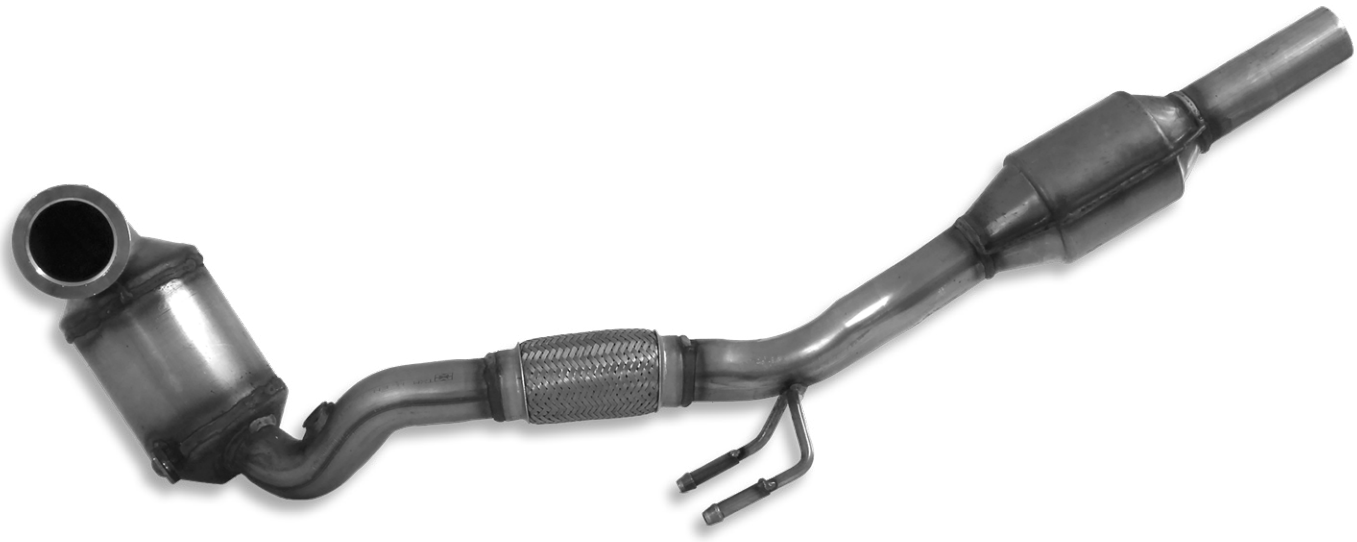

GASOLINE PARTICULATE FILTERS (GPFs)

WHAT IS A GASOLINE PARTICULATE FILTER (GPF)?

A Gasoline Particulate Filter (GPF), sometimes referred to as a PPF (petrol particulate filter) or OPF (otto particulate filter), is an emissions control device designed to reduce particulate (or soot) emissions from gasoline direct injection (GDI) engines.

Much like a diesel particulate filter (DPF), GPFs have a wall-flow honeycomb structure and are comprised from the same ceramic cordierite material as many DPFs. They are specifically designed to filter the finer particulates found in petrol exhaust gases and retain them within the walls of the filter.

GPFs can withstand high temperatures and are extremely resistant to thermal shock. This is important given that petrol engines heat up and cool down much quicker than diesel engines.

EXCEEDING EXPECTATIONS

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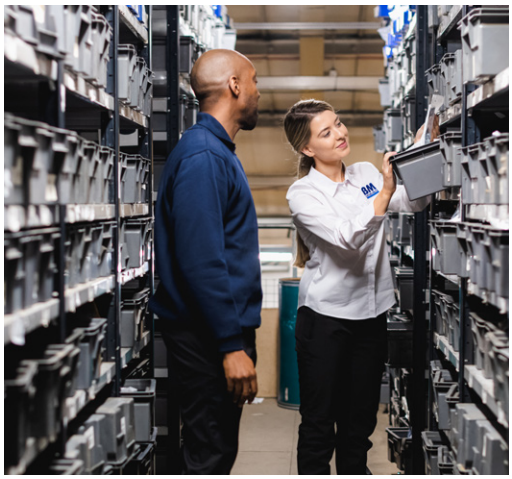


WHY WERE GPFs INTRODUCED?

The drive to reduce carbon dioxide (CO_2) emissions from vehicles has resulted in the replacement of traditional port fuel injection (PFI) petrol engines with GDI engines. Since around 2017, sales of passenger vehicles equipped with GDI engines in many markets have exceeded sales of both PFI and diesel vehicles.

GDI engines offer drivers better fuel economy without sacrificing performance. However, the injection of fuel directly into the cylinder means shorter air/fuel mixing times which can result in localised rich combustion. In turn, this results in particulate matter formation. These fine particulates have a particularly adverse impact on air quality and human health.

Petrol passenger vehicles have been subject to emissions legislation on particulates since the introduction of Euro 5 emissions standards in 2009 which imposed a limit on particulate mass. In addition, subsequent Euro 6 legislation introduced a limit on particulate number (PN) emissions.

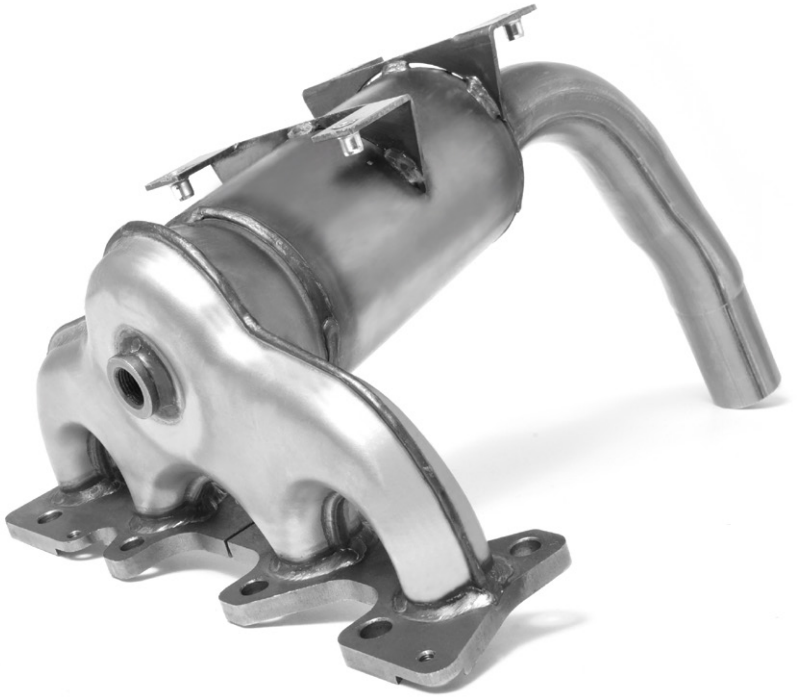
GPFs allow PN standards to be met under nearly all driving conditions, which is especially important for vehicles type approved under Real Driving Emissions (RDE) conditions. The RDE emissions test measures the pollutants emitted by a vehicle while being driven on the road, rather than in a lab designed to simulate real driving conditions.

HOW DO THEY WORK?

As exhaust gases pass through a GPF, they are forced through the channel walls of the honeycomb structure. The trapped particulates are reduced to carbon dioxide while at the same time the unwanted hydrocarbons, nitrogen oxides and carbon monoxide are converted to small amounts of carbon dioxide, nitrogen, and water.

GPF technology has matured in much the same way as DPF technology. Many early GPFs were uncoated and positioned downstream of a three-way catalyst. Since around 2018, coated GPFs, which are sometimes referred to as four-way catalysts, are commonly located much closer to the engine.

GPFs require heat to perform effectively. Exhaust temperatures of petrol vehicles are relatively higher than that of diesels which means the higher temperatures allow trapped particulates to be carbonised. In some instances, a vehicle's ECU may alter timings to trigger 'learn burn' conditions, whereby the amount of oxygen flowing through the engine and the exhaust system is increased. This also serves to increase operating temperatures, therefore allowing accumulated soot to be burned off.



EXCEEDING EXPECTATIONS IN EVERYTHING WE DO

As Europe's leading manufacturer of aftermarket hot end emissions products, you would expect us to deliver a wide range of quality focussed parts that are easy to order. What you may not expect is a company that has an ethos of continual investment and improvement to deliver the best possible working partnerships.

When you work with us, you will find that our approach is focussed on exceeding the aftermarket's expectations on quality. However, we also believe in working in partnership, helping you to increase your profits, offer a wider range and reduce your stock holdings so that you can ensure your customers have the very best choice available.

By aligning our business to suit your needs, we can offer bespoke solutions that are specific to your customers. We know that details matter so we invest in quality with our own best-in-class manufacturing processes.

We lead the way in providing practical and fitting support as well as cataloguing assistance, so can help you every step of the way.

BM Catalysts bring precision engineering and partner-first service to your business. Everything we do is dedicated to exceeding your expectations.

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