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# THE BMW GUIDE

TO WLTP TESTING AND EMISSIONS



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# INTRODUCTION

The test procedure for new vehicles has undergone its biggest change in a generation – and it's happened quickly, bringing new rules and changes for both fleet operators and company car drivers.

Phased in since September 2017, WLTP replaces the New European Drive Cycle (NEDC), which has been used to assess vehicles since 1992. WLTP introduces a more demanding drive cycle during the homologation process, aimed at

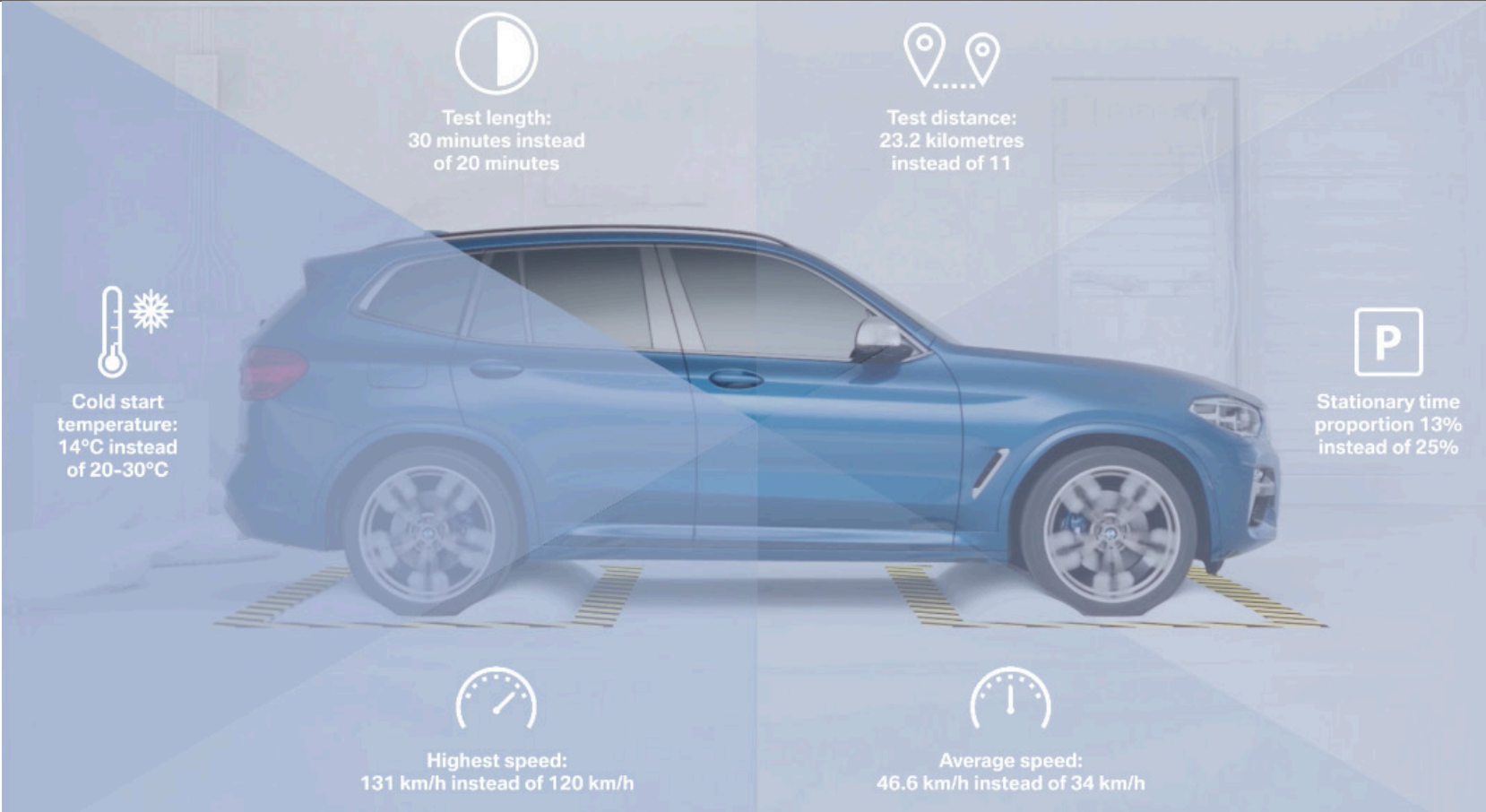
producing fuel consumption and emissions data which is more representative of on-road driving. The changes are already affecting manufacturers as it means entire model ranges had to undergo re-testing under WLTP before they could be sold in Europe. WLTP also accompanies the introduction of on-road emissions testing – Real Driving Emissions or RDE – designed to ensure compliance with the latest Euro 6 pollutant limits.

For businesses, it's vital to understand how these changes

apply to a company car fleet. In the UK the NEDC ceased to be customer-facing from 1 April 2020 for Vehicle Excise Duty and 6 April 2020 for BIK tax, with a switch to the current system based on WLTP CO<sub>2</sub> figures. From January 2021, all new cars sold in the UK have also had to comply with more stringent RDE2 emissions regulations.

This revised BMW Guide to WLTP explains the fleet implications, the detail of the changes and steps to mitigate additional costs.

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WLTP and NEDC test conditions

	NEDC	WLTP
Test duration	20 minutes	30 minutes
Distance covered	6.8 miles (11km)	14.6 miles (23.25km)
Time spent stationary	25%	16%
Test phases	Urban and extra urban with calculated 'combined' average	Low, Medium, High, Extra High, City (Electric Vehicles/ Plug-in Hybrid Electric Vehicles only), with calculated 'combined' average
Average speed	21.1mph (34km/h)	29mph (46.5km/h)
Maximum speed	74.6mph (120km/h)	81mph (131km/h)
Start temperature(s)	20-30°C	14°C and 23°C
Optional equipment	Wheels and tyres	Individually assessed
Gearshifts	Fixed	Different for each vehicle

# WHAT IS WLTP?

The full adoption of WLTP in the UK marks the end of a decade-long process to reform the way vehicles are homologated. It follows the analysis of a working group, established by the United Nations Economic Commission for Europe (UN ECE), which concluded that the NEDC – based on a system developed in the 1970s – was no longer fit for purpose, and set out a timetable for its replacement.

WLTP was introduced on 1 September 2017, from which point all new passenger model types have been assessed under the

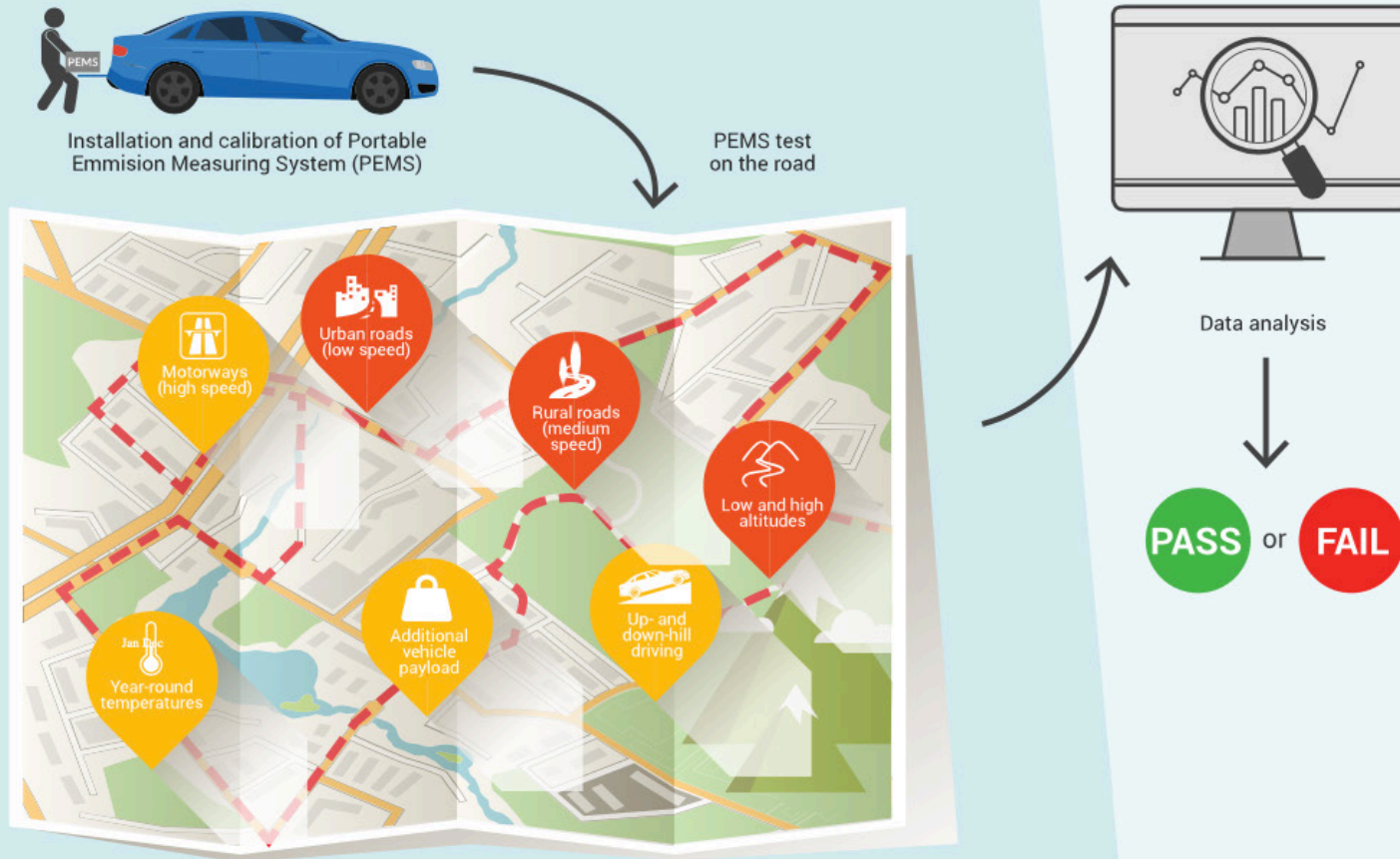
new system. The phase-in process for commercial vehicles followed 12 months later. Testing is still undertaken under controlled laboratory conditions, but the process has been revised to reflect real-world driving more accurately than the NEDC. Vehicles cover around twice as much distance, at a higher average speed, and with more aggressive acceleration and braking than under the outgoing regime. A comparison of the two test cycles is shown in the table above.

Testing encompasses four cycles, each with unique

acceleration and braking intensities to simulate different road conditions. Manufacturers also have to produce figures recognising the weight, aerodynamic and rolling resistance effects of optional equipment – such as bigger wheels and tyres, bodykits and panoramic sunroofs.

Despite this complexity, deadlines have been tight. All except run-out vehicles were required to be WLTP-tested by 31 August 2018, and since 1 January 2021 all new cars are required to be RDE2-compliant to be sold in Europe.



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### BMW EfficientDynamics

BMW Group has consistently innovated with emissions-reducing technology, delivering market-leading performance across its product portfolio. Alongside fuel-saving features introduced as part of the BMW EfficientDynamics programme, all diesel engines have featured particulate filters for more than a decade and the same technology is now being added to petrol models too.

Exhaust after-treatments for diesel engines include exhaust-gas recirculation with lean NO<sub>x</sub> traps and selective catalytic reduction (SCR), which uses a urea solution (AdBlue®) to convert nitrogen oxides (NO<sub>x</sub>) into water vapour and nitrogen.

BMW Group solutions are designed to offer effective and efficient control of pollutants, with this combination of technologies also minimising AdBlue® consumption.



# REAL DRIVING EMISSIONS (RDE)

The Real Driving Emissions (RDE) test appeared on many fleets' radars when it became part of the UK's car tax system in 2018.

Phased in alongside WLTP, RDE introduces the first on-road test element for vehicle homologations, proving emission control systems are as effective in use as they are under laboratory conditions. RDE adds a second stage to the test process, where vehicles are required to meet Euro 6 emission limits under WLTP conditions in strictly controlled laboratory conditions, followed by a separate on-road test in real traffic.

This uses a Portable Emissions Measurement System (PEMS) which analyses the particulate matter and nitrogen oxide (NO<sub>x</sub>) content of their exhaust emissions. On-road testing takes between 90 and 120 minutes, evenly split between urban, rural and motorway conditions, and vehicles must meet Euro 6 pollutant limits in all three situations.

As the process and equipment are new, RDE is being launched in phases with progressively stricter limits. Cars certified to RDE1 (Euro 6d-Temp) must emit less than 2.1 times the Euro 6

NO<sub>x</sub> limit of 80mg/km for diesel and 60mg/km for petrol engines, tightening to 1.43 times for RDE2-compliant (Euro 6d) vehicles. RDE2 compliance became mandatory for all new cars from 1 January 2021. Incentives in place to encourage fleets to opt for RDE2 compliant diesel vehicles include exemption from the 4% company car tax charge and a one-band reduction in first-year vehicle excise duty.

In 2023, it's expected that conformity factors will be removed, aligning laboratory and on-road emissions limits.





# COMPANY CAR TAX

The more dynamic driving style of WLTP affects vehicles' combined fuel consumption and CO<sub>2</sub> figures, usually despite there being limited or no mechanical changes involved.

According to a report by the European Union Joint Research Committee, petrol, diesel and hybrid (excluding Plug-in Hybrid and Battery Electric) vehicles emit an average 21% more CO<sub>2</sub> than under NEDC, with variations anywhere between 10 - 30%.

In the UK, where company car tax is based on a car's CO<sub>2</sub> emissions, fleet operators and drivers are particularly exposed to additional liability due to this change.

Proposals for the reform of company car tax were published by HM Treasury in July 2019 to accommodate WLTP changes, following a consultation process with fleet operators, and these become law in April 2020.

The changes introduced a two-tiered company car tax system based on the vehicle's date of registration.

Cars registered before 6 April 2020 are taxed according to the previous NEDC bands, while new car registrations have a WLTP-derived CO<sub>2</sub> figure.

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# COMPANY CAR TAX CONTINUED

New bands for vehicles emitting 50g/km CO<sub>2</sub> or less, and the 4% BIK tax charge for non-hybridised diesel models which don't meet Euro 6d/RDE2 requirements also apply under the new system, shown in the table *(right)*. The table shows how both NEDC and WLTP BIK tax bands align in 2022/23, with rates then frozen at that level until 31 March 2025.

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## Company car tax bands

CO <sub>2</sub> emissions (g/km)	Zero CO <sub>2</sub> emission range (miles)	2021/2022 BIK % (NEDC <sup>1</sup> )	2021/2022 BIK % (WLTP <sup>2</sup> )	2022-2025 BIK % (All) <sup>3</sup>
0	All	1	1	2
1-50	>130	2	1	2
1-50	70-129	5	4	5
1-50	40-69	8	7	8
1-50	30-39	12	11	12
1-50	<30	14 (18)	13 (17)	14 (18)
51-54	-	15 (19)	14 (18)	15 (19)
55-59	-	16 (20)	15 (19)	16 (20)
60-64	-	17 (21)	16 (20)	17 (21)
65-69	-	18 (22)	17 (21)	18 (22)
70-74	-	19 (23)	18 (22)	19 (23)
75-79	-	20 (24)	19 (23)	20 (24)
80-84	-	21 (25)	20 (24)	21 (25)
85-89	-	22 (26)	21 (25)	22 (26)
90-94	-	23 (27)	22 (26)	23 (27)
95-99	-	24 (28)	23 (27)	24 (28)
100-104	-	25 (29)	24 (28)	25 (29)
105-109	-	26 (30)	25 (29)	26 (30)
110-114	-	27 (31)	26 (30)	27 (31)
115-119	-	28 (32)	27 (31)	28 (32)
120-124	-	29 (33)	28 (32)	29 (33)
125-129	-	30 (34)	29 (33)	30 (34)
130-134	-	31 (35)	30 (34)	31 (35)
135-139	-	32 (36)	31 (35)	32 (36)
140-144	-	33 (37)	32 (36)	33 (37)
145-149	-	34 (37)	33 (37)	34 (37)
150-154	-	35 (37)	34 (37)	35 (37)
155-159	-	36 (37)	35 (37)	36 (37)
160-164	-	37 (37)	36 (37)	37 (37)
165+	-	37 (37)	37 (37)	37 (37)

Source: HMRC. <sup>1</sup> Cars registered before 6 April 2020, which use NEDC CO<sub>2</sub> figures. <sup>2</sup> Cars registered on or after 6 April 2020, which use WLTP CO<sub>2</sub> figures. Figures in brackets relate to non-hybrid diesels which are not certified as RDE2-compliant. <sup>3</sup> Rates held at this level until 31 March 2025.



# RUNNING COST IMPLICATIONS

## Fuel Consumption

Most WLTP-tested vehicles are no less economical than those using NEDC data. In fact, WLTP's tougher test conditions can highlight ongoing improvements in efficiency and enable more accurate whole-life cost modelling as it uses data which better reflects real-world use.

## Benefit-in-Kind Tax (BIK tax)

In 2021/22, zero-emission cars are liable for BIK tax at just 1%, while a one percentage-point BIK reduction for WLTP-models

compared with NEDC cars gives a further incentive for those selecting a new model to change earlier.

BIK tax rates for both NEDC and WLTP-tested cars align in 2022/23 and are then held at that level until 31 March 2025.

## Vehicle Excise Duty (VED)

Vehicle Excise Duty is based on WLTP CO<sub>2</sub> emissions data from 1 April 2021, but the bands have not altered to accommodate the changes.

## Capital Allowances

From 1 April 2021, a 100% first-year Write Down Allowance (WDA) against tax applies to zero-emission cars, while an 18% WDA applies to cars with CO<sub>2</sub> emissions of 1-50g/km. A 6% WDA applies to cars with CO<sub>2</sub> emissions of 51g/km or more. Lease rentals can also be offset, with the threshold at 50g/km of CO<sub>2</sub> with new cars with CO<sub>2</sub> emissions of 50g/km or less eligible for a 100% First Year Allowance (FYA); only 85% is claimable for those with CO<sub>2</sub> emissions of 51g/km or more. Leasing companies cannot claim the FYA.





## MORE REASONS TO PLUG IN

Fleets account for half of all new vehicles registered in the UK, and HM Treasury sees them playing a vital role in the ongoing transition to low-emission drivetrains.

WLTP has a specific test cycle for plug-in vehicles, with a unique 'City' phase designed to represent urban-area driving and weighted average fuel consumption and CO<sub>2</sub> figures calculated by the car's zero-emission electric range, which underpins its ability to drive on battery power for a large share of its journeys.

As a result, CO<sub>2</sub> figures for Plug-In Hybrid Electric Vehicles are often no higher than they were under NEDC.

HM Treasury first announced a staged set of BIK tax bands for cars emitting 50g/km of CO<sub>2</sub> or less in 2017, based on CO<sub>2</sub> emissions and electric range. The WLTP tax reforms from April

2020 extended the BIK band reductions to these vehicles. For 2021/22 the lowest BIK band is 1%.

Cars emitting 50g/km of CO<sub>2</sub> or less and offering a zero-emission electric range of more than 130 miles qualify for the 1% BIK tax rate from 6 April 2021, even if they were registered before that date.

### **Financial support for plug-in fleets**

**Grant funding\*** The Government Plug-in Grant scheme applies to zero emission cars, motorcycles, taxis and vans. Cars with a price of £35,000\* or less with zero CO<sub>2</sub> emissions are eligible for a Grant of up to £2,500 against their purchase price. Homeowners and businesses can also claim up to £350, or 75% of the installation cost, for a workplace charging point.

\*Figures correct at April 2021

**Benefit-in-Kind** April tax reforms incentivise drivers and fleets to choose low-emission vehicles, with bands weighted by electric range. Drivers selecting a zero-emission electric company car benefit from BIK tax at just 1% in 2021/22, while VED rates are zero-rated. Drivers charging at work also do not pay BIK tax on the electricity used.

**Capital allowances** Businesses can claim a 100% first-year allowance for cars emitting 0g/km CO<sub>2</sub>, or for the cost of installing workplace charging points. The 18% allowance applies to cars with CO<sub>2</sub> emissions of 1-50g/km, with a 6% allowance applying to cars with CO<sub>2</sub> emissions of 51g/km or more. See previous page for details of the new 130% 'super allowance' announced in Budget 2021. Go to [www.gov.uk/government/organisations/office-for-zero-emission-vehicles](https://www.gov.uk/government/organisations/office-for-zero-emission-vehicles) for further information.