

Technical bulletin

PRODUCT:	Turbocharger
OEM:	BorgWarner, BMTS, Continental, Garrett, IHI, Mitsubishi
FITS:	Various
JOB:	How to troubleshoot a DPF related turbo failure

Since 95 percent of turbo failures are caused by issues, other than the turbo itself, it's important to determine **why it failed, and fix it**, before a new one is fitted. If not, the replacement could fail too, costing you, and your customer, more time and money.

How does a blocked DPF damage the turbo?

Fitted to diesel vehicles from 2009, the DPF can easily become blocked and obstruct the flow of gas through the exhaust system. If the gas cannot be expelled from the engine quickly enough, it will start to build up, creating back pressure. As the pressure increases, so does the temperature of the gas in and around the turbo's turbine housing. Whilst this may cause minor problems initially, if left unchecked, the turbo can very quickly fail, or the ECU may put the vehicle into limp mode. Either way your customer is liable for an expensive repair bill.



What causes a blocked DPF?

- » frequent stop-start or short journeys at low speeds, where the engine fails to reach the optimum temperature for regeneration
- » a warning light or fault code can stop a regen
- » sulphated ash and/or additives contained in some oils
- » a faulty fuel injector or turbocharger can cause the vehicle to run rich, creating excessive soot
- » similarly, a faulty EGR valve can increase the production of diesel particulates
- » the fuel or Eolys™ additive tank is less than a quarter full
- » a poorly serviced vehicle i.e low oil quality and level can prevent regeneration

What are the signs of a DPF related turbo failure?

- » fault code triggered – this may include exhaust pressure control, EGR, DPF regeneration and/or turbo boost control related codes
- » DPF warning light illuminated
- » if severe, the ECU may put the vehicle into limp-home mode
- » reduced turbo efficiency given the exhaust's inability to remove gas from the engine
- » discolouration of parts within the CHRA due to heat transfer
- » oil leaks on the compressor side; rising back pressure forces the exhaust gas past the shaft seal on the turbine side, and into the CHRA, displacing the oil
- » the back pressure can also push exhaust gas through the small clearances in the wastegate, creating a build-up of carbon in and around the wastegate and its control mechanisms. If severe this can cause the wastegate door to stick open or closed
- » excessive temperatures can also cause the oil within the CHRA to carbonise. Often misdiagnosed as insufficient lubrication or oil contamination, this causes premature wear to the shaft, thrust plate, seals, and bearings and restrictions in the feed lines



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- » carbon build up in the turbine side piston ring(s), piston ring grooves, oil flinger groove and nozzle ring, preventing effective oil control
- » over time, the excessive heat inside the turbine housing can cause the turbine wheel to fail from high cycle fatigue

How to prevent DPF related turbo failure:

Although it can take some time for a DPF to block, once this happens, turbo failure can occur very quickly. Therefore, it's always advisable to follow some simple measures when replacing or refitting a turbo:

- » always check the vehicle's DPF – if the soot levels are high enough to stop the DPF from regenerating on its own, a forced regeneration, usually via a diagnostic scan tool, may be required
- » if the blockage is severe, the only way to completely remove the particles is to either fit a new OE-quality filter, or have it professionally cleaned by a company like Carwood
- » encourage your customer to drive for 30 minutes or so, at speeds over 50mph, every few hundred miles – this will allow the exhaust temperature to get hot enough to burn off any excess soot
- » use manufacturer approved engine oil – this is designed to produce as little diesel particulate material as possible

How to resolve a DPF related failure:

- » remove the DPF and have it professionally cleaned off-vehicle
- » thoroughly check and clean the entire exhaust system – replace components as required
- » fit new oil feed and return pipes whenever installing a turbo
- » check and clean the intercooler and pipes – replace if needed

Whilst this may add additional expense to your customer's bill, it is far more cost and time-effective than having to fit another turbo, and potentially an engine, when they return with the same issue soon after. So, remember to **always diagnose and fix what caused the original unit to fail**, before fitting a new turbo.



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