Catalyst And Rear Silencer Replacement

The following article will describe the process of replacing the catalyst and the rear silencer of your car. Catalyst replacement will be a necessity if your car does not pass the emissions test and over limit exhaust gases like HydroCarbons (HC) and Carbon Monoxide (CO) are found in the gas tester. Sometimes, an indication for replacement can also be metallic noises coming from the catalyst; these sound like shaking metallic items inside a tin can ... case as such indicates that the ceramic material inside the catalyst has broken and it is arbitrarily moving inside the catalyst body.

Note that catalyst replacement should be your last resort. It goes without saying that your motor should have fully operational its ignition system, the electroinjectors regularly cleaned by the supersonic method every 50.000 kms and the Lambda Sensor being fully operational to detect changes in oxygen present in exhaust gases. Lambda Sensor readings should be around 0.65 V when idle and fluctuate rapidly from 0.1 V - 0.9 V when engine r.p.m. are higher; it is a common fault of Lambda sensors to age and their readings become narrower and not give high range of voltage and consequently yield higher exhaust emissions. In my case, the Lambda sensor was replaced six months ago when exhaust gases were pretty high and the car could marginally pass the emissions test. The old Lambda sensor had the symptom of narrower voltage readings and after replacing it with a new one, the exhaust gases were in slightly better levels but still pretty high. After all, now that a new catalyst will be installed I will have the advantage of having new parts that will, at least in theory, be in top shape and give thus best results.

BOSCH Jetronic LE 3.2 employs 3-way catalyst which complies to the antipollution specifications USA '83. In order your car to pass the emissions test, it should fall within the values below.

	IDLE	2.500 r.p.m. (± 300)
CO	≤ 0.5	≤ 0.3
HC (in p.p.m.)*	≤ 120	≤ 100
Lambda ratio	-	0.97 - 1.03

* measured in parts per million

If you have followed periodic and regular maintenance mentioned above, and still exhaust levels are high, then it is high time you replaced the catalyst. A new catalyst from Alfa is possibly difficult to find and it should be ordered from Italy at a cost of 700€. It is best to seek one at aftermarket catalyst manufacturers like Walker or CatCo; their price is much lower and their effectiveness the same with the original one.

What you need:

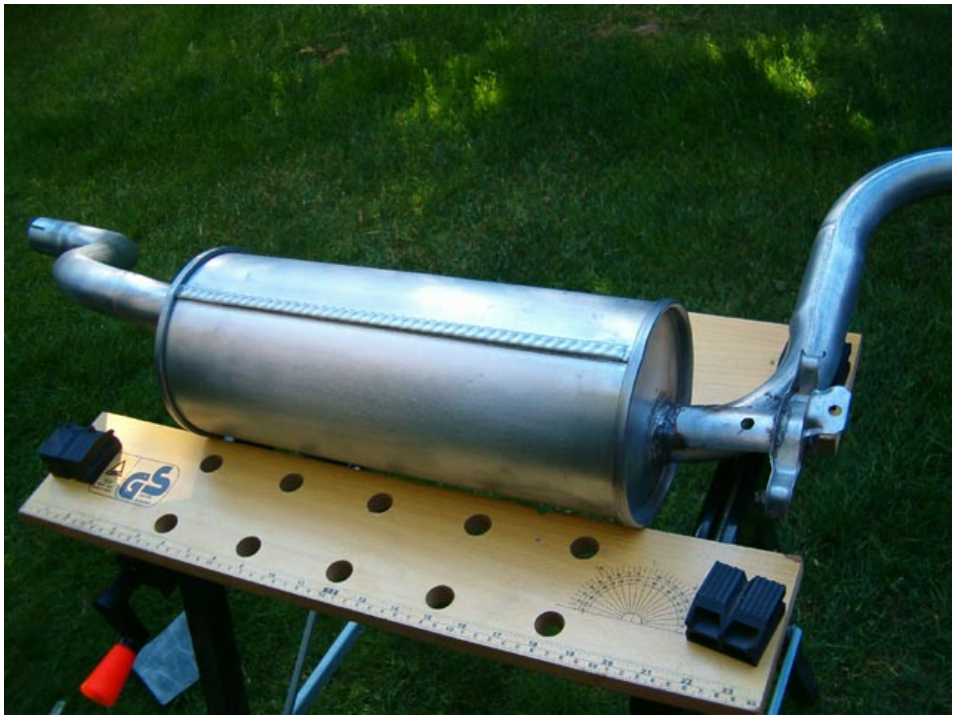
- catalyst

- copper catalyst flange
- 13 mm spanner
- exhaust system sealer

Optionally

- Exhaust flanges (4) if you plan to remove exhaust manifold
- Support rubber rings (5)
- Rear silencer if rusty and falling apart
- Lambda sensor if faulty
- High temperature engine / exhaust enamel paint (preferably in aerosol can)

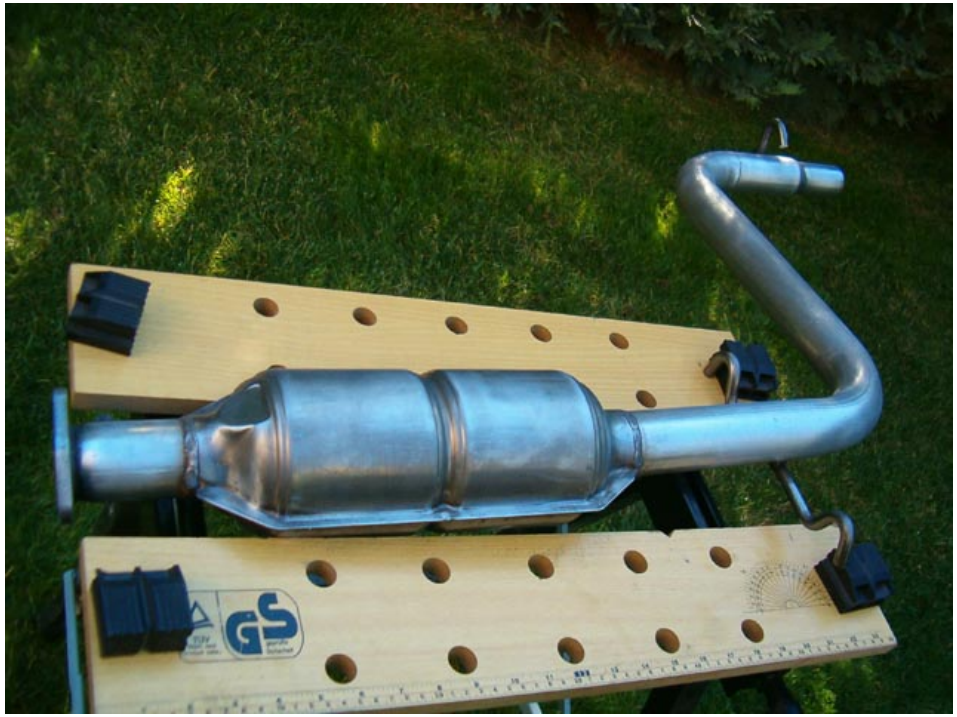
Let's begin



This is the set I got hold of. The bottom item is the catalyst and the item behind is the rear silencer.

I decided to treat both parts with high temperature engine / exhaust enamel. It would give a more nice look and prevent as much as possible any formation of surface rust. Note that rust in the exhaust system comes from the inside out and it is inevitable since water vapor and water are formed and become trapped. The silencer is now ready to be rubbed with low grit sandpaper in order to rough the surface of the metal.

Metal is now prepared for painting with high temperature exhaust enamel; note the shiny color of the silencer end



The same process of roughing the surface has been applied for the catalyst too

Note the specifications of the catalyst welded on its body


F 00 3761
81525
Fono
WALKER
610306 53 16256


WALKER
KA 268
182878
E 103 R-000173
78 03 41

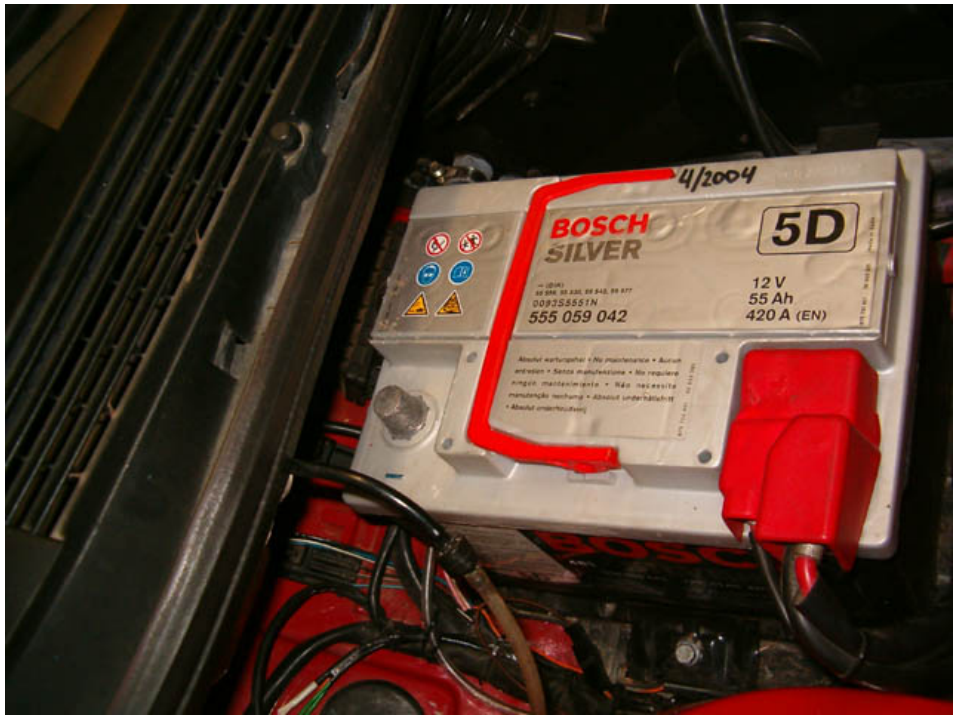
Both parts have now been sprayed with high temperature paint and left dry for a couple of hours. The specifications of the paint indicate warming the painted surface at high temperature (around 160 C); I have used a heat gun at its high scale (550 C) for several minutes. Note the screw at the catalyst neck; it is used for checking the exhaust gases upstream the catalyst in order to measure the correct level of emitted CO (blue adjustment cap on ECU adjusts CO level).

This is the high temperature engine/exhaust enamel paint used to paint the parts ...

... and all the bits that will help you with your project.

(L to R) Pipe clamp, rubber support rings, screws and nuts, exhaust flanges, catalyst copper flange and exhaust system sealer

It is now time to lift the car so that you have as much as possible clearance for you to get under the car and besides everything, being safe for the person under. A large cement brick was used to lift the rear axle and two support stands to keep the front high.



First of all disconnect battery negative pole

and then disconnect lambda sensor wiring.

got the lambda sensor harness hanging on the floor ...

... undone the tree screws keeping together catalyst and exhaust manifold. Note the high rust deposits on the connection and the screws.

a close-up of the lambda sensor portion of the exhaust ...

... and the manifold

time to remove the rubber support rings. The rightmost rusted weld seam was done years ago when the pipe needed to be replaced as it had rusted away and replacement was necessary; now everything's going to be thrown away and replaced with new parts.

rubber support rings have been removed

how are you going to separate the two pipes?

and here you see my friend and colleague Dennis, having a hard time punching the pipe in order to separate! That thing wouldn't move ... Thanks for the great help Dennis !!!

time to employ stronger methods ... propane torch did no difference

finally dad solved the problem with the aid of steel cutter ...

the monster is out at last

enjoy both of them sitting on the grass

Here you see a close-up of the tailpipe emerging from the muffler - remember telling you about rust coming from the inside out ?

this porous bottom is from the new catalyst. It won't be long to turn into black!

time to assemble the new catalyst to the manifold. New stainless screws and nuts were used. Note the copper color between the two plates; there sits the copper flange shown above.

From a wider angle

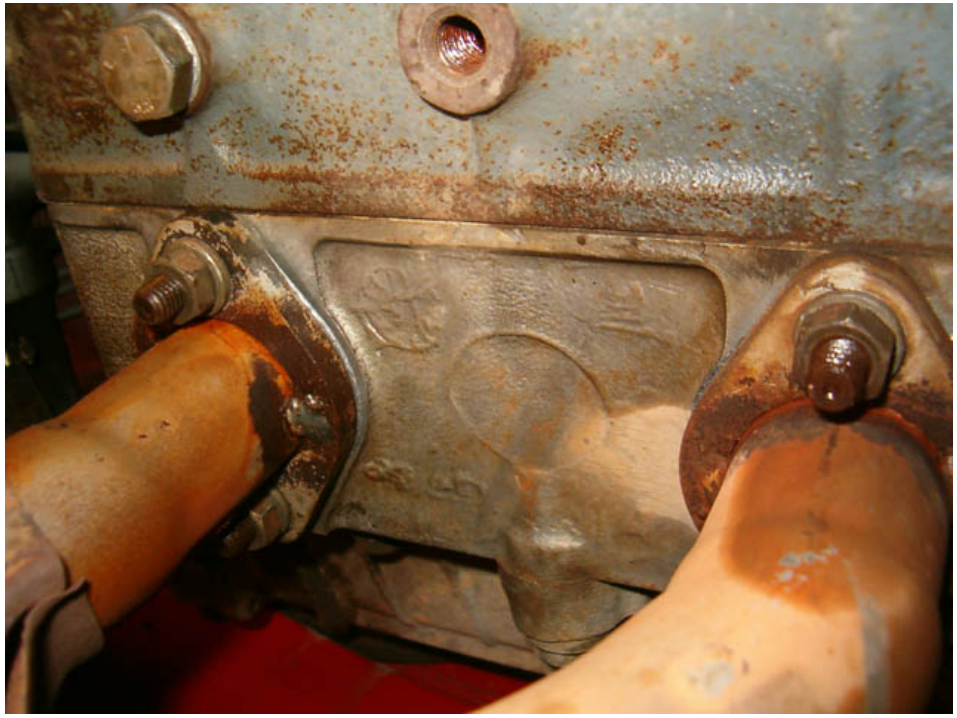
The exhaust nearly sits in place.

This part here is of major importance. Always use exhaust sealer in order to avoid air leaks. Possible leaks are measured by gas analyzers and sometimes measurement can't take place; so don't be mean with this material. It will start going hard within few minutes.

Rear silencer is now installed

The pipes are now connected and kept in place with the clamp

Rubber support rings are installed in place



and finally exhaust manifold is bolted on the engine block; you can see the relative flanges

After installation, an emissions test was done to the car and as it was expected the test was 100% successful; all harmful exhaust gases were far below the limit even without the engine having reached normal running temperature.

The engine now feels more free reving, car performance has been like the old days when new and this is attributed to the fact that the catalyst was old and clogged with combustion particles. In my opinion, do replace the catalyst at the Km's indicated at the service manual; at the time of replacement, my car had 110.000 kms and the catalyst was carrying 14 years on its back. Meanwhile, the engine sound has changed a bit to a more deep bass sound due to lack of silencer that the new catalyst doesn't have. OEM catalysts feature 3 chambers where the first two are occupied by catalyzing material and the third being a silencer. On the other hand, aftermarket catalysts feature only 2 chambers of catalyzing materials with no silencer. That's the reason for the bass sound ... but hey, after all it is a boxer sound !!!

Finally, it should be noted that proper catalyst disposal is of major importance. Do not dispose of at common garbage cans; harmful materials for health and the environment are contained inside the catalyst and only specialized process is capable to neutralize those materials. The best thing for you to do is find an authorized garage where they can accept such items; I handed over the catalyst and the silencer at a Ford garage where they collect used parts of the exhaust system (among other items) and give everything to companies specialized in such processes in order to break down the materials to more environment friendly substances.