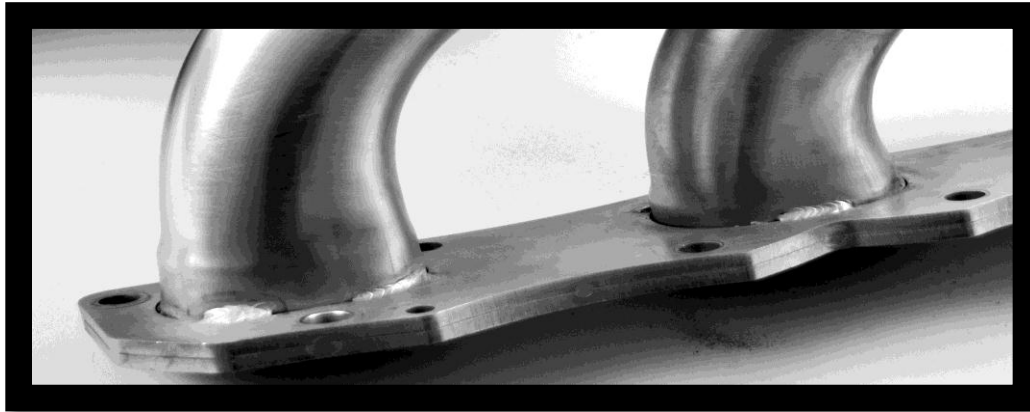


## FVD Brombacher's 2012 + Boxster / S (981) complete exhaust system in depth...

Many aftermarket exhaust manufacturers compare their products to the OEM Porsche® exhaust systems. They mention the benefits of their designs and point out the differences, etc. We will point out the common oversights with many aftermarket Porsche® exhausts and give you a detailed description of how our systems differ.

THE HEADERS on our latest 2012 + Boxster and Boxster S systems include a double plated flange (see picture below). This flange dissipates heat and vibration more efficiently and consequently does not warp like thicker single plate flanges commonly used by our competition. This small advancement is time consuming to make but is added in order to prevent loss of power over time due and will ensure years of trouble free operation even under severe track conditions.



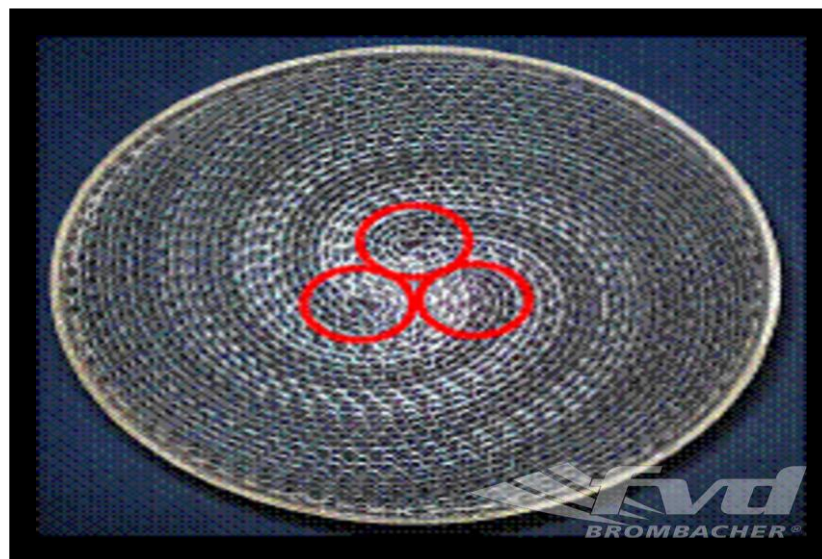
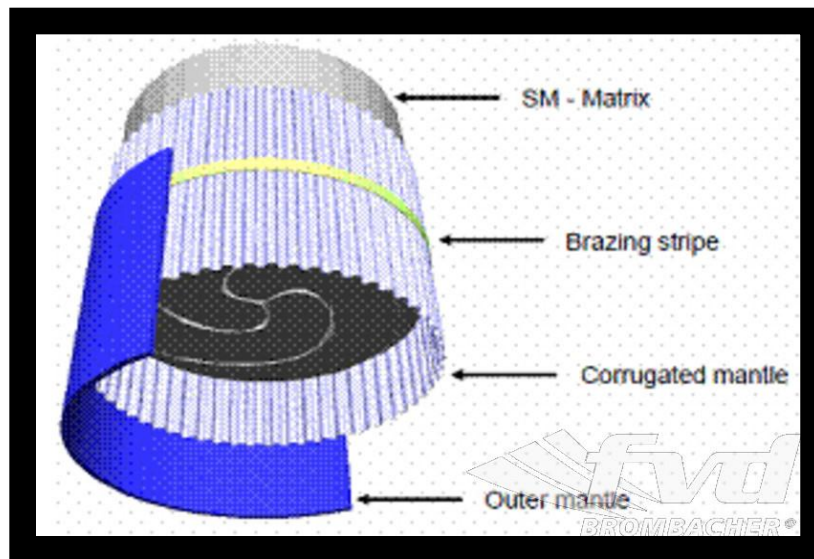
When you look closely at the pictures of the FVD system you will see that the primary tubing is segmented and welded. It is not “mandrel bent” like many swear by in the aftermarket industry. Mandrel bent headers have been proven to crack under the severe stresses found on the race track during severe endurance events. The mandrel bending process actually stresses and thins the material by bending it around corners. Thinner walls are the weakest point and under high heat and vibration will be the first area to crack, which will lead to power loss. Our primary tubing is segmented and welded under pressure with the use of forming gas. Forming gas actually pressurizes the area being welded to create a smooth inner surface. This means that material walls in the bend are consistent and strong, ensuring reliability. But we don't stop there, once the segmenting is completed, a tool is passed inside the header, which will actually grinds away any left-over slag. This process produces extremely durable headers with superior strength that ensures higher gas velocity and less exhaust gas restriction.

The header piping used in our 981 Boxster system incorporates a 2 1/2” motorsports style merge collector (see picture below). The collector smooth's out exhaust flow and turbulence created from the 3 primary pipes merging into one. Collectors create more velocity, which reduces backpressure and creates torque. Many exhaust manufacturers use “pyramid style” collectors or leave raw open-ended tubes, which create massive amounts of turbulence. Pyramid style collectors do a slightly better job than a raw tube but they still force air towards the flange. Our systems collector gently guides exhaust gases from the walls of the piping towards the center and lowest point of the 2 1/2” tubing. This dramatically reduces power robbing turbulence and increases the volume of gas and gas velocity which translates into superior low end and mid-range torque.



Our systems also include "AERO QUIP" connections sleeves at the muffler connecting point. These "AERO QUIP" connections reduce weight as they only use one bolt and nut versus 3 found on muffler flanges. They also keep gas volume and gas velocity constant as the tubing diameter is kept consistent.

THE CATALYTIC CONVERTERS cores used in this system are the most advanced in the industry. They are produced by HJS in Germany and are a 200 CPSI (cell per square inch) tri-metal design. Tri-Metal cats are the freest flowing and environmentally friendly aftermarket cats produced today. Tri-metal catalytic converters perform all three necessary and mandated reactions to prevent pollution. Reduction of nitrogen oxides to nitrogen and oxygen, oxidation of carbon monoxide to carbon dioxide and oxidation of unburnt hydrocarbons to carbon dioxide and water simultaneously. But we didn't stop there with these catalytic converters; we also opted for the most expensive HJS "HD" cores. The new generation of HJS high performance catalysts is characterized by 30 % less weight and 15% less backpressure. They are nicknamed "HD" for high durability matrix design catalytic converters. They have a "SM-matrix" (winding of three flat and corrugated foils) and a special connection to the matrix sheath (see picture below), which equates to extremely high flow and durability for track and street use. The added benefit is that they DO NOT generate catalytic efficiency codes (NO CHECK ENGINE LIGHT). Many of our competition simply state the cells per square inch or "German Cats" but they are not specific as this portion of any exhaust system is THE MOST EXPENSIVE component. We choose to include the best cores available on the market to ensure years of trouble free operation, reduce weight, increase horsepower and protect the environment.



THE MUFFLER section of our exhaust system includes thermal insulation shields on the piping to keep the suspension components as cool as possible. Our thermal insulation consists of bonded nonwoven silicate fibers covered with a special flexible stainless steel foil that can withstand up to 2,012 degrees Fahrenheit (1,100 degrees Celsius). The foil is then welded on to the piping ensuring long life and trouble free operation. The muffler incorporates an X pipe design to dampen and eliminate unwanted frequencies otherwise known as “drone” and gives the system the added benefit of increased torque in the mid-range. The actual muffler is vastly different than the common baffle plated mufflers stuffed with packing material that are common in the aftermarket. Ours are uniquely made with double perforated sound absorption tubes. The acoustic silencer absorption tubes are made in a trapezoidal pattern and are perforated with varying diameters, which isolate and dampen unwanted frequencies. Perforated tubes at higher gas velocities, present much less flow restriction than baffle plates and consequently translates into larger horsepower gains at higher RPMs. Also they produce the aggressive gurgling sound and contribute to the low, deep tones that you hear.

THE EXHAUST TIPS are a dual 3.5” round design and are double walled to dissipate heat, which means that they won’t tarnish as quickly as single walled tips. The design fits the factory cut outs in the bumper perfectly and is mounted via the “Aero-Quip” sleeve style connections so they can be perfectly adjusted and centered.

All of the points made above are far more time consuming to manufacture and add expense to our products. But we choose these methods to ensure maximum horsepower gains throughout a broad power band; all while maintaining reasonable sound levels with an exotic exhaust note that is purely Porsche®.

### **TÜV Approval and why the end user benefits in the long run...**

Like all European Vehicles, FVD parts are TÜV approved. What is TÜV approval you ask? Basically, German registered road vehicles may not be operated on public roads without a certificate from the TÜV. Also, all modifications must be approved, from installing tires of a different size to materials used in nuts and bolts. TÜV safety guidelines are among the strictest in the world, and getting a road permit for thoroughly customized vehicles borders on the impossible.

FVD parts must pass these criteria in order to obtain the TÜV stamp of approval:

**Corrosion Test** – Exterior metal parts (ie exhaust, brakes, rims, etc.) must undergo a HCL (Hydrochloric Acid) bath, which speeds up the corrosion process. This ensures long lasting, highly durable parts which benefit the end consumer.

**Extreme Temperature Test** – Items are put through –40 degrees Celsius to + 85 degrees Celsius sudden temperature change. This test ensures that material expansion and contraction does not cause cracking or material inconsistency.

**Material Analysis** – Chemical and Microscopic material analysis is done to determine the correct percentages of Iron, Zinc and many other elements. This also ensures material consistency and longevity.

**Exhaust Temperature Test** – Exhaust items are also put through a series of extremely high temperature tests in order to assure the consumer that parts can withstand cracking and splitting. Test temperatures exceed 1,400 degrees Celsius!! For reference normal exhaust gas temperatures are only 800 degrees Celsius.

FVD Brombacher exhaust products also carry a 2 year warranty. But rest assured, since our parts have to undergo the above testing they will last many, many years and many owners as well.