

Technical bulletin

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

*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.*

What is oil starvation?

With modern vehicles demanding the power output of larger engines, but with the economy of smaller ones, today's turbochargers operate at over 300,000 revs per minute and close on a 1,000°C temperatures. This puts a huge strain on the engine oil, the turbo's lifeblood. So, if its supply is restricted, even momentarily, it can cause catastrophic damage to the bearing systems, destroying a turbo within a matter of seconds, and in severe cases, the engine.



What causes oil starvation?

- » low oil levels
- » incorrect grade or degraded, high-mileage, contaminated oil
- » short frequent journeys or repeated hot engine shutdowns causing carbon build up – this can block oil galleries
- » hard acceleration from cold starts not allowing sufficient oil to circulate
- » carbon deposits or other contaminants in the oil supply lines
- » a bent or kinked oil feed or pipe
- » a damaged, clogged or poor-quality oil filter
- » failure to prime the replacement turbo with oil during installation and before start-up

- » engine left idle for extended periods, especially in cold weather
- » incorrect or worn oil gaskets

What are the signs of oil starvation?

- » oil warning light illuminated
- » reduced fuel economy
- » poor engine performance – unable to achieve full boost pressure
- » engine overheating from increased metal-to-metal contact
- » different or excessive noise from turbo
- » black exhaust smoke
- » blue discolouration of the shaft journal surface as a result of increased friction and heat
- » transfer of bearing material onto the shaft
- » wear to the inside of the journal bearings causing the shaft to become out of balance
- » broken/snapped shaft due to prolonged excessive temperatures
- » loose or missing compressor wheel nut following shaft seizure
- » excessive wear to the thrust bearing due to friction with collar
- » discolouration of and scoring to the thrust collar
- » staining to thrust pad due to excessive heat



Technical bulletin

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

How to prevent turbo failure due to oil starvation:

- » check that the entire air induction system is clean and object free
- » inspect all pipework for signs of wear and tear – clean and/or replace as necessary
- » always fit new oil feed and return pipes when replacing a turbo
- » never bend or use excessive force when fitting a new feed or return pipe, and torque tighten at both ends, as per VM guidelines, to prevent leaks
- » ensure that the oil is at the optimum level - too little can starve the turbo of oil, but too much can cause a build-up within the bearing housing
- » use fresh oil and new OE-quality oil and air filters, as specified by the vehicle or engine manufacturer
- » only ever use new, OE-quality gaskets, seals and fitting kits
- » prime the replacement turbo with the correct grade oil before fitting
- » when starting a vehicle for the first time, crank the engine in one second bursts, at least 10 times, or if practical, for 10 seconds continuously, without starting - this will lubricate the bearings and shaft at a low enough rpm to prevent seizure or damage
- » once started, allow the engine to idle at tick over for a few minutes before revving to enable full oil pressure build-up
- » never use silicone on oil gaskets - it can easily become detached and block oil passages

How to resolve oil starvation:

- » check and clean the entire oil supply system - replace components where required
- » fit new VM spec filters, gaskets and oil supply pipes
- » flush and change the engine oil with the correct grade and quantity
- » conduct an oil pressure test to identify any issues and check it's supplying full pressure

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.



For more expert advice visit
carwood.com/installer-hub

