Head gasket REPAIR

Given a terminal case of head gasket failure on a 2002 BMW 316i, **Andrew Everett** tests K-Seal Ultimate head gasket repair.

Head gasket failure comes in many forms. Most often, it's a straight case of overheating and pressurising. In our case, oil was getting into the coolant, resulting in a header tank full of beige goo, as well as a top radiator hose contaminated with oil. Oil, of course, floats on water and will always find the highest point, which is why the top hose was knackered – squeeze it and oil would ooze from the rubber.

The N42 is a very complex engine (double Vanos, valvetronic, etc) and replacing the head gasket, while possible, is an expensive and difficult job requiring special tools. Given the value of a 52-plate 316i with 125,000 miles, it's conceivably not worth it unless you can find a quick fix.

The N42 has one possible source of oil-to-water contamination: the heat exchanger fitted to the side of the oil filter housing. These can rupture internally, allowing pressurised oil into the coolant on a cold start. On our car, we disconnected the two coolant pipes from the exchanger – these have those annoying push-fit hoses rather than traditional hose clips. There was no oil seeping from the exchanger, but given that both coolant pipes to it were rotten, we cut off their ends and joined them with a bit of plastic pipe, then ran the engine for 10 minutes. There was no oil leak from the heat exchanger.

Given the poor state of the upper hoses and header tank, there was no point in going any further with them fitted. A trip to the breakers netted us a nearly new Behr replacement tank and a set of good used hoses for £10. The old parts were extracted – despite having an almost new Nissens radiator fitted, the expansion bottle resisted most attempts to remove it; it took one particularly strong yank to get it free. The next job was to flush out all the gunk before refitting the replacement parts. But how to effectively clean out the inside of the engine and cooling system? Machine Mart sold us a five-litre bottle of parts washer fluid, which was tipped in and the engine run for 10 minutes before being drained. We set the heater to 'Hot' to ensure that any residue in the matrix was washed out.

Adding K-Seal

There is no point in simply tipping the K-Seal into the expansion tank, as it will just sit there. You need to pour it directly into the engine.

We disconnected the top hose and poured in the K-Seal, before reconnecting, starting the engine and adding some antifreeze. We held the engine at 2500rpm until the heater began to blow warm air.

Did it work? Well, before adding the K-Seal and with the system running clean water, we could see oil droplets starting to appear. Following a flush through with washing-up liquid and rinsing out, we added the K-Seal and it has made an appreciable difference. The engine has run for a couple of days and the coolant is still a blue-green colour. There's no overheating, the heater blows hot when required, and the fan cuts in and out.

Only time will tell if it will last, but even if you needed to repeat the process every few months, it beats the expensive alternative. We will provide updates in the future to see whether the K-Seal lives up to its promise of making a permanent repair.

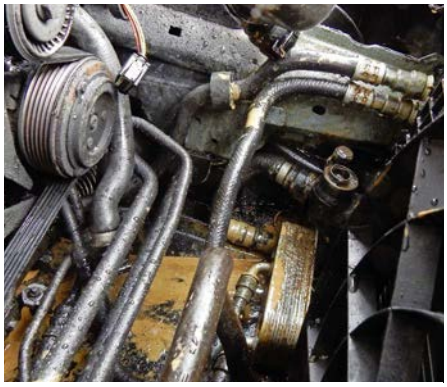
THE PRODUCT:

K-Seal Ultimate Permanent head gasket repair. RRP £24.99. Visit **www.kseal.com/uk** or **www.kalimex.co.uk**

K-SEAL TREATMENT

1 Here is the N42 engine. It's pretty oily, but it starts on the button and sounds OK. It isn't overheating, but we still need to replace a lot of the cooling system.

2 Removing the coolant header tank cap reveals that oil has entered the cooling system, resulting in this dreadful emulsion. However, the engine oil is the right colour, so it has not been contaminated.



3 It's clear the system has been pressurising, because when the radiator cap was removed, the emulsified gunk spilled over. It looked better following a blast with a pressure washer.

4 We needed to replace the top coolant hoses as the oily emulsion in the top hose had soaked though and rotted the rubber. When it got hot enough, pressure in the system would have blown it apart.

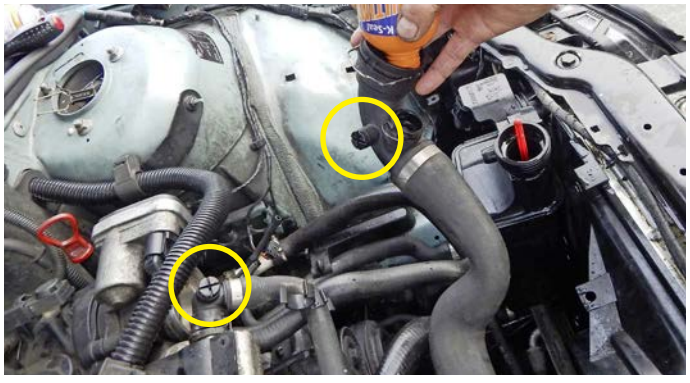
5 The coolant-to-oil heat exchanger is bolted to the oil filter housing with four Torx screws. There is a rubber gasket between it and the filter body, but that rarely fails and won't result in a cross-leak – that's caused by a small internal split in the unit.

6 The worst of the gunk is flushed from the header tank and five litres of parts washer fluid poured into the header tank. The engine was run for 10 minutes with the heater set to ' Hot' to clean it out, then it was allowed to cool, drained and flushed out with a hose.

7 The old header tank was replaced with a newish one along with a secondhand top hose assembly. The header tank clips onto the side of the radiator – smear the rubber seals with washing-up liquid on refitting to make sure it's easily removable if you need to replace in the future.

8 ◀ BMW has used this quick-release hose clip since 1998 on most models – they can be a real pig to remove. The one securing the base of the header tank to the rad stub has a plastic tang on the end so that it can be pulled sideways.

9 ▶ K-Seal isn't like Radweld and won't block a heater matrix. It's a viscous fluid containing copper particles and ceramic microfibres that can block a hole up to 0.635mm. Engine heat will cure the mixture, but will it fix our head gasket?



10 We wash the system through with water and washing-up liquid before a final cold water flush, then pour the K-Seal down the top hose. You can see one bleed screw on the coolant elbow and there's another on the small hose near the throttle body (circled).

11 Remove both bleed screws and slowly pour antifreeze into the header tank until the red level sensor stick is raised (as shown). We added four litres, topped up with clean water, started the engine and bled the system. When the heater is blowing warm air, it's bled.