect timing, or misfiring spark plugs. Any of these conditions could lead to catalytic converter failure or worse.

Excess Fuel Entering Exhaust.

The fuel that powers your vehicle is meant to burn in the combustion chamber only. Any fuel that leaves the combustion chamber unburned will enter the exhaust system and light-off when it reaches the catalytic converter. This can super-heat the converter far above normal operating conditions and cause a meltdown. Possible causes are an incorrect fuel mixture, incorrect timing, corroded spark plugs, a faulty oxygen sensor, sticking float, faulty fuel injector or a malfunctioning check valve.

Oil or Antifreeze Entering Exhaust.

Oil or antifreeze entering the exhaust system can block the air passages by creating a heavy carbon soot that coats the ceramic catalyst. These heavy carbon deposits create two problems. First, the carbon deposits prevent the catalytic converter from reducing harmful emission in the exhaust flow. And second, the carbon deposits clog the pores in the ceramic catalyst and block exhaust flow, increasing backpressure and causing heat and exhaust to back up into the engine compartment. Your engine may actually draw burnt exhaust gasses back into the combustion chamber and dilute the efficiency of the next burn cycle. The result is a loss of power and overheated engine components. Possible causes are worn piston rings, faulty valve seals, failed gaskets or warped engine components.

Deteriorated Spark Plug or Spark Plug Wires.

Spark plugs that don't fire, or misfire, cause unburned fuel to enter the exhaust system. The unburned fuel ignites inside the converter and could result in a partial or complete meltdown of the ceramic catalyst. Spark plugs and spark plug wires should be checked regularly and replaced if damaged or if wires are worn or cracked.

Oxygen Sensor Not Functioning Properly.

An oxygen sensor failure can lead to incorrect readings of exhaust gasses. The faulty sensor can cause a too rich or too lean condition. Too rich and the catalyst can meltdown. Too lean and the converter is unable to convert the hydrocarbons into safe elements and may not pass a state inspection.

Road Damage or Broken Hangers.

The catalyst inside a catalytic converter is made from a lightweight, thin-walled ceramic. It is protected by a dense insulating mat. This mat holds the catalyst in place and provides moderate protection against damage. However, rock or road debris striking the converter, or improper or broken exhaust system support can cause a Catalyst Fracture. Once the ceramic catalyst is fractured, the broken pieces become loose and rattle around and break up into smaller pieces. Flow is interrupted and backpressure in the exhaust system increases. This leads to heat build-up and loss of power. Possible causes of a catalyst fracture are road debris striking the converter, loose or broken hangers, potholes or off-road driving.

A catalytic converter will rarely fail without a problem or malfunction occurring somewhere in the emission system in front of the converter. It is important to determine what caused the converter to fail so that the problem can be fixed and to prevent a recurrence of the failure.



Converter Meltdown.

This is an example of a converter meltdown. The converter was super-heated due to a raw fuel condition in the exhaust flow. The excess unburned fuel ignited when it struck the hot ceramic catalyst and drove the temperature far above the normal operating condition of the converter. The ceramic catalyst is unable to withstand the extremely high temperature and begins to melt. The ceramic collapses and the converter is destroyed. The melted ceramic may block the exhaust flow and cause additional damage to the engine. A converter glowing red-hot, or evidence of heat discoloration, confirms this situation.

The condition that led to this converter meltdown could be the result of a number of malfunctions including faulty oxygen sensor, an incorrect fuel mixture, worn spark plugs or plug wires, a faulty check valve, incorrect ignition timing, sticking float, faulty fuel injectors or other ignition malfunctions



carbon

Carbon Deposits.

This is an example of a converter with carbon deposits in the ceramic catalyst. This is usually a result of oil or antifreeze entering the exhaust system or a too-rich fuel mixture. The heavy carbon deposit clogs the converter and reduces exhaust flow. This increases backpressure and causes the entire exhaust system to heat up. The heat backs up into the engine compartment and may result in a number of heat-related engine problems.

Mild carbon scoring may do less damage to engine components but it may seriously affect the converter's ability to reduce harmful emissions. It could easily cause a vehicle to fail an emission test. Carbon deposits may be the result of faulty valves, worn piston rings, worn or leaking gaskets or lead in the fuel.



Catalyst Fracture.

This is an example of a catalyst fracture. The ceramic became loose, cracked and began to break down. The pieces began to obstruct flow, creating backpressure and increasing the heat in the exhaust system. There is evidence of a partial meltdown in this example due to overheating.

The initial cause for this damage could have been road debris striking the converter based on evidence of impact on the converter shell. In some cases, if the protective mat that holds the catalyst in place is directly exposed to exhaust gasses, it could deteriorate and allow the catalyst to fracture. The Car Sound converter uses two recessed cavities in the body to hold the protective mat out of the exhaust flow to prevent any deterioration. The mat stays in place and the catalyst is held firm.