

CONVERTER QUARTERLY

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Anatomy of a Converter

The catalytic converter helps control harmful emissions from mobile engine sources by converting the hydrocarbons (HC), nitrogen oxides and carbon monoxide (CO) in the engine's exhaust into carbon dioxide (CO₂), nitrogen (N₂) and water (H₂O) vapor. Five key components — the substrate, the washcoat, the catalysts, the mat and the can — must be properly configured to vehicle-specific parameters in order to achieve maximum emissions conversion. A mat surrounding the catalyzed substrate provides thermal insulation and protects against mechanical shock and chassis vibration. These components are encased in a metal can with end cones, which link to the exhaust pipe to complete the catalytic converter package. There are no moving parts inside the catalytic converter that could cause failure of the catalyst.

Essential components of a catalytic converter

Substrate -- A ceramic honeycomb-like structure with thousands of parallel channels that provide a large surface area for the application of washcoat and precious-metal catalyst to convert the engine exhaust to less harmful components. This is the clean-air enabler at the heart of the catalytic converter.

Mat -- A wrapping surrounding the catalyzed substrate that provides thermal insulation and protects against mechanical shock and chassis vibration. Mats are available in a variety of mat densities, thick-nesses, and compositions.

There are no moving parts inside the catalytic converter that could cause failure of the catalyst.

Can -- A metal package that encases the catalyzed substrate and mat, and integrates it into the exhaust system.

Washcoat -- A coating that increases the surface area of the substrate for catalysis, which helps control emissions

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- EMI's New Diesel Converters

FAQ'S ON CA EMISSIONS

"My car has a California emission system on it but your catalog says except CA, can I use your cat?"

There are basically four types of aftermarket emissions certification levels in the U.S.:

- 1) 49 state EPA (Environmental Protection Agency) pre-OBDII
- 2) EPA OBDII (1996 and newer vehicles)
- 3) CARB (California Air Resource Board) pre-OBDII
- 4) CARB OBDII.

All Eastern Catalytic converter are approved for all 49 states pre-OBDII and OBDII applications, most Eastern converters are also certified for use on pre 1996 or pre-OBDII vehicles in California as well. Eastern Catalytic also has a separate product line with converters available that are certified to CARB OBDII levels.

Of the close to 1,000 direct fit converters that Eastern Catalytic offers, all are approved for use in all states unless your vehicle is registered in California. In California you will need to review our line of CARB approved converters.

There are some states in the US that have decided to follow the CARB emission regulations for OEM vehicles. This is the reason why you will see cars in New York for example with a "California Emission System" label.

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-- System Difference 2000 Nissan Maxima --



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conversion across the fluctuations of engine operations and facilitates the application of precious-metal catalysts onto the surface of the ceramic substrate. Unique types of washcoats and processes have been developed by catalyzing specialists to help auto manufacturers reach specific goals, including: reducing the amount of precious metals loading required to meet emissions regulations, accommodating a variety of ceramic substrate material compositions and mitigating the effects of engine fluctuations.

Catalysts -- Catalytically active precious metals and other components are incorporated into the washcoat. The treated washcoat is then applied to the ceramic substrate, where the catalytically active materials convert noxious emissions into less harmful gases and water vapor.

Designing for Unique Specifications

The ideal approach to designing an efficient and durable catalytic converter is to first identify the vehicle-specific objectives, including:

- Engine emissions and operating conditions
- Available space and associated temperature requirements
- Converter size, contour, and location
- Fuel management
- Acceptable power loss or pressure drop
- Achievement of new levels of emissions regulation

Location, Location, Location ...

The trend in catalytic converter design is to locate the converter closer to the engine in order to meet increasingly stringent emissions regulations. When converters are located closer to the engine, engine-out gases lose less heat through the exhaust pipe before reaching the catalytic converter, so the unit reaches temperature in less time. This allows the catalyst to light off more quickly after start-up. However, the increased temperatures and vibration near the engine place greater demands on the durability of the converter's package design and on the converter.

In general, it is advisable to choose a converter location that optimizes conversion efficiency. Consider, for example, using a close-coupled pre-converter in instances where space near the engine is severely limited. It is also important to note that package design requirements for converters in close-coupled positions are completely different from those for converters in underbody or toe board positions. For example, mat density, thickness, and composition are extremely important due to the high temperatures generated closer to the engine and the proximity of other components.

Catalytic Converter Positions

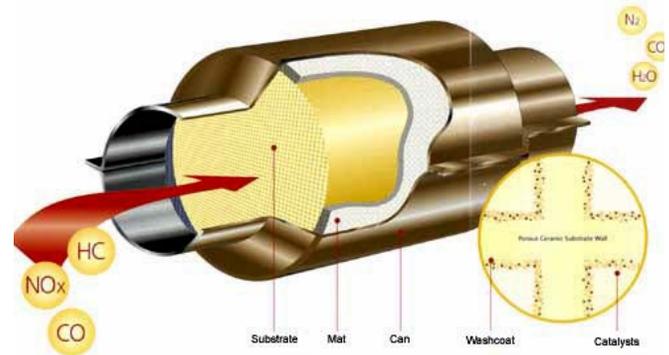
Underbody - This is the traditional converter position, under the floorboard of the vehicle.

Toe board - In this position, the converter is located close

to the brake pedal or transmission.

Close-coupled main - This is a full-size converter located close to the exhaust manifold of the vehicle.

Close-coupled pre-converter - This is a small converter positioned very close to the engine, used in conjunction with a second converter located in the underbody or toe board position.



Continued from page 1, FAQ's on CA Emissions

You can find out what type of emission system your car has by locating the Vehicle Emission Control Information tag under the hood of the vehicle. While these CA emission certified vehicles may require a different converter system (see pictures on page 1) than the Federal/EPA version of the same vehicle, the **Eastern Catalytic aftermarket system is approved for OBDII use** in all states except if the vehicle is registered for use in the state of California.

As our research and development projects continue at Eastern Catalytic we are finding new ways to meet the OBDII performance as required by the OE system. You will notice some Eastern systems that have additional catalyst volume as compared to traditional aftermarket converters, this is due to the need to meet the tough emission standards set by the OEM.

By using the most advanced washcoat technology in the aftermarket industry, converter shell sizes close to OEM standards, and a best in class benchmark for manufacturing quality system, Eastern Catalytic has extended the warranty for all converters to an industry first 5 years, 50,000 miles for both construction and performance. EPA law mandates only 25,000 miles warranty for performance but due to our high level of confidence in our products we have doubled to amount of miles covered under our warranty program.

New OBDII parts are being added weekly! **Contact Eastern Catalytic for an updated parts list to guarantee the best coverage in the business!** ❖