

LoCITY

TOOLBOX TALKS



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TOOLBOX TALK 1

Recharging an electric vehicle

This toolbox talk covers the different electric chargers currently available and answers a few common questions.

What types of chargers are available?

Electric vehicle charging has changed a lot since the first public stations were installed in the mid-2000s, as have the regulations and safety standards.

That means there are different charging modes and connections for different vehicles, applications and requirements, so it's important you know exactly what type of charger you need.

It's also essential that you use a dedicated charging point – vehicles should never be charged from a domestic three-pin plug, as they don't provide the recommended overload protection.

There are three main charge point speed types:



Slow up-to-7kW chargers

- Likely to be used at home or in the workplace
- Uses AC electricity, as supplied to UK homes
- Can recharge a typical electric car battery from empty to full in six to eight hours



Fast 7-22kW chargers

- Require a dedicated three-phase AC feed
- Can recharge a typical electric car battery in one to two hours



Rapid chargers

- Available as 43kW AC, 50kW DC or 120kW*
- Require a dedicated three-phase AC feed
- Can charge a typical electric car from empty to around 100% in just 30 minutes
- Best for vehicles that need rapid turnaround times, like electric taxis or courier vans on shift

*120kW high-power chargers are available from Tesla that provide rapid DC charging to drivers of their cars.

Why do some charge points have more than one plug?

In addition to the different charging speed types currently in use, there is also a wide variety of plug types (or connectors), each suitable for different charging speeds and vehicle models.

For this reason, some charge points provide more than one plug to allow drivers to use the appropriate connector for their vehicle.

It's important you know which connector(s) works with your vehicle so you can find the correct plug type at charge points you want to use.





Slow Charging Connectors



3-Pin
3kW AC



Type 1
3kW AC



Type 2
3kW AC



Commando
3kW AC



Fast Charging Connectors



Type 1
7kW AC



Type 2
7 - 22kW AC



Commando
7 - 22kW AC



Fast Charging Connectors



CHAdeMO
50kW DC



CCS
50kW DC



Type 2
43kW AC



Tesla Type 2
120kW DC

Is it safe to charge or park an electric vehicle in the rain in a puddle?

Water and electricity don't normally mix well, so it's often wrongly assumed that electric vehicles and puddles are a dangerous combination.

It will always be completely safe to charge or park your vehicle in a puddle. Most workplace and public charging is done from dedicated waterproof cables and sockets that have vehicle-to-charge point communication and current protection – known as Mode 3 or Mode 4 charging.

This means that no current will flow in the charging cable unless a full, secure communication is established between the vehicle and the charge point, with it plugged in correctly and with the cable in a good condition. There should only be an issue if the cable is damaged or poorly insulated, and should not be used in these cases.

And when it comes to rain, all plugs are weatherproof and vehicles can be charged – and left plugged in – with no issues.

Can I install my own charge point?

All public, domestic and workplace charge points should be professionally fitted in safe locations with appropriate signage, with the owner of the recharging station responsible for ensuring it conforms to current regulations.

Domestic units will involve a wall mounting of the charge point on an exterior wall or garage, connecting to the mains electricity supply with specialist hardware.

I have a pacemaker. Can I recharge an electric vehicle?

Like almost all electrical and communications equipment, electric vehicle chargers emit electromagnetic interference or radio frequency interference that can affect nearby equipment – including pacemakers.

Fortunately, newer rapid chargers are housed in all-metal enclosures and feature shielding on their cables, meaning they comply with recommendations on emissions from low-frequency electric fields made by International Committee on Non-Ionizing Radiation Protection and are safe for people wearing pacemakers.

While these models shouldn't interfere with your pacemaker, earlier rapid chargers were often not encased in all-metal enclosures and therefore carry warning labels as a precaution.

If you wear a pacemaker, you should always read the instructions before using any rapid charging equipment, especially if the device looks older.



TOOLBOX TALK 2

Refuelling and using a gas vehicle

This toolbox talk explains the different gases available for vehicles and answers common questions around refuelling and where restrictions exist.

What types of gas vehicles are there?

Natural gas and liquefied petroleum gas (LPG) vehicles have been around for many years and are a far more common sight in other countries than in the UK, so there are well-established regulations and safety standards for refuelling stations.

In addition to natural gas and LPG vehicles, the advice in this toolbox talk also covers compressed natural gas (CNG) and hydrogen vehicles and refuelling stations.

What gases are available for gas vehicles?



LPG: **Liquefied Petroleum Gas**

LPG consists mainly of propane, propylene, butane and butylene, and can vary widely in composition leading to variable engine performance. Stored in pressurised steel bottles, LPG can potentially explode. As LPG has a lower energy density to petrol, the fuel consumption is often higher.



CNG: **Compressed Natural Gas**

CNG consists mostly of methane and is a natural gas, meaning this is lighter than air. As such, in the event of a leak, it will often dissipate, giving it a significant safety advantage over LPG.



LNG: **Liquefied Natural Gas**

Also a natural gas, LNG is stored between -120°C and -170°C. This can mean a higher cost due to the storage on vehicles and infrastructure requirements of dispensing stations. On the other hand, due to its energy density, LNG is comparable to petrol and diesel, meaning extended range and reduced refuelling.

How are gas vehicles refuelled?

Refuelling a gas vehicle involves the transfer of fuel from storage to the vehicle's fuel tank via a dispenser.

That's similar to refuelling a diesel or petrol vehicle – but because gaseous fuels present a different set of risk and safety precautions, there are a few specific things to bear in mind when it comes to gas refuelling.

What safety measures should be in place?

The safety equipment required for each fuel and station is defined by the station's operator as part of its risk assessment.

In some instances gas, like LPG, will be dispensed from a public forecourt without the need for training or specialist equipment. The integrated shield on the filler valve protects the user and lugs ensure a tight connection before any gas is released.

Occasionally, using liquefied natural gas stations as an example, higher levels of safety are required. Typical measures include:

- The use of personal protective equipment, such as goggles, gauntlets, long sleeves, long trousers and lace-up boots
- An exclusion zone around the station where smoking or naked flames and ignition sources are prohibited
- A bundled (i.e. walled) area around the station in case of spillages

Can I drive a gas vehicle through tunnels?

When it comes to what type of vehicle you can drive through tunnels, there's a crucial difference between those powered by gas and those transporting gas.

It comes down to load limits, tunnel categories and restriction codes – so it's important you understand the rules and regulations for your cargo and plan in advance which tunnels you want to drive through. In some rare instances, like Eurotunnel, gas-powered vehicles (even when empty) are prohibited to travel so additional restrictions may apply for some business journeys.

What regulations apply to gas vehicles and tunnels?

The International Carriage of Dangerous Goods by Road regulations, commonly known as ADR, separate tunnels into five tunnel categories from A to E. You can check the ADR categories of major tunnels on the UK government website.

Tunnels also have restriction codes – a series of letters that govern what substances can be transported by vehicle through a specific tunnel. Hydrogen, liquefied petroleum gas and natural gas all have the tunnel restriction codes B/D, which mean that:

- Vehicles – like tankers – carrying large quantities of hydrogen, liquefied petroleum gas and natural gas can't be driven through tunnels of categories B and C
- But vehicles that are fuelled by gas and not carrying large quantities are allowed through all tunnels.

TOOLBOX TALK 3

Defining a low emission vehicle

With emission-controlled zones set to expand across the UK, it's becoming more important to know where and when your vehicle will be considered low emission.

What standards govern vehicle emissions?

Euro engine standards set limits for the amount of air quality pollutants, such as nitrogen oxides, that can be emitted by a vehicle.

Every few years, tighter standards are brought out. We're currently on the Euro 6 standard for light-duty vehicles (cars and vans) and the Euro VI standard for heavy-duty vehicles – so remember that it's numbers for smaller vehicles, but Roman numerals for heavier ones.

As a general rule of thumb, the more modern the vehicle, the higher its Euro Standard will be – and the cleaner its engine should be. You can learn more from **Toolbox Talk 1: Environmental Awareness** in the LoCITY Fleet Manager Toolkit, available on the LoCITY website.

So what's a low emission vehicle?

There's currently no agreed national definition for a low emission vehicle. Until that is resolved, it's sensible to use emission levels you need to meet to enter certain parts of London without penalty.

Alternatively fuelled vehicles generally have lower exhaust emissions than diesel so in the future will be able to freely access more parts of London. In rough terms:

- A low emission vehicle is one that uses an alternative fuel or technology to petrol or diesel and provides a CO₂ or air quality benefit
- An ultra-low emission vehicle is one that has some zero-emission range, like being able to run on electricity alone for a given distance
- A zero-emission vehicle is a pure electric vehicle that is allowed into any emission zone or clean air zone

Ultra-low emission vans are eligible for the government's plug-in van grants if they emit less than 75g of CO₂/km from the tailpipe and have a zero-emission range of at least 10 miles.



What are low-emission zones?

The government's 'Road to Zero' strategy wants all new cars and vans to be effectively zero emission by 2040. However, to do so, there is a need to provide more alternative fuelled options, especially for heavier vehicles operating in urban environments.







Clean Air Zones will be used to improve air quality in England. To date, the five cities of Birmingham, Derby, Leeds, Nottingham and Southampton are aiming to introduce Clean Air Zones (CAZs) by 2020. On a national level, London's Ultra Low Emission Zone (ULEZ) should be considered a CAZ.

These zones aim to reduce the exhaust emissions of commercial vehicles by penalising vehicles that do not conform while allowing free access to those that meet cleaner standards. Most cities' plans are still under discussion, but we expect that most will require vans and HGV to be Euro 6/VI standard to enter an urban centre without charge.

What low emission zones exist or are planned for London?

London has different zones being introduced in phases by both Transport for London (TfL) and local authorities, with the overall objective of making London a zero-carbon city, i.e. no exhaust, by 2050. Being familiar with these areas will ensure you can avoid extra charges by driving a suitable vehicle.

Key

-  Inner London area
-  Low emission zone (LEZ)
-  Congestion zone (CCZ)
-  Ultra low emission zone (ULEZ)
-  Low emission neighbourhoods
-  Proposed ultra low emission zone expansion



Low Emission Zone (LEZ)

- 24 hours a day
- Covers most of Greater London
- Larger vans and minibuses need to meet Euro 3 standards while HGVs need to be Euro IV in order to avoid a charge. This will be tightened from October 2020 to Euro VI and Euro 6.
- This means most operators' vehicles are exempt from the charge
- The daily charge is £100 for larger vans and £200 for HGVs (as of September 2018)

Congestion Charge Zone (CCZ)

- 07:00 and 18:00 weekdays
- Covers central London
- Vans of 3.5 tonnes gross vehicle weight or lower that emit 75g/km or less of CO₂ and meet the Euro 5 standard qualify for a 100% discount once registered
- £11.50 daily charge (as of September 2018)

Ultra Low Emission Zone (ULEZ)

- Introduced from 8 April 2019
- 24 hours a day
- Covers central London but from October 2021 will expand to inner London bounded by the North and South Circular
- To not pay a charge diesel vans will need to be Euro 6/VI standard, petrol vehicles to be Euro 4, and Euro VI for lorries, buses and coaches and specialist heavy vehicles
- Daily charge, in addition to CCZ charge, is £12.50 for vehicles of 3.5 tonnes gross vehicle weight or lower, or £100 for lorries, buses and coaches

Zero Emission Zones (ZEZ)

- Options are being considered for London. These will vary in scale and criteria until national standards for implementation are introduced.

Example ZEZ - City Fringe Low Emission Neighbourhood:

- Introduced from 3 September 2018
- Borough roads within Islington, Hackney and Tower Hamlets
- Operates between 7am-10am and 4pm-7pm Monday to Friday
- Access restricted to vehicles that emit less than 75g/km CO₂
- Non-conforming or unregistered vehicles entering during restricted hours will be issued £120 penalty charge (as of September 2018)

