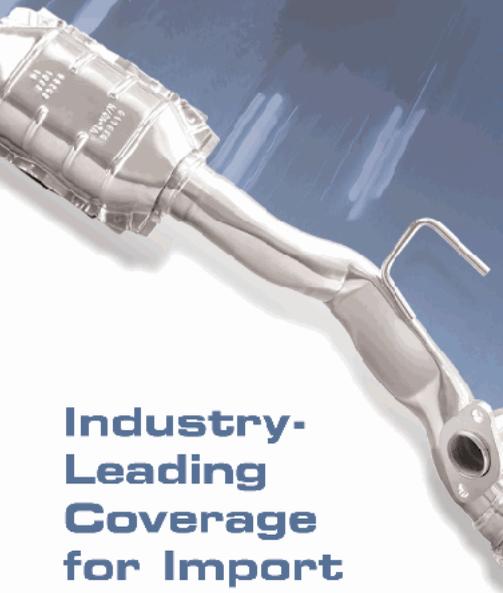


# WALKER

CATALYTIC  
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# Exhaust System

There will be one question on the ASE P2 test that deal with exhaust, parts and products.



The exhaust system begins at the exhaust manifold and goes all the way to the tailpipe.

The exhaust manifold is bolted to the cylinder head and routes hot exhaust gases into the rest of the exhaust system. The manifold may be cast iron or welded stainless steel tubing. Manifolds run extremely hot and occasionally crack, allowing exhaust gases and noise to leak into the engine compartment.

Aftermarket replacement exhaust

a head pipe. The converter attaches directly to the manifold. On V6 and V8 engines with a single exhaust system, the head pipe is called a "Y-pipe" because it is shaped like a "Y" and joins the two sides together into a single outlet.

On some import front-wheel drive cars with transverse-mounted engines, the head pipe has a ribbed flexible section covered by stainless steel webbing. This allows the pipe to flex as the engine rocks back and forth. After many miles, the flex section eventually cracks and starts to leak. Flexible head pipes are very expensive to replace, so there are flexible repair sections that can be welded into an existing pipe (this requires professional installation).

Behind the head pipe is the catalytic converter. There are four basic types of converters:

- Two-way converters in pre-1980 vehicles reduce unburned hydrocarbons (HC) and carbon monoxide (CO).

- Three-way (TWC) converters in many 1980 and newer vehicles reduce HC, CO and oxides of nitrogen (NOx).

- Three-way plus oxygen converters in newer vehicles have additional plumbing to accept air from an air pump to reduce HC, CO and NOx.

- OBD II converters are essentially three-way converters certified to meet OBD II requirements on 1996 and newer vehicles.

Since 1995, new catalytic converters have been covered by an eight year/80,000 mile federal emissions warranty. Converters can be contaminated by oil burning and internal coolant leaks in the engine, and damaged by overheating (often from ignition misfiring). If the converter is plugged or has failed an emissions test, the replacement converter must

Automatic Transmission

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Engine Parts

Gaskets and Seals

 Exhaust System

Fuel System

HVAC

Ignition System

Manual Transmission/Transaxle

Steering & Suspension

manifolds are available for many engines. Related items that should also be replaced if changing a manifold include the exhaust manifold gasket and manifold mounting bolts.

The next item down the line is the "head pipe." Usually made of stainless steel, the head pipe connects the exhaust manifold to the catalytic converter. Some engines don't have

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be the same type as the original. Aftermarket converters are less expensive than OEM converters, and are now available for 1996 and newer vehicles with OBD II.

Behind the converter is usually another pipe that connects to a muffler or resonator. Mufflers contain tubes and baffles to reduce exhaust noise. Most original-equipment mufflers are a three-tube design to provide

maximum sound control. Resonators contain fewer tubes and baffles and are used primarily to "tune" the sound of the exhaust. Some vehicles use both, others just use a muffler.

Mufflers and resonators usually fail from the inside out. Exhaust contains corrosive acids and moisture. When the engine is shut off, moisture condenses and puddles in the muffler. Over time, the resulting corro-

sion can eat through the shell. Most late-model vehicles now have mufflers made of long-lasting stainless steel. A few are even using lightweight titanium mufflers and pipes (Corvettes, for example). But most aftermarket replacement mufflers are aluminized steel or coated steel. Stainless steel is usually limited to premium aftermarket performance mufflers.

Replacement mufflers are available in various price ranges. The best (and most expensive) are premium mufflers that provide superior sound control and corrosion resistance. These may have extra tubes and baffles, fiberglass "roving" for additional sound absorption, and a lifetime warranty. Next would be a standard replacement muffler, which is often a direct bolt-on replacement. There are also "universal" mufflers that can be installed on a wide variety of applications using pipe adapters and low-cost "economy" mufflers for those who are mostly concerned with keeping their repair costs down.

Polished stainless steel performance mufflers and resonators are also available for many vehicles and are especially popular on sports compact cars. Many have "straight-through" designs to reduce backpressure for more horsepower. "Turbo-style" performance mufflers and other low-restriction designs are also popular upgrades for customers who want to uncork the exhaust.

Chrome and stainless steel exhaust tips are also popular. And the bigger the better. These bolt-on exhaust accessories are affordable and easy to install. They don't really do much for performance but they look cool and that's what many young drivers want.

Exhaust work often requires special tools. These include pipe cutters and pipe chisels for separating corroded pipes and connectors, and expanders for repairing or installing new pipes and mufflers. Exhaust customers may also need clamps (a must when replacing most pipes and mufflers), hangers and fasteners. ●

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