RULES & REGULATIONS ON ELECTRIC CYCLES IN EUROPEAN UNION

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White Paper

White Paper: rules and regulations on electric cycles in the EU

Rules & Regulations on Electric Cycles in European Union

Photo Trek

UPDATED WHITE PAPER ON ALL ELECTRIC BICYCLE RULES AND LEGISLATION

As a follow-up on the first edition published by Bike Europe a few years ago, this White Paper offers an updated and detailed overview of all rules and regulations governing electric bicycles.

One of the major changes concerns the technical regulations resulting from the new type-approval, which has become definitely effective in January 2017.

All electric bikes, except those with assistance up to 25 km/h and a maximum continuous rated power of 250W, must comply with the European harmonised technical rules laid down in type-approval legislation. 2016 was a transition year during which manufacturers could choose between type-approval according to Directive 2002/24 or according to Regulation 168/2013. Since January 2017, all new electric bikes subject to type-approval must comply with the rules laid down in Regulation 168/2013 and its delegated and implementing acts, before they can be distributed on the European Union.
Electric bikes approved according to the 2002-system may still be made available on the market, registered or entered into service until 31 December 2019.

The new Bike Europe White Paper contains all details on type approval Regulation 168/2013, including full details on the categorization of different types of electric bicycles. Furthermore, the White Paper has full updated details on rules and legislation governing electric bicycles with 250W and assistance up to 25 km/h.

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PART 1:

TECHNICAL RULES SPECIFICALLY FOR ELECTRIC CYCLES: TYPE-APPROVAL AND CEN-STANDARDS

1. TYPE-APPROVAL

A. TYPE-APPROVAL SCOPE

For clarity, in the following text pedelec means a bicycle with a motor that only functions on condition the cyclist pedals, whilst e-bike means a bicycle that can be propelled by the motor itself irrespective of the cyclist pedalling. The term electric (bi)cycle is generic and includes pedelecs, e-bikes and combinations of these types.

In principle, all electric cycles with two, three or four wheels come under the type-approval as set out in Regulation 168/2013, the three supplementing, technical Regulations and the implementing, administrative Regulation. However, article 2 of Regulation 168/2013 excludes the following categories of electric cycles from type-approval:

(d) vehicles exclusively intended for use in competition;
(g) vehicles primarily intended for off-road use and designed to travel on unpaved surfaces;
(h) pedal cycles with pedal assistance which are equipped with an auxiliary electric motor having a maximum continuous rated power of less than or equal to 250 W, where the output of the motor is cut off when the cyclist stops pedalling and is otherwise progressively reduced and finally cut off before the vehicle speed reaches 25 km/h
(k) vehicles equipped with any seating position of the driver or rider having an R-point height ≤ 540 mm in case of categories L1e, L3e and L4e or ≤ 400 mm in case of categories L2e, L5e, L6e and L7e.

Electric mountain bikes are not in the type-approval. Photo Haibike

Because of the above, electric bikes used for competition, electric mountain bikes, pedelecs 25 km/h – 250 W and electric recumbent cycles with a seat height below the specified limits are not in the type-approval. Furthermore, article 2 excludes self-balancing vehicles and vehicles without a seating position. This exclusion paved the way for CEN, the European standardization institute, to start up the development of a European standard for these two vehicle types. Consequently, working group 4 of CEN/TC 354 "Light electric vehicles and self-balancing vehicles" is currently developing such a standard.

L-category	Technical specifications	Number of wheels
L1e-A – "powered cycles"	Max. power: > 250 W – < 1 kW Max. speed: 25 km/h Pedal assistance + Motor only	2, 3 and 4 wheels
L1e-B – "mopeds"	Max. power: < 4kW Max. speed: 45 km/h Pedal assistance + Motor only	2 wheels
L2e – "three-wheel moped"	Max. power: < 4kW Max. speed: 45 km/h Pedal assistance + Motor only Max. mass: <270 kg Max. 2 seats	3 wheels
L6e – "light quadricycle"	Max. speed: 45 km/h Pedal assistance + Motor only Max. mass: <450 kg Max. 2 seats	4 wheels

B. TYPE-APPROVAL CATEGORIZATION

For the type-approval, Regulation 168/2013 classifies the vehicles in 7 different categories. Depending on their speed limit, power limit and number of wheels, electric cycles come under 4 different categories as detailed in the table below.

C. TYPE-APPROVAL REQUIREMENTS FOR ELECTRIC CYCLES

L1e-A – "powered cycles" is a new category, which has been introduced into type-approval through Regulation 168/2013. The category L1e-A did not exist in the type-approval following Directive 2002/24. It has been set up to accommodate electric cycles, both pedelecs and e-bikes, with a speed limit of 25 km/h and a power limit that exceeds 250W with a maximum of 1kW.

The other three categories did exist in the previous system and were originally set up for conventional mopeds and motorcycles. Consequently, the technical requirements for these categories were not adapted to electric cycles. A number of stakeholders, such as ETRA, AVERE and CONEBI

negotiated with the Commission on adapted technical requirements for electric cycles in the L1e-A and B categories.

The system is not perfect yet, so in the next couple of years, further updating and improving will be required. The table below lists all requirements from which electric cycles are excluded, as well as those requirements which have been adapted to better suit electric cycles. If components and characteristics are not in the table, it means that electric cycles have been excluded from type-approval for these.

OVERVIEW TYPE-APPROVAL REQUIREMENTS FOR ELECTRIC BICYCLES

Regulation	Component/characteristic	Vehicle type	Requirements and tests
RVFSR – Annex II	Audible warning devices	L1e-A	Excluded
RVFSR - Annex II	Audible warning devices	L1e-B	Electrical device approved following UNECE Reg. No 28
RVFSR - Annex III	Braking	L1e-A & B	Requirements of UNECE Reg. 78 but if mass in running order is < 35 kg, then 2 exceptions: In hydraulic brakes, reserve fluid receptacles excluded from ease of fluid-level checking requirements Adapted testing requirements for rim brakes Adapted stopping distance requirements for vehicles with rim widths of < 45 mm.
RVFSR – Annex IV	Electrical safety	L1e-A & B	Requirements detailed in the Regulation
RVFSR – Annex V	Endurance testing	L1e-A	Requirements detailed in the Regulation: definition of normal use: 5 years and a total distance travelled of 7,500 km
RVFSR – Annex V	Endurance testing	L1e-B	Requirements detailed in the Regulation: definition of normal use: 5 years and a total distance travelled of 16,500 km
RVFSR- Annex VIII	Driver-operated controls	L1e-A	Excluded
RVFSR – Annex VIII	Driver-operated controls	L1e-B	Requirements in UNECE Reg. No 60 except lever requirements in Annex 3 + certain requirements in the Regulation

RVFSR – Annex IX	Lighting and light signalling devices	L1e-A	White headlamp, red rear light, amber side reflectors, amber pedal reflectors and a red rear reflector. Type-approval not required but manufacturer must declare conformity with ISO 6742-1:1987 and 6742-2:1985. Retro-reflective bands on tyre sidewalls or rims are allowed. Activated instead of automatically switched-on headlamps are allowed.
RVFSR – Annex IX	Lighting and light signalling devices	L1e-B	Requirements in UNECE Reg. No 74 + certain requirements in the Regulation. Vehicles may be fitted with additional rear and side reflective devices. Rear registration plate lamp required. Activated instead of automatically switched-on headlamps are allowed.
RVFSR- Annex X	Rearward visibility	L1e-A	Excluded
RVFSR – Annex X	Rearward visibility	L1e-B	Class II or III devices type-approved according to UNECE Reg. No 46
RVFSR – Annex XIII	Seating position	L1e-A & B	Vehicles must be fitted with one saddle facing forward, no type-approval required
RVFSR – XIV	Steerability, cornering properties & turnability	L1e-A & B	Limited requirements in the Regulation
RVFSR – Annex XV	Tyres	L1e–A & B	Vehicles with a technically permissible maximum mass ≤ 150 kg may be fitted with non-type-approved tyres with a section width ≤ 67 mm.
RVFSR – Annex XVIII	Maximum continuous rated and/or vehicle speed limitation by design	L1e-A & B	Specific anti-tampering requirements for electric motors in the Regulation
RVFSR – Annex XIX	Vehicle structure integrity	L1e-A & B	Requirements in the Regulation + vehicles L1e-A and cycles designed to pedal in L1e-B must conform with ISO 4210:2014. Definition of cycles designed to pedal in Annex XIX: pedelecs up to 45 km/h + factor 4
RVCR – Annex II	Anti-tampering measures	L1e-A & B	Requirements in the Regulation
RVCR – Annex III	Arrangements for type-approval procedures	L1e-A & B	Requirements in the Regulation
RVCR – Annex III	Conformity of production	L1e-A & B	Requirements in the Regulation
RVCR – Annex V	Devices to prevent unauthorised use	L1e-A & B	Excluded

RVCR – Annex VI	Electromagnetic compatibility	L1e-A & B	Requirements of UNECE Reg. No 10
RVCR – Annex VII	External projections	L1e-A & B	Requirements in the Regulation
RVCR – Annex XI	Masses and dimensions	L1e-A & B	Requirements in the Regulation
RVCR – Annex XIII	Passenger handholds and footrests	L1e-A	Excluded
RVCR – Annex XIII	Passenger handholds and footrests	L1e-B	Handholds not required if the vehicle is not designed to carry passengers. Pedals are considered to meet the footrests' requirements
RVCR – Annex XIV	Registration plate space	L1e-A & B	Requirements in the Regulation: min. 10 cm wide and 17.5 cm high
RVCR – Annex XV	Repair and maintenance information	L1e-A & B	Requirements in the Regulation
RVCR – Annex XVI	Stands	L1e-A & B	Requirements in the Regulation
REPPR – Annex X	Propulsion Unit performance	L1e-A	Maximum speed testing requirements in Annex X but vehicles with pedal assistance tested according point 4.2.6 in EN 15194:2009. Torque and power testing following UNECE Reg. No 85. Requirements for measuring continuous rated power, switch-off distance and maximum assistance factor in Appendix 4 of Annex X
REPPR – Annex X	Propulsion Unit performance	L1e-B	Maximum speed, maximum torque and maximum continuous rated testing requirements in Annex X but bicycles with pedal assistance tested according to point 4.2.6 in EN 15194:2009. Torque and power testing following UNECE Reg. No 85. Requirements for measuring continuous rated power, switch-off distance and maximum assistance factor in Appendix 4 of Annex X
REPPR – Annex XII	Measurement of electric energy consumption and of electric range	L1e-A & B	Excluded from electric range measurement. Requirements for electric energy consumption measurement in the Regulation

The table above has quite a few references to UNECE Regulations. It was the Commission's intention to integrate as many UNECE Regulations as possible in the new type-approval legislation for the benefit of global harmonisation.

D. TYPE-APPROVAL FACTOR FOUR

L1e-A "powered cycles" are defined as cycles designed to pedal, equipped with an auxiliary propulsion with the primary aim to aid pedalling. The propulsion should be limited to a speed of 25 km/h and its maximum continuous rated power should not exceed 1000 W. L1e-A includes two-, three- and four-wheel vehicles, i.e. also electric cargo bikes with more than two wheels. L1e-B "mopeds" are defined as vehicles with a maximum design speed of more than 25 km/h and up to 45 km/h with a maximum continuous rated power of 4000 W. This category only includes two-wheel vehicles.

Following this categorisation, a pedelec 25 km/h with 750 W for instance will come under L1e-A, an e-bike 25 km/h with 500W as well, whilst a pedelec 45 km/h with 1000 W will come under L1e-B. A vehicle that combines pedal assistance with open throttle up to maximum 25 km/h will come under L1e-A.

Electric cycles with a speed limit above 25 km/h and with three wheels belong to category L2e – "three-wheel moped", whilst vehicles with four wheels belong to category L6e – "light quadricycle". But since the requirements in these categories have not been adapted to electric cycles, it is virtually impossible for these electric cycles with three or four wheels to pass type-approval.

As for pedelecs 45 km/h, manufacturers may decide to limit their vehicles with the so-called "factor four". This means that the auxiliary propulsion power added to the driver's pedal power is less than or equal to four times the actual pedal power. In that case, their vehicles become so-called "cycles designed to pedal of vehicle category L1e-B". In the Regulation on Vehicle Functional Safety Requirements these are defined as: *"cycles with a mass in running order ≤ 35 kg and shall be fitted with pedals enabling the vehicle to be propelled solely by the rider's muscular leg power. The vehicle shall feature adjustable rider positioning in order to enhance the ergonomic posture of the rider for pedalling. The auxiliary propulsion power shall be added to the driver's pedal power and shall be less than or equal to four times the actual pedal power."*

These *"cycles designed to pedal"* are not a separate type-approval category. Type-approval legislation does not hold a legal obligation to comply with factor four, it only holds a legal obligation to test the auxiliary propulsion power. This obligation also applies to all vehicles in L1e-A. If, however, the pedelec 45 km/h complies with factor four, then the requirement for vehicle structure integrity is that the pedelec must be designed and constructed to conform with all prescriptions regarding strength and construction of front forks and frames as stipulated in standard ISO 4210:2014. This, combined with the limitation of the weight to 35 kg, is the only practical consequence of the designation "cycles designed to pedal". L1e-A vehicles must in any

case conform with the frame and fork requirements in ISO 4210.

Pedelecs 45km/h that do not comply with factor four are subject to more general requirements in the field of vehicle structure integrity. The legislative text stipulates: *"Vehicles shall be so designed and constructed as to be sufficiently robust to withstand their intended use over their normal lifetime, taking into account regular and scheduled maintenance and specific equipment adjustments clearly and unambiguously set out in the instruction manual provided with the vehicle. The vehicle manufacturer shall provide a signed statement to this effect." Moreover: "Vehicle assembly and construction in the assembly plant(s), in particular the processes relating to the vehicle frame, chassis and/or body and the drivetrain, shall be covered by a quality assurance system to ensure that essential mechanical connections such as welds and threaded connections, as well as other relevant material characteristics, are checked and verified as appropriate."* The assumption is that an electric cycle not complying with factor four, but which has passed the ISO 4210 tests, meets the more general requirements above. However, it should be noted that ISO 4210 does not apply to delivery and recumbent cycles.

The Commission has confirmed that, probably in 2017, factor four will be examined based on scientific data and statistics on vehicles placed on the market. This examination may result in the review of factor four in a future revision of the Regulation.

E. TYPE-APPROVAL LEGAL TEXTS

The type-approval legislation is made up of the framework Regulation 168/2013, which lays down the basis of the type-approval. The competence for this law was with the European Parliament and Council. All technical and administrative details however were in the hands of the European Commission, who laid these down in 4 Regulations:

- Delegated Regulation on functional safety (Regulation 3/2014)
- Delegated Regulation on vehicle construction (Regulation 44/2014)
- Delegated Regulation on environmental and propulsion unit performance (Regulation) 134/2014)
- Implementing Regulation on administrative provisions (Regulation 901/2014)

In the previous system, all legal texts had to go through Parliament and Council, which made it a complicated and very time-consuming procedure. In the new procedure, Parliament and Council have only treated the basic text, whereas technical and administrative details are dealt with by the Commission. Thus, those details can be easily and quickly amended and corrected if necessary and/or adapted to technical progress. In the meantime, a first batch of amendments have effectively been published by means of Regulation 2016/1825 for the administrative requirements and Regulation 2016/1824 for the technical requirements.

All the above-mentioned legal texts can be found here: https://ec.europa.eu/growth/sectors/automotive/legislation/motorbikes-trikes-quads_en

Since January 1, 2017, the new type-approval rules laid down in Regulation 168/2013 have come into force. It is no longer possible to approve a new vehicle type according to the system based on Directive 2002/24/EC. Nevertheless, vehicles approved according to the 2002-system may still be made available on the market, registered or entered into service.

In our interpretation, the new type-approval system has made "old type-approval" invalid because the new system has introduced new requirements. In this case, a transitional period in which previous type-approval remains valid, applies until 31 December 2019. Also, manufacturers may not sell and register more than 100 vehicles per member state approved according to the old system.

F. TYPE-APPROVAL PROCEDURES

Type-approval is allowed in one member state only but that type-approval is valid throughout all member states of the European Union. The approval authority officially certifies that a vehicle, system, component or separate technical unit is approved by means of the type-approval certificate. Following this, the manufacturer must issue a certificate of conformity, i.e. a document that certifies that the produced vehicle/system/ component/... conforms to the approved product.

The type-approval legislation also lists the obligations of all parties in the procedure. Manufacturers for instance must ensure that their products are manufactured and approved in accordance with type-approval requirements. They must also ensure to have procedures in place for series production to remain in conformity with the approved type. They have specific obligations to fulfil in case of non-conformity or serious risks appearing from certain products. Manufacturers established outside the EU must appoint a single representative in the Union before the type-approval authority.

As for dealers, they have the following obligations:

- Verify that the product bears the required statutory marking or type-approved mark
- Verify that the product is accompanied by the legally required documents and safetyinformation in the official language(s) of the member state
- Verify that the product is accompanied by the certificate of conformity
- Verify that the name, registered trade name or registered trade mark and the address at which the manufacturer can be contacted is on the vehicle or on packaging or in a document with the vehicle- Check that the required statutory plate with the appropriate marking is affixed
- Check that each component has the required type-approval mark. If a component does not need type-approval, the manufacturer must

at least affix a trade name or a trade mark and a type number or identification number
- In case of non-conformity or serious risk the dealer must inform the manufacturer
- The dealer must ensure that type-approved components are replaced only by type-approved components

The type-approval must be carried out by a technical service, which has been designated by the approval authority of a member state, as a testing laboratory to carry out tests or as a conformity assessment body. The approval authority of a member state is established or appointed by the member state and notified to the European Commission. The approval authority is competent for all aspects of type-approval, i.e. issuing, withdrawing or refusing approval certificates. An approval authority may also act as a technical service.

The list of all approval authorities is here: http://ec.europa.eu/DocsRoom/documents/18442/attachments/1/translations/

The list of all technical services is here: http://ec.europa.eu/DocsRoom/documents?tags=technical-service-auto&pageSize=30&sortCol=title&sortOrder=asc

Type-approval for electric cycles already applies since 2003. However, it now becomes apparent that a large number of electric bikes has been sold without being type-approved. Unfortunately, the abuse goes on, manufacturers/importers continue to put electric bicycles on the market without type-approval, thus without COC.

Consumers are increasingly confronted with the consequences of this illegal practice. If the law requires the vehicle to be fitted with a number plate or if the member state imposes an insurance, these can only be obtained upon presentation of the COC. Consumers have the right to hold the manufacturer/importer responsible for selling an illegal vehicle. They are entitled to demand for the supplier to take the vehicle back and ask for compensation. Alternatively, the manufacturer/importer can still take measures to remedy his breach of the law for instance by means of an individual type-approval of the vehicle.

2. CEN STANDARDS: EN 15194, EN 14764, ISO 4210 AND EN 50604

A. EN 1519

As mentioned under 1.1 *"pedal cycles with pedal assistance which are equipped with an auxiliary electric motor having a maximum continuous rated power of less than or equal to 250 W, where the output of the motor is cut off when the cyclist stops pedalling and is otherwise progressively reduced and finally cut off before the vehicle speed reaches 25 km/h"* are excluded from the type-approval. This exclusion allowed member states to categorize this type of vehicle as a bicycle. Furthermore, it created the possibility for the European standardization institute CEN to develop a

European harmonized safety standard, EN 15194.

All member states were under the obligation to implement EN 15194 (EPAC – Electrically Power Assisted Cycles), however they did not have to impose the obligation on manufacturers to comply with the standard. Only in a few member states, among which the UK and France, compliance with the standard is compulsory.

Manufacturers throughout the EU do however have a legal obligation to comply with the General Product Safety Directive (GPSD), 2001/95/EC. The basic principle of this law is that manufacturers must make sure that the products they put on the market are safe. If a problem with a pedelec occurs and the vehicle complies with EN 15194, then it will benefit from a presumption of conformity with GPSD. If the pedelec does not have EN 15194 certification, there will be no such presumption and it will therefore be more challenging for the manufacturer to prove that the vehicle he has put on the market was safe.

Most member states allow for self-certification. This means that if a manufacturer has his own testing facilities and concludes, after testing, that his pedelecs comply with EN 15194, the manufacturer is allowed to certify his own products. In reality, many manufacturers have their pedelecs tested by professional testing organisations.

The EPAC-standard has been under revision for quite some time, among other things with a view to harmonizing the standard under the Machinery Directive (see below). There is a legal obligation for pedelecs 25 km/h – 250 W to comply with the Machinery Directive. All requirements in the Machinery Directive, which are relevant to these pedelecs have been incorporated in the review of EN 15194. Consequently, once the revised standard is published, compliance with that standard will automatically ensure compliance with the Machinery Directive. However, to date the revised standard has still not been published, despite its publication having being announced for a very long time now. The formal vote has finally started as a result of which publication is now expected for the summer of 2017.

Both EN 15194 and ISO 4210 have exhaustive requirements for marking the vehicles and for providing the consumer with the necessary instructions on the use of the vehicle.

The marking requirements in EN 15194 are as follows:

The frame must be visibly and permanently marked with:

- a serial number at a readily visible location
- the name of the manufacturer or the manufacturer's representative and the number of the standard, i.e. ISO 2410
- the following words:
  - EPAC according to EN 15194
  - 25 km/h, i.e. cut off speed
  - 250 W, i.e. electric motor maximum continuous rated power

B. EN 14764 AND ISO 4210

The current version of EN 15194 only concerns the electric part of the vehicle, where for the bicycle part originally EN 14764 applied. But in 2015, ISO 4210 was published, thus superseding EN 14764. This has affected the scope of EN 15194 relating to cargo bikes. Whereas EN 14764 only excluded "tradesmen's delivery bicycles", ISO 4210 excludes all delivery bicycles. So, to date, EN 15194 does not apply to delivery bicycles. However, in the long awaited revised 15194, there will be no more reference to ISO 4210 since for the mechanical part of the bicycle, specific requirements have been adopted for EPACs. Furthermore, the scope of the revised 15194 includes "EPAC bicycles for private and commercial use with exception of EPAC intended for hire from unattended stations". In other words, contrary to the current situation, cargo bicycles will be included in the new 15194. On the other hand, electric cycles for hire or sharing schemes will be excluded.

In the meantime, the German standardization institute DIN has engaged in the development of a new standard, DIN 79010 for electric cargo bikes. When this standard is completed, it will only be valid in Germany but DIN and CEN may come to an agreement on turning the DIN standard into a European standard. This however raises the question as to the compatibility of the DIN standard and the new 15194, since the revised version of the latter will also include cargo bicycles. The DIN standard is being made for cargo bikes with a maximum width of 1 meter and a maximum weight of 250 kg in the case of 2wheels, whilst cargo bikes with 3 or 4 wheels are allowed 2 meters and 300 kg.

Electric recumbent bikes with their seat height under a set limit are excluded both from both type-approval and from EN 15194. Consequently, to date there are no technical regulations in Europe for this type of vehicle. The same applies to electric bicycles for competition and for electric mountain bikes. The only obligation that rests on the manufacturer of these vehicles is to comply with the GPSD, Machinery, EMC and RoHS Directive (see below).

C. EN 50604

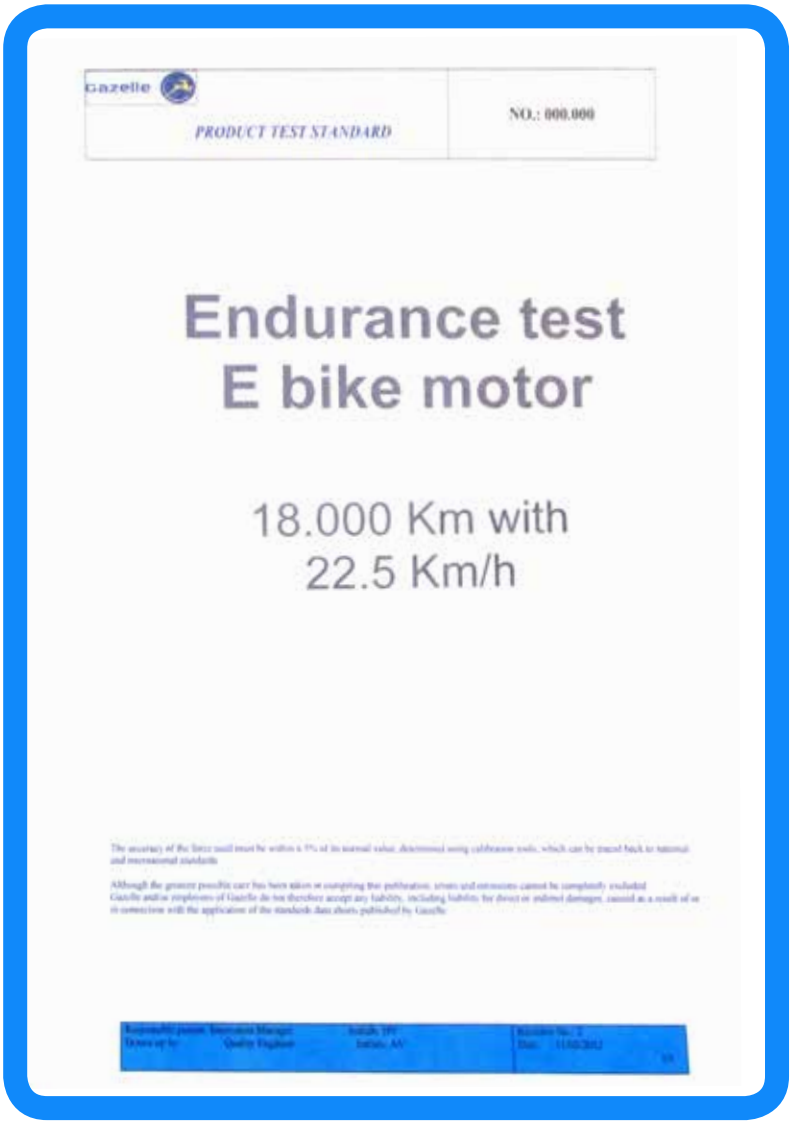
The new standard EN 50604 was published in 2016 and sets out the safety requirements and test methods for lithium-ion batteries used in L-category vehicles and for all electrically propelled or assisted cycles including plug-in hybrid road vehicles that derive their energy from on-board rechargeable energy storage systems.

This standard also comes with marking and instructions requirement. This is also a voluntary standard, which means that manufacturers have no legal obligation to comply with the standard.

PART 2:

OTHER LEGISLATION APPLICABLE TO ELECTRIC CYCLES

As explained above, certain categories of electric cycles, i.e. pedelecs 25 km/h – 250 W, electric mountain bikes, electric competition bikes, certain electric recumbent bikes are excluded from the type-approval. For pedelecs 25 km/h – 250 W, CEN has developed the standard EN 15194 but in most member states there is no legal obligation to comply with the standard. There is however a set of Directives that apply to the above listed vehicle categories. In all cases, manufacturers have a legal obligation to comply with the Directives but they are allowed to self-certify the compliance of their products.



For all e-bike types and categories manufacturers have a legal obligation to comply with the EU Directives but they are allowed to self-certify the compliance of their products. Photo Bike Europe

Rules & Regulations on Electric Cycles in European Union

1. GENERAL PRODUCT SAFETY DIRECTIVE

The General Product Safety Directive (GPSD) 2001/95/EC aim is to ensure that only safe products are made available on the market.

The GPSD applies in the absence of other EU legislation, national standards, Commission recommendations or codes of practice relating to safety of products. It also complements sector specific legislation.

Manufacturers must inform consumers of any risks associated with the products they supply. They also have to make sure any dangerous products present on the market can be traced so they can be removed to avoid any risks to consumers.

Member States, through their appointed national authorities are responsible for market surveillance. They check whether products available on the market are safe, ensure product safety legislation and rules are applied by manufacturers and business chains and apply sanctions when necessary. Member States should also send information about dangerous products found on the market to the Rapid Alert System (RAPEX). This is a cooperation tool enabling rapid communication between EU, EEA authorities about dangerous products to be able to trace them everywhere on the European market. Third countries like China and international institutions are also involved.

2. MACHINERY DIRECTIVE

Article 2 of Directive 2006/42/EC on Machinery stipulates that vehicles which are subject to type-approval are excluded from the Machinery Directive. This implies that electric cycles which are not subject to type-approval are included in the Machinery Directive. This is the case for 25 km/h – 250 pedelecs, electric mountain bikes, electric competition bikes and certain recumbent bikes.

This Directive contains a list of essential health- and safety requirements related to the design and construction of machinery, i.e. pedelecs. Vehicles may only be placed on the market and/or put into service if they comply with these requirements.

For quite a number of years now, CEN TC 333 'Cycles' has been working on the review of EN 15194 to ensure that all obligations resulting from the Machinery Directive are covered by the standard. When the review is completed, a reference to the new standard will be published in the Official Journal. This will turn EN 15194 into a harmonised standard under the Machinery Directive. That means that if a pedelec complies with EN 15194, it will be presumed to comply with Directive 2006/42/EC. The publication of the revised standard is now announced for the summer of 2017. In the meantime, the European Commission is reviewing the Machinery Directive. But because of the harmonization of EN 15194 under the Machinery Directive, this exercise is not expected to have any effect on electric cycles subject to the Directive.

The Machinery Directive holds a few additional administrative obligations

for the manufacturers. They have to have a complete technical file on the product available. Furthermore, they have to supply the pedelec with an EC Declaration of Conformity, the particulars of which are specified in Annex II of the Directive. The vehicle must have a CE conformity marking with the initials "CE". The CE marking shall be affixed to the pedelec visibly, legibly and indelibly in the immediate vicinity of the name of the manufacturer or his authorised representative. This marking however, can only be affixed if the pedelec also conforms to the EMC-Directive and the RoHS Directive.

Finally, in addition to the CE marking, the pedelec must be marked visibly, legibly and indelibly with the following minimum particulars:

- The business name and full address of the manufacturer and, where applicable his authorised representative
- Designation of the pedelec
- Designation of series or type
- Serial number, if any
- The year of construction, that is the year in which the manufacturing process is completed.

The manufacturer has to certify himself that his products comply with the Machinery Directive.

Here you can find a comprehensive guide on the application of the Machinery Directive in all EU languages.

3. ELECTROMAGNETIC COMPATIBILITY DIRECTIVE

All electric devices influence each other when interconnected or close to each other. Sometimes one may observe interference between a TV set, a mobile phone, a radio and a nearby washing machine or electrical power lines. The purpose of electromagnetic compatibility (EMC) is to keep all those side effects under reasonable control.

All electric cycles excluded from type-approval must comply with Directive 2014/30 relating to electromagnetic compatibility. For all other electric cycles, the EMC requirements are in the type-approval legislation.

The Directive specifies legally-binding protection requirements. As for pedelecs 25 km/h – 250W, most of these requirements are covered by EN 15194. But compliance with EN 15194 does not automatically equal compliance with the EMC Directive.

The manufacturer has to certify himself that his product complies with the Directive and for that purpose he has to apply his own methodology. He should prepare technical documentation to demonstrate evidence of compliance with the requirements and have that documentation available. He is also required to supply the vehicle with an EC Declaration of Conformity, the minimum content of which is specified in the Directive. He has to affix the CE marking. This however, cannot be done unless the product also complies with the Machinery and the RoHS Directive.

The EMC Directive requires that products are identified by type, batch, serial number or any other information allowing for the identification of the vehicle. In order to facilitate traceability, the actual manufacturer needs to be identified by name and address. In case the manufacturer is located outside of the European Community, also the name and address of the authorised representative or (when neither are in the Community) the person responsible for placing the vehicle on the Community market needs to be noted. This information must accompany the vehicle.

Next to the EMC Directive, the EN 15194 has some additional marking requirements for electrical and electronic sub-assemblies (ESAs), except for cables. They shall bear the following indelible and clearly legible markings: make or name of the manufacturer of the ESAs and their components and trade description.

4. ROHS DIRECTIVE

Directive 2011/65/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment also excludes vehicles subject to type-approval and therefore includes all electric cycles excluded from type-approval.

As a result, vehicles that have to comply with the Directive may not contain any lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE).

The manufacturer has to certify that his product complies with the RoHS Directive by means of a CE marking. This however, cannot be done unless the product also complies with the Machinery and the EMC Directive. In order to comply with the RoHS Directive, the manufacturer also has to draw up technical documentation, carry out an internal production control procedure and provide for a Declaration of Conformity.

5. LOW VOLTAGE DIRECTIVE

Point 4.2.4 of EN 15194 on the battery charger stipulates that both integrated and external battery chargers of pedelecs 25 km/h – 250W must be tested according to the requirements of the Low Voltage Directive. Therefore, manufacturers who wish to comply with EN 15194 have to supply their pedelecs with chargers that comply with the Low Voltage Directive.

Again, the manufacturer has to provide for the required technical documentation and carry out an assessment procedure as described in Annex III of the Directive. On the product he must mention a type, batch or serial number and he has to indicate his contact details. The charger must be accompanied by instructions and safety information in the language of the consumer. If his product complies with the Directive, he must apply the CE marking.

6. BATTERY DIRECTIVE

The European Union has put legislation in place to ensure the collection and recycling of both batteries and vehicles. The Battery Directive applies to all electric cycles. The WEEE Directive only applies to two-wheel vehicles which are not included in the type-approval.

Batteries may contain metals such as zinc, copper, manganese, lithium and nickel, which present a risk to the environment and human health if they are incorrectly disposed of. Consequently, the collection, recycling, treatment and disposal of batteries and accumulators are ruled at European level by Directive 2006/66/EC, also known as the Battery Directive.

This Directive also prohibits the placing on the market of most batteries and accumulators with a certain mercury or cadmium content.

The Directive applies to all batteries and therefore also includes the Lithium Ion (Li-ion) batteries commonly used in electric bicycles. These are classified as "industrial batteries". Such batteries may no longer be incinerated or disposed of in landfills.

The Battery Directive establishes one framework for the collection and recycling of batteries in all member states. It also sets out minimum rules for the functioning of national collection and recycling schemes, in particular for the financing of these schemes by the producers. It is up to the battery producers to finance the cost of the collection, treatment and recycling of waste batteries. Although they may organize everything themselves, most producers will use the services of the national collection scheme.

Here is an overview of these national collection schemes. Also, this website offers short and very comprehensible e-learning courses that deal with all different battery aspects including collection, storage and discarding end-of-life and damaged batteries. These courses are highly recommended to electric bicycle dealers.

The producer is the person in a Member State who supplies or makes available to a third party, batteries (including those incorporated into vehicles) in that same Member State for the first time on a professional basis. This definition applies irrespective of the selling technique used and irrespective of whether the batteries are made available in return for payment or free of charge. This includes import into the European Union.

The following specific measures apply to industrial batteries:

- Producers must be registered in the national register of all Member States where they place batteries on the market for the first time. If for instance, the manufacturer of the battery in an electric bicycle or the manufacturer of the electric bicycle or his representative are not registered nationally, the dealer will be considered to be the producer of the battery and will be held responsible.
- Producers of industrial batteries or third parties acting on their behalf have an obligation to take back waste industrial batteries
- Industrial batteries have to be readily removable from electric bicycles. If the battery is integrated in the bicycle, it has to be accompanied by instructions showing how the batteries can be safely removed and who is the best person to do this.
- Batteries must be labelled with a crossed out wheeled bin and chemical symbols indicating the heavy metal content of the battery.

- All collected industrial batteries must be recycled. Industrial batteries may not be disposed of in landfills or by incineration. Since September 2011, battery recycling processes must meet minimum recycling efficiencies of and 50% for lithium-ion batteries.

The producer's obligation to take back waste batteries has some very concrete and practical implications for his dealers. The producer must offer the possibility to collect these batteries through the dealers he works with. For this collection, the dealers have to carefully follow safety procedures:

- Put waste batteries in a dedicated container that will be supplied by the national collection scheme the producer works with.
- Cover the poles with tape and wrap the batteries in transparent plastic foil or a plastic bag so that, when they are sorted, it is visible if a battery is damaged.
- Place the container in sight of staff, in a dry, cool and well-ventilated environment.
- Avoid mixing lithium-ion batteries with other batteries as well as with other conductive or inflammable materials.
- Make sure batteries are never left in the wet or outside unprotected.
- Do not put damaged batteries in the container for waste batteries. They cannot be transported in the same way as waste batteries. You should ask your national collection scheme for instructions.

Recently, the European Commission has put the Battery Directive through a so-called fitness check. That has shown that the Directive is now fully transposed in national law and that collection rates for batteries are high. However, there appear to be a few shortcomings.

The check has shown that the growing use of Li-Ion batteries in electric vehicles is not yet properly addressed. For these batteries re-use rules would be useful, as they will still have 80% capacity at the end of life of the vehicle. Further challenges will need to be addressed stemming from the lack of recycling facilities. Moreover, the current methodology for recycling efficiency appears to be not fully in line with the Battery Directive goals, particularly for the recycling of Li-ion batteries, as 50% recycling efficiency target does not guarantee the recycling of hazardous and scarce materials.

Another problem that became apparent through the health check is the double charging for WEEE collection and batteries incorporated in WEEE, which creates unnecessary costs for producers and consumers.

Finally, the definition of "producer" differs between the Battery Directive and the WEEE Directive, which complicates the enforcement of the two laws, especially when it comes to Internet sales. According to the current definitions, dealers are not obliged to register EEE sold over the Internet but are obliged to register batteries incorporated in these EEE, which leads to confusion and misreporting. A harmonisation of the definitions of "producer", "distributor", "placing on the market" and "making available on the market" in all two Directives would solve this problem.
Read more about battery collection and recycling rules.

7. WEEE DIRECTIVE

Directive 2012/19/EU on waste of electrical and electronic equipment (WEEE) is aimed at improving the collection and recycling of the said waste. The objective of this Directive is to protect the environment and public health by preventing or reducing the adverse impacts of WEEE and by reducing overall impacts of resource use, thus contributing to sustainable development. All two-wheel vehicles which have been excluded from type-approval are explicitly included in the scope of this Directive.

As a result of this Directive, private EEE users should have the possibility to return WEEE free of charge to the distributor. When supplying a new product, distributors must accept to take back such waste at least free of charge on a one-to-one basis as long as the equipment is of equivalent type and has fulfilled the same functions as the supplied equipment.

The producers are responsible for taking back the WEEE from the distributors. For that purpose, they should be able to choose to fulfil this obligation either individually or by joining a collective scheme.

In other words, if a customer buys a new electric bike, the dealer has the obligation to take back his old electric bike, whilst the manufacturer has to arrange for taking it back from the dealer and recycling it.

'Producer' means any natural or legal person who, irrespective of the selling technique used, including distance communication is:

- established in a Member State and manufactures EEE under his own name or trademark, or as EEE designed or manufactured and markets it under his name or trademark within the territory of that Member State
- established in a Member State and resells within the territory of that Member State, under his own name or trademark, equipment produced by other suppliers, a reseller not being regarded as the 'producer' if the brand of the producer appears on the equipment
- established in a Member State and places on the market of that Member State, on a professional basis, EEE from a third country or from another Member State; or sells EEE by means of distance communication directly to private households or to users other than private households in a Member State, and is established in another Member State or in a third country.

Producers or their authorised representative, including those supplying EEE by means of distance selling, must be registered in every member state in which they sell. This registration is different form the registration relating to the Battery Directive. For that registration, the producer has to provide, next to general administrative details, the following information:

- type of EEE (household or other than household equipment)
- brand name of EEE
- information on how the producer meets his responsibilities: individual or collective scheme, including information on financial guarantee
- selling technique used (e.g. distance selling)

- declaration stating that the information provided is true.
- quantity of EEE placed on the national market, by weight
- quantity, by weight, of waste of EEE separately collected, recycled (including prepared for re-use), recovered and disposed of within the Member State or shipped within or outside the Union.

Each Member State has to ensure the implementation of the 'producer responsibility' principle and, on that basis, ensure that a minimum collection rate is achieved annually. Since 2016, the minimum collection rate is 45%, calculated on the basis of the total weight of WEEE collected in a given year in the Member State concerned, expressed as a percentage of the average weight of EEE placed on the market in the three preceding years in that Member State. Member States must ensure that the volume of WEEE collected evolves gradually during the period from 2016 to 2019.

For each WEEE category, the Directive sets out minimum recovery targets. However, it remains unclear under which product category electric cycles fall.
Read more about the European Commission's rules on WEEE.

8. REACH

REACH is the Regulation on Registration, Evaluation, Authorisation and Restriction of Chemicals. It entered force on 1st June 2007. It streamlines and improves the former legislative framework on chemicals of the European Union.

REACH is aimed at ensuring a high level of protection of human health and the environment from the risks that can result from chemicals, at promoting alternative test methods, improving the free circulation of substances on the internal market and enhancing competitiveness and innovation.

As a result of REACH, the industry must assess and manage risks resulting from chemicals. REACH also obliges industry to provide the users with appropriate safety information. However, the legislation only applies to substances manufactured or imported above 100 tonnes per year.

PART 3:

BATTERY TRANSPORTATION

One of the major risks associated with the transport of batteries and battery-powered equipment is short-circuit of the battery as a result of the battery terminals coming into contact with other batteries, metal objects or conductive surfaces. Therefore, their transport is subject to very strict rules, which have been internationally harmonized.

Any Lithium-Ion battery over 100 Wh is classified as CLASS 9 - MISCELLANEOUS DANGEROUS GOODS under the dangerous good regulations for transport by road (ADR), by air (IATA & IACO) and by sea (IMDG). Lithium-Ion batteries for electric cycles are more than 100 Watt-hours. As a result, their transport has to comply with these regulations. The UN number for Lithium-Ion batteries is 3480, if contained in or packed with equipment 3481.

These rules do not only concern transport of batteries for instance from manufacturer to dealer, but all transport, except transport for private purposes. Firstly, to ship goods in the CLASS 9 category means that the battery needs to be tested in accordance with the UN Manual of tests and criteria, Part III, subsection 38.3.1.

Batteries manufactured, distributed or sold by major companies usually comply with the UN test requirements. However, certain replacement batteries, which are not OEM or aftermarket batteries but simply low-cost copies of those, may not have undergone the required tests. Untested batteries are consequently excluded from transport.

Any Lithium-Ion battery over 100 Wh is classified as CLASS 9 - MISCELLANEOUS DANGEROUS GOODS under the dangerous good regulations for transport by road (ADR), by air (IATA & IACO) and by sea (IMDG). Lithium-Ion batteries for electric cycles are more than 100 Watt-hours.

Photo BMZ

Rules & Regulations on Electric Cycles in European Union

Users of equipment powered by Lithium-Ion batteries should therefore be vigilant when buying replacement batteries from unknown sources, such as on markets or the web. The differences between genuine and copied battery types may not be visible but could be very dangerous; such untested batteries may have a risk of overheating or causing fires.
As for the transport of Lithium-Ion batteries, very specific and strict procedures related to handling, packing, labelling and shipping need to be followed.

If any company handles, packs and labels dangerous goods, such as Lithium-Ion batteries at their own premises, a trained "Dangerous Goods Advisor" is required onsite to oversee that this is done in full compliance with the rules and to declare the goods safe to travel. If you have no member of staff which has received the above training, you must hire a specialist company to handle, pack and label the goods and to fill out a "Dangerous Goods Note". It is compulsory for Dangerous Goods shipments to be accompanied by this document.

There are also weight restrictions for the transport of batteries. A package shipped by air containing a lithium battery may not exceed 10kg gross. The weight limit per package shipped by road or sea is 30kg gross.
If the lithium batteries are contained in a vehicle or packed with it, they are not required to have a Class 9 hazard label and there is no requirement for a Shipper's Declaration for Dangerous Goods for consignments of these batteries. Nevertheless, they must meet the packing instructions of the relevant transport regulations (ADR, IATA, IACO or IDMG). And, in the event of an incident involving these batteries, the incident reporting requirements apply.

Furthermore, only batteries that have successfully passed the test procedures of Part III, Sub-Section 38.3.1 of the UN Manual of Tests and Criteria qualify under this exception. This also applies to so-called "OEM" or "aftermarket" batteries. Any battery manufacturer or distributor should be able to provide documentation, confirming that the batteries have been so tested.

There will be occasions where a manufacturer may wish to have a defective or damaged battery returned for analysis. However, such batteries are prohibited from transport by air. This prohibition also applies to waste batteries and batteries being shipped for recycling or disposal. The rules for transport of defective, damaged and waste batteries by road or by sea are inconclusive and are currently being discussed in the relevant international committees.

Recharge, the European Association for Advanced Rechargeable Batteries proposes an e-book providing all information about UN transport regulation of Lithium batteries. It costs € 89 and you can find it here: http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1493724273731&uri=CELEX:32012L0019

PART 4:

TERMS OF USE FOR ELECTRIC CYCLES

In the previous part, we have explained in detail the technical rules that apply to different categories of electric cycles. These rules have been harmonized, which means that they are the same in all EU member states. This harmonization ensures the free movement of goods, one of the basic principles of the Single Market. Harmonized technical rules allow manufacturers to produce one and the same product for all 28 member states.

Most of the rules governing the use of electric cycles however have not been harmonized. In the main, they still belong to the competence of the member states and that creates problems. This concerns the rules governing:

- Helmet obligations
- Number plate
- Insurance
- Traffic code
- Age limits
- Driving licenses
- Fiscal/financial incentives

Most of the rules governing the use of electric cycles have not been harmonized. In the main, they still belong to the competence of the member states. For example member states may decide for themselves whether road users need to wear helmets.
Photo Stromer

Rules & Regulations on Electric Cycles in European Union

1. HELMET OBLIGATIONS

Member states may decide for themselves whether road users need to wear helmets on certain categories of vehicles. None of the member states have imposed helmet obligations on adult users of conventional bicycles. Consequently, 25 km/h-250W pedelec users are also exempted from wearing a helmet.

Speed pedelecs however are categorized as "mopeds" and most member states, if not all, have compulsory helmet wear for mopeds. What's more moped users must wear helmets that comply with the standard for motorcycle helmets. These are too heavy and offer insufficient ventilation to be comfortable for speed pedelec users, who are still pedalling and therefore perspire. Besides, there has been no scientific research into the necessity for speed pedelec users to wear a helmet nor into what type of helmet they would require.

Member states do have the competence to issue specific helmet rules for pedelecs and that is exactly what for instance Belgium has done. Since 2016, speed pedelec users are allowed to use a bicycle helmet instead of a moped helmet.

The Netherlands have dealt with the issue differently. The transport department has not changed the moped helmet requirement for speed pedelec users. But, in the meantime, the Dutch standardization organization NEN has developed the standard NTA 8776. Since 1st January 2017, Dutch speed pedelec users may choose between a motorcycle helmet or a NTA 8776 certified helmet.

As for electric cycles in category L1e-A, it appears that very few member states have decided on the terms of use for this new category. One exception to that rule is Belgium, where the transport minister has decided that L1e-A cycles are subject to the same terms of use as conventional bicycles. This means that they may be used without a helmet and that they fall under the same traffic rules as bicycles.

2. NUMBER PLATES

The decision as to whether L1e-A and L1e-B electric cycles must have a number plate also lies with the member states. The type-approval only defines minimum dimensions for the plate but does not impose the use of it.

In Belgium, the transport department has introduced in the traffic code a new vehicle category specifically for speed pedelecs. This decision made it possible to also introduce a specific number-plate for speed pedelecs. It starts with the letter "S" and it is smaller than its moped counterpart.

The introduction of the obligation for speed pedelecs to have a number place has revealed the abuse in the field of type-approval. Large numbers of speed pedelecs have not been type-approved and continue not to be type-approved. As a result, the vehicles are being sold without COC. When the customer tries to obtain a number plate for his vehicle, the absence of

the COC, brings to light that he has bought an illegal vehicle. The customers have the right to demand for the manufacturer to take back the vehicle and to be compensated or to take the necessary measures to make the vehicle legal.

3. INSURANCE

The insurance issue is one of the most complex issues relating to electric bicycles. There is a European harmonized Directive 2009/103, which imposes insurance against civil liability in respect of the use of motor vehicles. However, the definition of "vehicle" in this Directive causes problems: "*'vehicle' means any motor vehicle intended for travel on land and propelled by mechanical power, but not running on rails, and any trailer, whether or not coupled*".

In Belgium for instance, this definition has led to the interpretation that pedal assisted cycles are outside the scope of the above Directive and therefore do not require a motor vehicle insurance. These cyclists should be covered by their general family insurance. As a result, some insurers state that speed pedelecs, because of their pedal assistance, do not require a motor vehicle insurance. Consequently, in those member states which apply strict liability, they would also enjoy this privilege. This means that in the case of an accident, which also involves a vehicle subject to motor vehicle insurance, the latter insurance will always compensate the so-called vulnerable road user, irrespective of who was at fault. Other insurers interpret the categorization of speed pedelecs as "mopeds" as an obligation to have motor vehicle insurance. In this case, strict liability would not apply. Furthermore, there is a lot of discussion about pedal assisted cycles equipped with a walk assist of maximum of 6 km/h. This feature would make the pedelecs, including the 25 km/h – 250W, subject to the motor vehicle insurance obligation. Following all this, the situation in Belgium is extremely unclear, whereas the Netherlands has a clear obligation for speed pedelec users to take on a motor vehicle insurance. Therefore, Dutch speed pedelec users do not enjoy the privileges of strict liability.

Insurance is another aspect which reveals type-approval abuse since consumers have to present a COC to obtain an insurance.

4. TRAFFIC CODE

If member states have not developed specific provisions for speed pedelecs, then they are subject to the same traffic rules as conventional mopeds. This has important consequences for the position of speed pedelecs on the road. For instance, some member states allow mopeds on cycle paths, others explicitly ban mopeds from cycle paths. If speed pedelecs have no specific status, they must follow the rules for mopeds. This regime applies in the Netherlands where, in some cases, mopeds are allowed on cycle paths. If mopeds may go on a cycle path, then speed pedelecs are allowed as well, but a prohibition for mopeds also includes speed pedelecs. In those cases, they have to go on the road and mix with car- and truck-traffic.
As explained, Belgium has created a separate speed pedelec category in the traffic code. This decision made it possible to issue specific traffic rules

for speed pedelecs. They may be subject to the same rules as conventional bicycles on condition that the road managing authority takes an explicit decision and provides in the necessary traffic signs to make that clear. So, if the road managing authority decides so, speed pedelecs may be allowed on cycle paths, in both directions of one-way streets, on cycling highways, in cycling streets, ... and they may benefit from other cycling advantages such as turning right at a red traffic light.

5. DRIVING LICENCE AND AGE LIMITS

25 km/h-250 W pedelecs are not subject to a driving license. Member states may however impose an age limit on the use of these vehicles. The UK for instance has decided that riders should be at least 14 years old.

Electric cycles in the type-approval are subject to the European harmonized Directive 2006/126 on driving licences. This European law imposes the AM driving licence for all two and three-wheel vehicles with a maximum design speed of more than 25 km/h but not more than 45 km/h, as well as for light quadricycles. As a result, speed pedelec riders must have an AM driving licence whilst riders of an L1e-A are exempted.

The age limit for the AM driving licence is 16 years but member states have the right to lower this limit to 14 or to increase it to 18 years. According to the relevant Wikipedia article (https://en.wikipedia.org/wiki/European_driving_licence) the following exceptions to the 16 years' limit have been applied: 15 years in Austria, Denmark, Finland, Czech Republic, Slovenia, Spain and Sweden, 14 years in Estonia, Latvia, France, Italy, Poland and Hungary. This information is unverified.

The Directive imposes a theoretical test for obtaining AM, but member states have the right to add to that a test of skills and behaviour and a medical examination. The problem here is that if such a test has been introduced, it most certainly has been designed for conventional mopeds. The question is to what extent these tests will be suitable and relevant for speed pedelecs.

Any other driving licence is valid for AM but if a member state imposes a practical test as a condition for obtaining AM, then the member state may limit the equivalences to A1, A2 and A.

6. FISCAL/FINANCIAL INCENTIVES

This is yet another area for which the competence lies with the member states. There is only one harmonized initiative: the European Union decides on the list of products subject to respectively the standard, reduced and zero VAT rate. If a product or a service is in the reduced rate list, member states may apply a reduced VAT rate but are not under any obligation to do so.

Quite a number of years ago, the European Union decided to add bicycle repairs to the list that allows for a reduced rate. To date 7 member states are making use of this option and apply a rate in between 6 and 15%: Benelux, Ireland, Malta, Poland and Portugal.

But once again, if this measure is in place it may only be applied to pedelecs 25 km/h – 250W. For the repair of speed pedelecs, being categorized as mopeds instead of bicycles, the standard VAT rate must apply.

The categorization has more negative fiscal/financial implications. Let's take Belgium as an example again. People who use a bicycle to commute, may be awarded € 0.23 per kilometer tax free. The employer may give his employee a bike for commuting and deduct the purchase from his tax. The purchase of cycling accessories and related infrastructure are also tax deductible. All these benefits apply to pedelecs 25 km/h – 250 W but not to speed pedelecs as part of the moped-category, which remains excluded from all fiscal/financial incentives