

Advanced Diesel Technology Introduction

U.S. Market Diesel Introduction

Beginning with model year 2009, BMW will introduce 2 diesel models for the first time since 1987. The E90 and E70 will be available with the new M57D30T2 (US) engine.



The two new models will meet the EPA Tier 2, Bin 5 requirements and will be considered “50 State” legal. In order to comply with these new stringent regulations, both vehicles have the latest in emission control and engine management technology.

Both vehicles will be equipped with the latest Selective Catalytic Reduction system to reduce unwanted NO_x emissions. Also, the X5 will have an additional Low Pressure EGR system to further assist in the reduction of NO_x.

The E90 will be known as the 335d, while the E70 will reflect the new naming strategy as the X5 “Xdrive35d”.



In addition to having a new engine, the new diesel powered 3-series will also be considered a “face-lifted” version (or LCI) with other changes to be detailed in future training.

The new X5 Xdrive35d and 335d will be available in the late fall of 2008 with the same impressive six-cylinder diesel engine.

The provisional fuel economy data is as follows:

- 23/36 mpg (city/hwy) for the 335d
- 19/26 mpg (city/hwy) for the X5 (X Drive 35d)

**Note: The above fuel economy data is provisional.
The official EPA data is not currently available**

A Diesel Engine for North America

Impressive power and performance as well as exemplary efficiency have contributed to making BMW diesel engines an attractive as well as future-oriented drive technology.

This technology is now being made available to drivers in North America. BMW is introducing this diesel technology to the USA and Canada under the name "BMW Advanced Diesel with Blue Performance".



The introduction is an integral part of the Efficient Dynamics development strategy, which has become a synonym for extremely low CO₂ emissions - not surprising when considering its extremely low fuel consumption.

Efficient Dynamics is not solely an instrument for reducing fuel consumption, but rather it is designed as an intelligent entity with increased dynamics. Not without good reason, the M57D30T2 engine is referred to as the world's most agile diesel engine.

In the 2008 International Engine of the Year Awards, the BMW diesel came in second in the 2.5 to 3.0 liter category. Surprisingly, the M57D30T2 engine finished second only to the gasoline powered N54 engine.

But, both the N54 and M57 diesel engines finished well ahead of the competition which included diesel engines from other manufacturers.



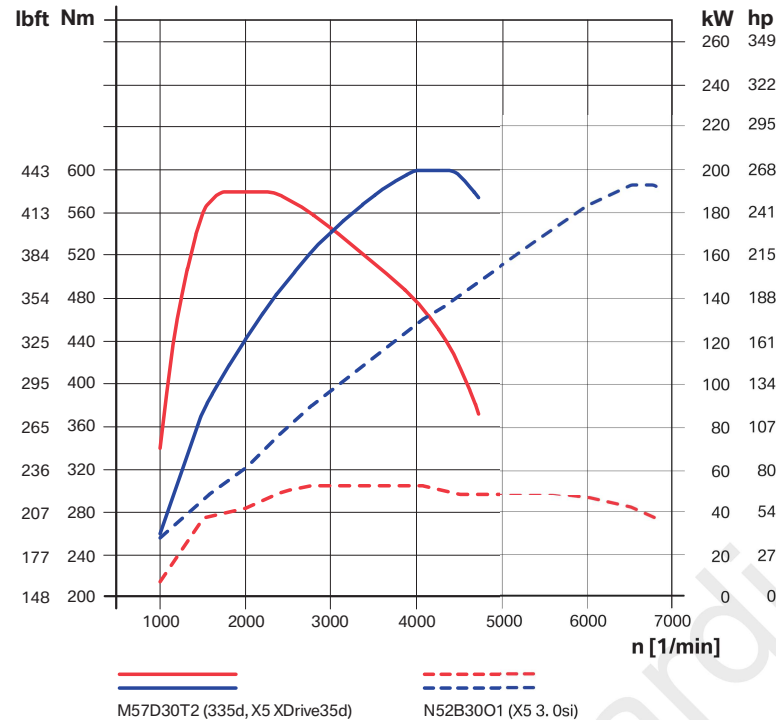
The following pages contain a comparison of the new BMW diesel engine technology to the current BMW gasoline engine technology.

Technical Data Comparison

Description	Units of Measurement	N52B3001	N54B3000	N62B4801	M57D30T2 (US)
Engine type		R6	R6	V-8	R6
Displacement	(cm ³)	2996	2979	4799	2993
Firing order		1-5-3-6-2-4	1-5-3-6-2-4	1-5-4-8-6-3-7-2	1-5-3-6-2-4
Stroke	mm	88	88.9	88.3	90
Bore	mm	85	84	93	84
Power output @ rpm	hp @ rpm	260@6600	300 @ 5800	360 @ 6300	265 @ 4200
Torque @ rpm	Nm @ rpm	305@2500	400 @ 1300-5000	475 @ 3500	580 @ 1750
Maximum engine speed	rpm	7000	7000	6500	4800
Power output per liter	hp/liter	86.7	100	75	89.3
Compression ratio	ratio	10.7 : 1	10.2 : 1	10.5 : 1	16.5 : 1
Cylinder spacing	mm	91	91	98	91
Valves/cylinder		4	4	4	4
Intake valve	mm	34.2	31.4	35	27.4
Exhaust valve	mm	29	28	29	25.9
Main bearing journal diameter	mm	56	56	70	60
Connecting rod journal diameter	mm	50	50	54	45
Fuel specification (Octane)	(RON)	91-98	91-98	91-98	Diesel (Cetane 51)
Engine management		MSV80	MSD80	ME 9.2.2	DDE 7.3
Emission standard		ULEV II	ULEV II	ULEV II	ULEV II

Power Output Comparison

Diesel vs. N52

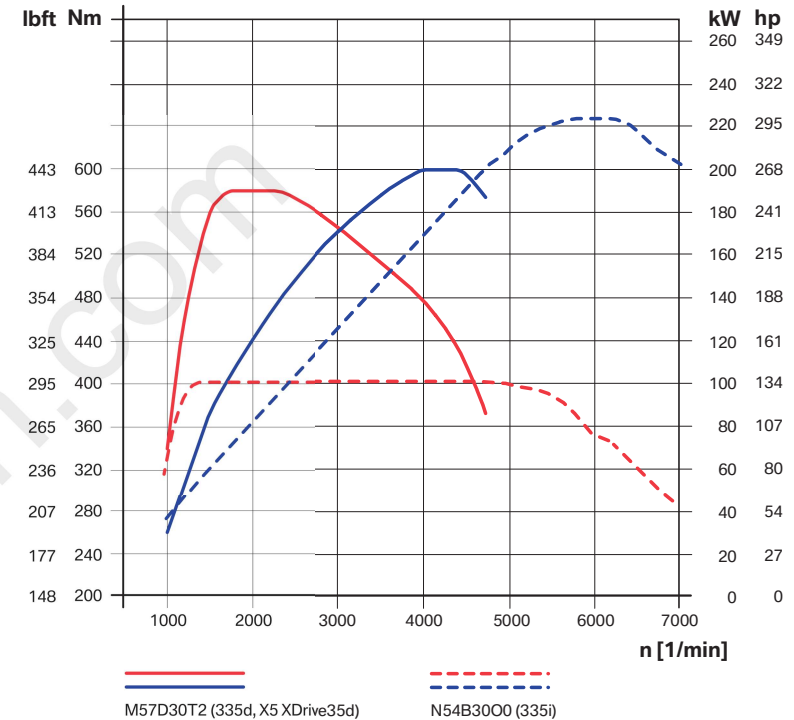


The following full load diagrams provide a comparison of the new diesel engine to the current production gasoline engines, both 6 and 8 cylinder.

Most notably, the diesel has the advantage in the torque output. The above comparison shows a comparison between the N52 engine, which is a naturally aspirated 3-liter gasoline engine.

The power developed by the gasoline engine is carried over a broader RPM range, but the diesel has more output torque which is available at a much lower engine speed.

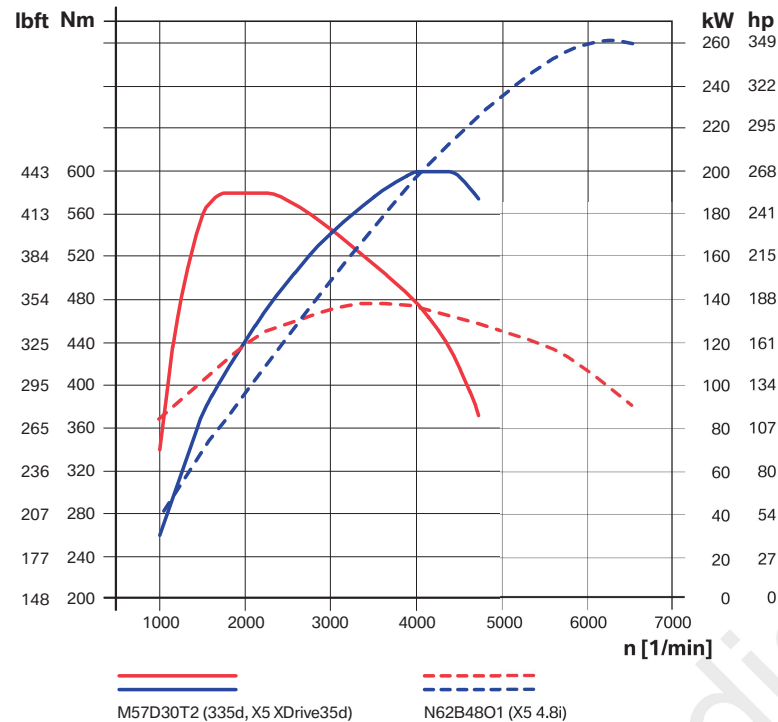
Diesel vs. N54



In the above graph, the N54 has a slight advantage in peak output with regard to horsepower. Since the N54 is a turbocharged engine, the output torque figures show the torque output at a lower engine speed, but it is quite "flat" up to almost 5000 RPM.

In contrast, the diesel has a much higher torque output, but is only available for a short time. After about 2400 RPM, the torque drops off considerably.

Comparison to the V8 Engine



The familiar N62B48O1 has impressive horsepower output but, even with 8-cylinders, it does not have the torque output of the M57 diesel engine.

Overall, these engine output graphs illustrate that the diesel has very specific characteristics especially with regard to torque output.

Vehicles with diesel engines are adapted to suit these torque characteristics with an upgraded torque converter and a rear axle gear ratio which allows the full utilization of the output curve.

In short, the new BMW diesel engine exceeds all of the currently available gasoline engines up to an engine speed of about 4000 rpm.



Workshop Exercise - Vehicle Walkaround

1. *Locate the following components on both vehicles (E70 and E90), look over both vehicles and fill in requested information:*

- ☐ Locate the dipstick on the E70 and E90.

Why is one red and one black?

- ☐ Look at the method of oil checking between both vehicles

What is the difference between the two?

- ☐ Locate the SCR fill points on both vehicles

Where are they located?

E70:

E90:

- ☐ Locate the additional underbody paneling on the E90

- ☐ Locate SCR reservoirs (tanks) on both vehicle and note locations:

E70: Passive Tank

Active Tank

E90: Passive Tank

Active Tank

- ☐ Locate the fuel filter
- ☐ Locate the oil filter and drain plug locations
- ☐ Locate the air filters and housings
- ☐ Open the fuel filler door and remove cap, note differences
- ☐ Examine the DPF on both vehicles and note the differences
- ☐ Note the EGR system and the differences between E70 and E90
- ☐ Note the external appearance of the E70 and compare with gasoline version:

How can you ID a diesel vehicle (without looking at the badges)?

- ☐ Note the external appearance of the E90 and compare with gasoline version:

How can you ID a diesel vehicle (without looking at the badges)?

NOTES

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