



## N54 (335i and 135i) Inlet Valve Intensive Cleaning

### The Problem.

It has already been widely acknowledged that BMW engines with Direct Injection Technology can suffer from contamination of inlet valves. This issue has been known to occur at quite low mileages, where the engine has not been used enthusiastically. The level of contamination at 50,000 miles will almost always create erratic cold start and idle performance.

### The Symptoms.

Perceived rough running from cold, especially from cold start where the engine is left to idle for a few minutes. Often can cause misfires sufficient to bring up the "Check Engine" warning lamp. Diagnostics often show that the misfire detection event is isolated to a specific cylinder.

### The Cause.

The N54 engine is one of the first direct-injection, lean burn engines in the BMW stable. Up until this technology was released, the fuel injectors were always placed in the airflow in front of the inlet valves, and often deliberately fired directly at the rear face of the valve to create swirl, and efficient combustion of the fuel once inside the combustion chamber. In this case, the fuel would clean the back of the inlet valves of any breather gasses that are necessarily vented into the inlet manifold.

Direct injection technology mirrors that found in diesel engines, whereby the fuel is metered via a high pressure fuel injector directly into the combustion chamber. This yields the opportunity to meter the fuel to a high degree of accuracy, and the air/fuel mixture can be run very lean, without causing cold start and excessive rough idle problems. This has a very significant effect on fuel consumption and emissions, and the technology is here to stay. The only downsides of this are less than perfect idle characteristics, and the removal of the valve cleaning characteristics of the former technology.

### Diagnosis.

Standard diagnostic procedure should always be followed. The known issues of spark plug deterioration, ignition coil failure, and injector failure should be eliminated before the cleaning should be entertained. If there is no reason to suspect any of these failures, we would recommend switching the above three components to another cylinder with no history of misfire detection prior to committing to the cleaning procedure.

### Secondary Diagnosis.

Once it has been established that there is no ignition or injection component failure or degradation, the inlet manifold should be removed to allow endoscope inspection of the valves.

### BMW Solution

Current BMW Procedure calls for the removal of the cylinder head, removal of the valves for cleaning, the reinstalling all removed parts. This procedure is charged at around 25 hours labour time, and including parts can easily amount to a £3,000 invoice from a BMW Dealer.

### Birds Solution.

We do not follow the logic of this BMW measure, and have developed our own procedure for the cleaning process without removal of the cylinder head. Our process involves removal of the manifold, and manual cleaning of the substantial residues, followed by a chemical cleaning of the remaining residues. Our cleaning procedure costs up to £550 including VAT, depending on the level of contamination. The results are immediately noticeable, and often lost fuel economy and performance can be restored.



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Before Treatment



After Treatment

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