Ministry of Infrastructure
and Water Management

Dutch framework for Light Electric Vehicles (LEVs)

Introduction

An increasing variety of light vehicles use our roads and cycle paths. Bicycles are the most numerous (there are approximately 23 million bikes in the Netherlands, including more than three million electric bikes or “e-bikes”), followed by motor scooters and mopeds (of which there are approximately 1.6 million).

More innovative Light Electric Vehicles (LEVs) are also being launched, including e-scooters and various types of cargo and carrier bikes. These new vehicles can potentially help society achieve some of its goals relating to, for instance, accessibility, recreation and sustainability, provided their technical safety and use on the road is properly guaranteed.

Unlike for bicycles, motor scooters, mopeds and speed-pedelecs, there is no EU legislation laying down requirements for LEVs. These vehicles may be used on the road only if they comply with the Netherlands’ Administrative Rules on the Designation of Special Mopeds. The Dutch Safety Board (OVV) observes the need for a more targeted framework for the various types of LEV, and therefore recommends investigating whether electric bikes and electric cargo bikes should be covered by a new national authorisation framework.[1]

The goal of the framework is to ensure that LEVs authorised for use are technically safe, and that they are used safely on the road. Consumers will know which LEVs they are allowed to use on the road, manufacturers will know what technical requirements vehicles must meet, and road management authorities will know what vehicles they can expect to see on the roads. LEVs which are already authorised for use on the road and which are to be covered by the new framework will be subject only to the user requirements. Consumers may therefore continue to use these LEVs on the road, provided they comply with new rules for their use. Manufacturers and retailers will have time to comply with the new LEV framework, under a transitional scheme to be agreed with the relevant stakeholders.

This document explains how the Dutch LEV framework is structured and which choices have been made, starting with the relationship between EU rules and the new national framework.

1 House of Representatives, 2019-2020 session, 29 398, no. 758 blg-905952.

European framework

EU rules apply to the authorisation of vehicles for use on the road. Regulation (EU) no. 168/2013 sets out the requirements for two- or three-wheel vehicles and quadricycles. Mopeds (including speed-pedelecs and electric scooters with seats) and motorised quadricycles are covered by the Regulation. An independent approval authority assesses whether a vehicle complies with the EU requirements, and thus whether it is allowed on the roads. In the Netherlands, these vehicles have a blue or yellow number plate. The number plate indicates the national requirements applying to the use of the vehicle (helmet, driving licence) and its position on the road (main road or cycle path for example).

Vehicles intended for persons with a physical disability, certain electric bikes, vehicles without a seat and self-balancing vehicles are not covered by the Regulation. Member states may therefore introduce their own national requirements for these vehicles, in so far as this is possible under EU law (taking into consideration legislation in other areas such as the Machinery Directive). A separate national framework is being developed for vehicles intended for persons with a physical disability. The LEV framework focuses on electric vehicles not covered by the EU framework.

The ultimate aim is to arrive at an EU framework for LEVs in order to prevent a patchwork of different rules developing in different member states. As soon as an authorisation framework for LEVs is available at EU level, elements of this national framework (particularly the technical requirements) will cease to apply. However, it will take some time for the European process to be completed. Talks of an EU framework for LEVs are still at an early stage, so it is important for this national framework to provide clarity in the Netherlands in the meantime.

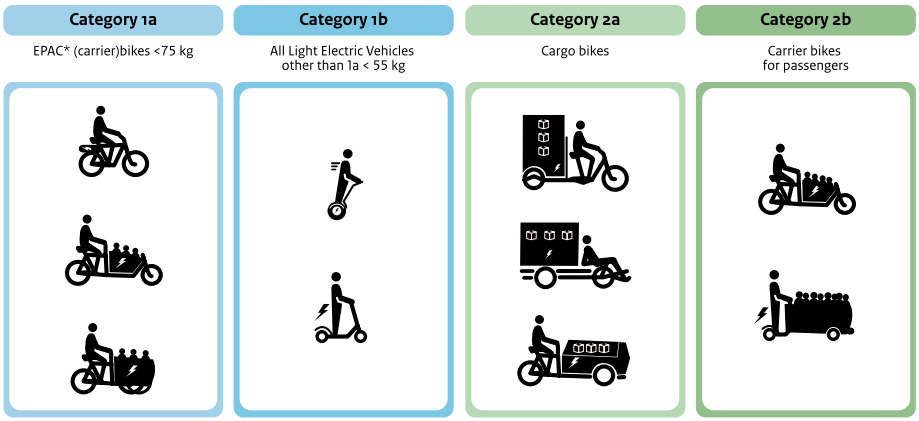
Dutch LEV framework

This LEV framework is the result of an extensive consultation process and various studies involving relevant stakeholders and experts, such as the Dutch Institute for Road Safety Research (SWOV) and the Netherlands Vehicle Authority (RDW).

The LEV framework sets specific requirements for various categories of LEV in terms of technology (vehicle), users (people) and introduction into existing traffic (environment). The same requirements apply to all LEVs in the same category. This ensures a level playing field. The LEV-framework is divided into four categories, of which the two main categories are based on kerb mass (mass of the vehicle with batteries without load). The effect kerb mass has on other road users in case of an accident (kinetic energy) is the main reason for these categories.

The requirements have been converted into three sets of rules for each category: for the method of authorisation and surveillance, for admission to the road network and for use on the road. Together, the categories and sets of rules form the outline of the LEV framework.

Categorisation of LEVs



** Electrically Power Assisted Cycle*

Elaboration of the LEV framework

The LEV framework was fleshed out on the basis of the following principles:

- Road safety first: technology, people and infrastructure have been considered as a whole, as recommended by the Dutch Safety Board (OVV). Where safety considerations allowed for it other societal goals, such as sustainability, innovation and health were taken into account as much as possible.
- Clear division of roles between policymakers and implementing organisations: the government sets the rules, while technical vehicle assessment for the purpose of authorisation is left to independent experts.
- Clarity and predictability: the aim is for rules to be as uniform and as clear as possible so that consumers, manufacturers, road authorities and enforcement authorities know where they stand.
- Proportionality: the rules must not impose an unnecessarily heavy burden on consumers, manufacturers or implementing organisations.
- Consistency: consideration was given to the rules for similar categories of vehicles and to developments at EU level and in neighbouring countries. This is important because manufacturers export their products to several countries, and in the case of a future EU framework.

Specifically for electric bikes and small electric cargo bikes: category 1a
Category 1a covers the current generation of electric bikes and small electric cargo bikes with full pedal assistance, intended mainly for use by families, to transport groceries or young children. Larger electric cargo bikes fall into category 2. The limit is 75 kg for the vehicle and no more than three children may be carried as passengers. Category 1a vehicles with full pedal assistance, have a maximum power of 250 Watt. Vehicles with pedal assistance with more power fall under Regulation (EU) no. 168/2013 (1,000 or 4,000W) and are therefore not covered by the LEV framework.

This framework does not introduce any changes to the method of authorisation and surveillance or requirements for use on the road. In terms of admission to the road, the only change is that the width of electric bikes and small electric cargo bikes has been reduced from 1.5 metres to 1 metre, so that they are safer for use on cycle paths.

Specifically for LEVs for personal transport like electric scooters: category 1b
Category 1b is for all LEVs for personal transport without full pedal assistance which weigh less than 55 kg. The 55 kg limit on the maximum mass of LEVs in category 1b is based on the German national framework for this type of LEV. With this mass, a vehicle that has broken down due to blocked wheels, for example, can still be pushed or pulled to a safe place. The maximum width for LEVs in this category will be 0.75 metre, the length 2 metres and the height 1.5 metres. Drivers of these vehicles must be at least 16 years old, the same as currently also applies to special mopeds. Category 1b vehicles are likely to require more power for the vehicle to be propelled. To ensure a more homogenous speed on cycle paths, the maximum rated power is 400 Watt with a maximum acceleration of 1,5 m/s².

Vehicles without hand steering and/or with a single wheel such as the EUC and the Onewheel do not fall under any of the categories in the LEV framework because of the safety risks that are observed in the use of these vehicles. The Netherlands Vehicle Authority (RDW) indicates that this type of vehicle requires different technical requirements and drivers require different skills. A recent report by the Mobility Expertise Centre confirms this.[2] After four weeks of practice it is still difficult for users of these vehicles to make an emergency stop and maintain control over the vehicle. It has also been pointed out that they are involved in many accidents (albeit generally not with serious consequences). According to a previous report published by TNO, given the fact that braking capacity depends on the skills of the user, it is not desirable from a safety point of view that these vehicles be used on public roads. More forceful braking can cause the user to lose their balance, resulting in a fall. A group of independent experts has been asked to explore whether these vehicles could be safely admitted to the road network if specific requirements are set for the technology and users, and if they can safely join current traffic.

Specifically for LEVs for transporting goods and people: categories 2a and 2b
A maximum width of 1 metre, and a maximum length of 3 metres and a maximum height of 2 metres will apply to both these categories of LEV (categories 2a and 2b), which include all heavier electric cargo bikes and electric carrier bikes used by childcare centres. Also category 2 vehicles without pedal assistance are likely to require more power for the vehicle to be propelled. To ensure that heavy loaded vehicles can accelerate from stand still like standard bikes on cycle paths, the maximum rated power is 1250 Watt with a maximum acceleration of 1,5 m/s².

2 Op weg met LEV: de rol van lichte elektrische voertuigen in het mobiliteitssysteem
Publicatie | Kennisinstituut voor Mobiliteitsbeleid (kimnet.nl).

A LEV in category 2b has a maximum of eight seats, in accordance with the current Administrative Rules on the Designation of Special Mopeds. An exemption was originally granted for the 'BSO Bus', a special moped used by childcare centres which is allowed to carry up to 10 children, in combination with a voluntary agreement between the Ministry of Infrastructure and Water Management and the childcare sector concerning driving skills and the use of safe routes. One of the points agreed was that the number of children would be reduced to eight when the new LEV framework comes into effect. There is currently no maximum limit on the number of children that can be carried in electric carrier bikes, but a maximum of eight seats will be introduced.

In order to ensure clarity and consistency a driving licence requirement will be introduced for LEVs used for passenger transport. Due to the fact that these are relatively heavy vehicles that pose a greater risk to the driver, passengers and other road users, drivers of heavier LEVs used to transport goods will be treated the same as drivers of LEVs used for passenger transport. To drive either category of vehicle, the driver must be 18 or older and have a moped licence (category AM driving licence). People with a licence to drive a car (category B licence) are automatically permitted to drive a moped. They too may use this category of LEV.

It is currently being explored whether, and if so how, driving skills can be further ensured for category 2 vehicles, in what timeframe measures could be introduced, and what this would mean in terms of implementation.

From e-scooter to large e-cargo bike: similarities between categories 1b, 2a and 2b
In order to guarantee their safety, admission to the road of these LEVs is based on type-approval, and surveillance (monitoring of the manufacturing process). This process is overseen by the Netherlands Vehicle Authority (RDW), which is an independent approval authority. This approval system was chosen because these are either new types of vehicles, such as e-scooters, with which we have little experience, or vehicles which are relatively large and heavy and, in some cases, are used to transport children. A detailed sets of technical requirements has been drawn up for each of these three categories, covering things like brake efficiency, steering and power. The aim is to keep the speed as similar as possible to that of cyclists, in order to reduce variations in speed on cycle paths.

For use on public roads, these LEVs will need a number plate and will be subject to the Civil Liability Insurance (Motor Vehicles) Act (WAM). Use of a helmet will not be mandatory, in line with the rules that apply to electric bikes and special mopeds.

A maximum design speed of 25km/h applies to all categories of LEV. This is consistent with EU legislation on e-bikes, and is the same as the maximum design speed for special mopeds. This does not mean that all LEVs will travel at this speed. It is initially up to manufacturers to decide on an appropriate maximum design speed for the type of vehicle. The maximum speed will also be checked in the approval process.

Place of LEVs on the road

In principle, LEVs should currently use the cycle path. The speed difference on roads with maximum speeds of 50 km/h is too high. For other road users, particularly pedestrians, the framework will make clear that LEVs are not permitted on pavements or in (other) pedestrianised areas. Municipal authorities have some discretion in what they can allow, and can put up signs indicating when and where these vehicles may be used.

Research has been conducted in collaboration with road management authorities on the heavy e-cargo bike to establish the possibilities for local discretionary measures concerning place on the road. In this study, options are compared with the 'zero option', in which the cycle path remains the place for the heavy e-cargo bike on the road. The main conclusions of the study are:

- The most important preconditions for traffic rules are that they are clear and predictable for all road users and that they are enforceable. These preconditions are at risk in the scenario where heavy e-cargo bikes are no longer allowed on the cycle path, because the number of heavy e-cargo bikes is still small (approximately 10,000 vehicles in 2022) and they are visually difficult to distinguish from light e-cargo bikes that must stay on the cycle path.

- Safe use is an important goal of the LEV framework. Overall, the heavy e-cargo bike on the cycle path is the most favourable for road safety. At speeds of up to approx. 30 km/h, vehicles with large differences in mass can be safely mixed. With speeds of up to 25 km/h for the e-cargo bike, the speed difference with motorized traffic on a 50 km/h carriageway is too great, whilst the speed on the cycle paths will remain under 30 km/h.

- On 30 km/h roads with separate cycle paths where the limit is properly observed, the heavy e-cargo bike could travel safely on the roadway. However, as indicated in the first conclusion, this would not make for clear and predictable rules, nor be (easily) enforceable. Moreover, there are few 30 km/h roads with separate cycle paths and it appears that the speed limit is frequently exceeded on these roads.

Implementation in Dutch law

The outline of the framework was finalised by the end of 2021. Currently, we are preparing legislation and further developing the framework. Our ambition is to submit our legislative proposals to Parliament in 2023. After the approval of the Dutch Parliament, the framework has to be implemented in various laws and regulations. Currently no clear timeline exists for when the LEV framework will come into force, but a transition period will be observed.

Schematic overview Dutch LEV framework

	Category 1a	Category 1b	Category 2a	Category 2b
	EPAC* (carrier)bikes <75kg	All Light Electric Vehicles other than 1a < 55 kg	Cargo bikes	Carrier bikes for passengers
Method of admission and supervision				
Method of admission	Self-certification	Approval	Approval	Approval
Surveillance method	Market	Manufacturer	Manufacturer	Manufacturer
Baseline	EU Machine Directive / EN 15194	EU 168-2013 / Designating specialmopeds / EN 17128 / German norm + integrated risk assessment	EU 168-2013 / Designating special mopeds + integrated risk assessment	EU 168-2013 / Designating special mopeds + integrated risk assessment
Admission requirements				
Maximum Measurements LxWxH	2 wheels: 3 x 0,75 x 2 m | > 2 wheels: 3 x 1 x 2 m	2 x 0,75 x 1,50	3 x 1 x 2 m	3 x 1 x 2 m
Maximum construction speed	> 6 km / h and < 25 km/h	> 6 km / h and < 25 km/h	> 6 km / h and < 25 km/h	> 6 km / h and < 25 km/h
Max. mass	Max. kerb weight <75 kg, total max. mass: 250 kg	Max. kerb weight <55 kg, total max. mass: 140 kg	Max. kerb weight 270 kg or 425 kg for more wheels, total max. mass: 565 kg	Max. kerb weight 270 kg or 425 kg for more wheels, total max. mass: 565 kg
Performance	< 250 W	< 400 W	Pedal assistance: < 250W, No pedal assistance: <1250 W	Pedal assistance: < 250W, No pedal assistance: <1250 W
Number of persons	1 driver, max. 3 passengers	1 driver	1 driver	1 driver, max. 8 passengers
Requirements for road usage				
License plate	No license plate	License plate	License plate	License plate
Insurance	third-party liability insurance	Motor Vehicle Liability Insurance Act	Motor Vehicle Liability Insurance Act	Motor Vehicle Liability Insurance Act
Helmet	No	No	No	No
Drivers license	No	No	AM	AM
Minimum age	No	16 yrs	18 yrs	18 yrs

** Electrically Power Assisted Cycle*

Relevant documents (all in Dutch):

Research reports:

General
Licht Elektrische Voertuigen (LEV) door de ogen van de wegbeheerder – Stand van zaken Outline LEV-kader
Rapport | Rijksoverheid.nl

Op weg met LEV: de rol van lichte elektrische voertuigen in het mobiliteitssysteem
Publicatie | Kennisinstituut voor Mobiliteitsbeleid (kimnet.nl)

Power and acceleration of LEVs
bijlage-4-notitie-tu-delft-vermogen-van-levs.pdf (overheid.nl)

Impactanalysis LEVs
bijlage-5-notitie-impactanalyse-nationaal-toelatingskader-lichte-elektrische-voertuigen.pdf (overheid.nl)

Place of LEVs on the road
Kamerbrief over onderzoeksresultaten Plaats op de weg zware e-bakfiets
Kamerstuk | Rijksoverheid.nl

Technical requirements
Afschrift brief RDW Motivatie keuringsregime en COP door de RDW voor LEV-categorie 1b
Rapport | Rijksoverheid.nl

Commentaar op het concept technische eisen LEVs
Rapport | Rijksoverheid.nl

Beknopte evaluatie Concept Technische Eisen LEV
Rapport | Rijksoverheid.nl

Beoordeling van concept technische eisen nieuw LEV kader categorieën 1b, 2a en 2b
Rapport | Rijksoverheid.nl

Letters to Dutch Parliament:

July 2021
Kamerbrief over kader Lichte Elektrische Voertuigen
Kamerstuk | Rijksoverheid.nl

November 2021
Beantwoording feitelijke vragen over het kader Lichte Elektrische Voertuigen
Kamerstuk | Rijksoverheid.nl

April 2022
Kamerbrief over stand van zaken verkeersveiligheid
Kamerstuk | Rijksoverheid.nl