

Engine Mechanical

Engine Mechanical Changes

For the US market, several changes were incorporated into the M57 engine. Some of the components affected include:

- Bearings (crankshaft and connecting rod)
- Pistons
- Crankcase
- Crankcase ventilation

Bearings

The connecting rod bearings are now lead-free. The familiar sputter bearing arrangement is still used.

The upper (con rod side) bearing is a 3-layer sputter bearing. The cap side is a 2-layer non-sputter bearing.

The crankshaft main bearings are still the conventional 3-layer (lead-based) bearings.

Future engine designs will use completely “lead-free” bearings.

Pistons

The piston pin has a greater offset than in the European version. The offset of the piston pin means that the piston pin is slightly off center.

This provides acoustic advantages during changes in piston contact. The acoustic advantages of increasing the offset are further developed particularly at idle speed.



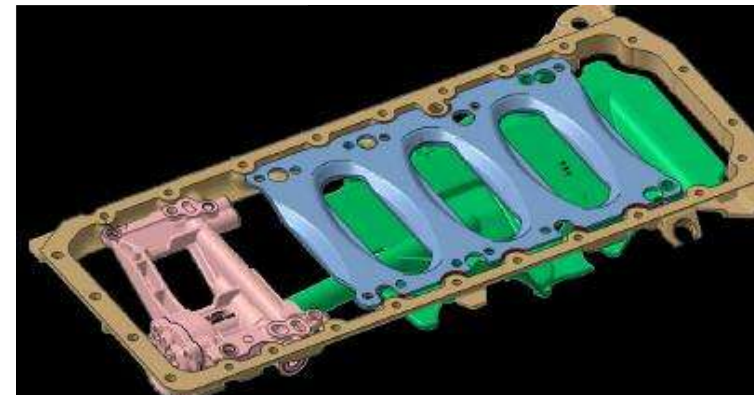
Crankcase

In contrast to the European version, the M57D30T2 US engine has a larger reinforcement panel on the underside of the crankcase.

The reinforcement panel now covers four of the main bearing blocks for the crankshaft. In principle, the reinforcement panel serves to enhance the stability of the crankcase.

However, the enlargement was realized solely for acoustic reasons.

Note: Never drive the vehicle without the reinforcement panel.



Crankcase Vent

The crankcase vent in the US version is heated. In addition, the operation of the crankcase breather is OBD monitored. This is because a leaking system would increase unwanted emissions.



Index	Explanation	Index	Explanation
1	Cylinder head cover	5	Filtered intake air
2	Blow-by heater connection (OBD)	6	Blow-by heater connection at blow-by pipe
3	Blow-by heater connection at wiring harness	7	Intake air to exhaust turbocharger
4	Filtered air pipe	8	Blow-by pipe

The only probable reason for a leak in the system would be that the blow-by pipe is not connected to the cylinder head cover. In order to facilitate protection of this situation by the OBD, the heating line is routed via a connector to the cylinder head cover (2).

Essentially, this connector serves only as a bridge so that actuation of the heating system is looped through. The plug connection is designed in such a way that correct contact is made only when the blow-by pipe has been connected correctly to the cylinder head cover, i.e. the contact for the heating system is not closed if the blow-by pipe is not connected to the cylinder head cover. The OBD system recognizes this situation as a fault.

Note: If the blow-by pipe is not connected to the cylinder head correctly, the OBD will activate the MIL (Malfunction Indicator Lamp).

Note:

When making repairs which concern malfunctions of the crankcase ventilation system. Or, if any repairs are made to a turbocharger which has leaked oil into the engine, be sure to remove any residual oil in the intake air system.

Failure to do so may result in an engine over-rev situation causing irreparable engine damage. In this case, the warranty may be affected.

Summary of Changes for the M57D30T2 (US)

The following table provides an overview of the special features of the M57D30T2 US engine. They are divided into various categories.

- New development signifies a technology that has not previously been used on BMW engines.
- Modification signifies a component that was specifically designed for the M57D30T2 US engine but does not represent a technical innovation.
- Adopted describes a component that has already been used in other BMW engines.

This information describes only the main modifications to the M57D30T2 engine compared to the European version as well as fundamental vehicle systems specific to diesel engines.

Component/System	New Development	Modification	Adopted	Remarks
Engine mechanical systems		X		Very few modifications have been made to the basic engine. The modifications that have been made focus mainly on ensuring smooth engine operation. A significant feature, however, is the OBD monitoring of the crankcase breather.
Air intake and exhaust systems	X			The most extensive changes were made to the air intake and exhaust system. For instance, low pressure exhaust gas recirculation (low pressure EGR) is used for the first time at BMW on the E70. In addition to other minor adaptations, there are substantial differences in the sensor and actuator systems.
Cooling system		X		In principle, the cooling system corresponds to that of the European versions, however, it has been adapted to hot climate requirements.

Component/System	New Development	Modification	Adopted	Remarks
High pressure fuel system		X		The functional principle of the fuel preparation system does not differ from that of the European version, however, individual components have been adapted to the different fuel specification.
Fuel supply system			X	The fuel supply system is vehicle-specific and corresponds to the European version. There are, however, significant differences to petrol engine vehicles.
Selective Catalytic Reduction System (SCR)	X			The SCR system is used for the first time at BMW. Nitrogen oxide emissions are drastically reduced by the use of a reducing agent that is injected into the exhaust system upstream of a special SCR catalytic converter. Since the reducing agent is carried in the vehicle, a supply facility, made up of two reservoirs, is part of this system
Engine electrical system			X	The engine is equipped with the new DDE7 (digital diesel electronics) control unit that will be used in the next generation diesel engines (N57). The preheater (glow plug) system also corresponds to the N57 engines.
Automatic transmission			X	The automatic transmission corresponds to that in the ECE variant of the X5 xDrive35d. The gearbox itself has already been used in the US version of the X5 4.8i, however, a different torque converter is used for the diesel model.