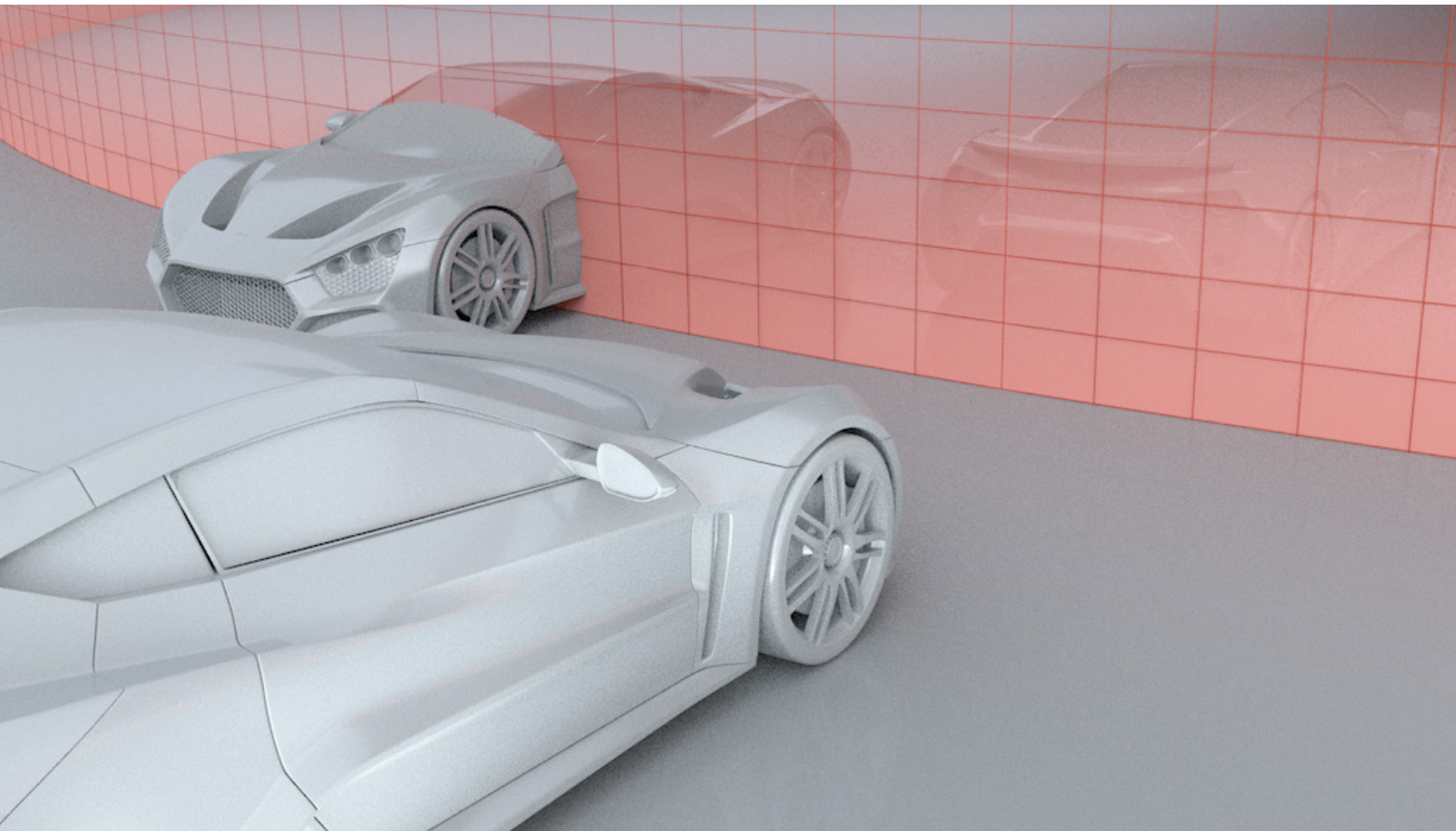




ESSENTIAL INFORMATION  
ON UNECE REGULATION 10  
FOR AUTOMOTIVE EMC



# ESSENTIAL INFORMATION ON UNECE REGULATION 10 FOR AUTOMOTIVE EMC.

## Summary

As of November 2014, European directives no longer regulate automotive electromagnetic compatibility (EMC). Because of confusion within the automotive industry in the European Union due to past electromagnetic compatibility directives between the complete vehicle and subassemblies used in the vehicle, the automotive industry lobbied the European Commission to simplify the automotive EMC standard.

The Commission tasked the United Nations Economic Commission for Europe (UNECE) [Ref 1] to develop a consistent EMC standard for automotive manufacturers and ECE Regulation 10 was the result [Ref 2]. See footnotes below for more information and to download a free copy of the standard.

UNECE was chosen because they have a responsibility for implementing global trade agreements within Europe.

Because automotive manufacturing has evolved into a global business, the common requirements and standards are much broader than for just the European Economic Area.

UNECE Regulation 10 requires manufacturers to gain type approval for all vehicles, electronic sub assemblies, components and separate technical units (STUs). Type approval includes testing of a sample product and inspection of the test data by a country Type Approval Authority. The Regulation is enforced by a Type Approval Authority in each member state.

## History and Purpose

Regulation 10 replaced The Automotive Electromagnetic Compatibility Directive 2004/104/ EC (AEMCD) in November 2014. Prior to enactment of the AEMCD, the EMC Directive covered electrical equipment intended for use in motor vehicles.

However, the application of the EMC Directive to vehicles is complicated by a number of other directives and so a situation developed where components and STUs were CE marked but the complete vehicle was not.

The automotive industry was also concerned that the EMC Directive was inadequate to ensure safe operation in vehicles where compatibility with engine management and braking systems were critical for the safety of passengers. With modern semi-automated driving systems, this concern for safety was magnified further.

On the basis of these concerns, the industry successfully lobbied the Commission to introduce new measures, which removed components and sub-systems for road vehicle applications from the scope of the EMC directive and introduced a new single market process, under UNECE Regulation 10.

### SCOPE

The Regulation requires manufacturers to gain type approval for all vehicles and electronic sub assemblies (ESAs). This means that any device, or a part of the vehicle (whether it is an original part or an aftermarket part) needs to be approved before it can be sold.

Vehicles within the scope include class L, M, N, and O, per UNECE/TRANS/WP.29/78/Rev.6 [Ref 3]. This includes two- and three-wheeled motorcycles, mopeds, electric bicycles, four-wheeled (or more) vehicles for carrying passengers or cargo, and trailers (including semitrailers).

Exclusions include passive items such as spark plugs, cables and passive antennas. Equipment, which only operates when the vehicle is immobilized (i.e. when the handbrake is on) and items, which do not connect to the vehicle wiring, are also generally excluded. Items intended for connection via standard (already approved) interfaces are also exempt.

The Regulation also covers 'Rechargeable Electric Energy Storage Systems' (REESS) which are charging systems intended to provide energy for electric propulsion of electric or hybrid vehicles.

### REQUIREMENTS

In essence, the requirements of the Regulation state that products that have direct control of the vehicle must not emit electromagnetic emissions above the limits specified in the Regulation and that products must be immune to the interference levels stated in the Regulation. Products that have no effect on the direct control of the vehicle are required only to meet the emissions requirements.

It should also be mentioned that immunity to systems protecting the driver and passengers, such as airbags and other safety restraint systems, as well as interference to systems that could cause confusion to the driver (optically or acoustically), such as incorrect operation of indicators, lamps, warning systems, or other displays; either is very important.

### ENFORCEMENT

Each EU member state has their own Type Approval Authority responsible for enforcing the Regulation but the general structure of testing and approval is the same.

### COMPLYING WITH THE REGULATION

The EMC tests are separated into three groups; narrow band emissions (clock harmonics, etc.), broadband emissions (generally motor or switch mode power supply noise), and immunity tests (radiated RF, ESD, pulse, surge, etc.)

All test procedures and test limits are defined within the Regulation, which is a departure from normal EC Directives that rely on individual IEC standards for procedures and limits for each test.

### APPROVAL PROCESS

The application process will vary depending on the country. Generally, a third-party Test Service will be able to test and provide the certification required to comply with the Regulation.

The Test Service should also be able to contact the specific country Type Approval Authority on behalf of the client and provide copies of required documentation.

Most country Type Approval Authorities will not have their own EMC test facilities. However, they should be able to provide a list of approved and accredited Test Services. If a manufacturer has their own EMC test facilities then the country Authority can witness tests on site, without the involvement of any other third party. This will require a formal appraisal of the manufacturer's test facility by the Authority to ISO 9002, or similar. Different country requirements may vary.

Worst-case selection should be considered prior to testing in order to reduce the amount of testing needed across the range of a product types. It's recommended this discussion be held between the manufacturer, the Type Approval Authority, and Test Service (if used), prior to any testing. Type approval requires the testing of a sample and inspection of the documentation according to the technical specifications.

### MARKING REQUIREMENT

Products approved to the Regulation should carry the ‘E’ mark (Figure 1). This mark consists of a circle surrounding the letter ‘E’ followed by the distinguishing number of the member state, which has granted type-approval.

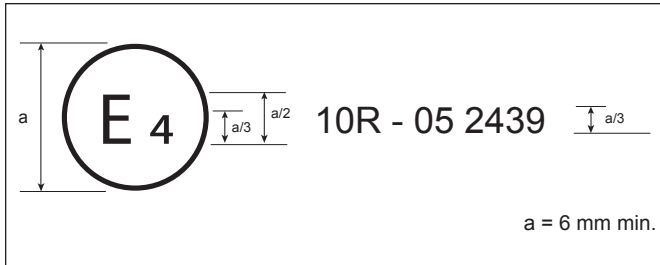


Figure 1 – The “E”-Marking indicating compliance to Regulation 10.

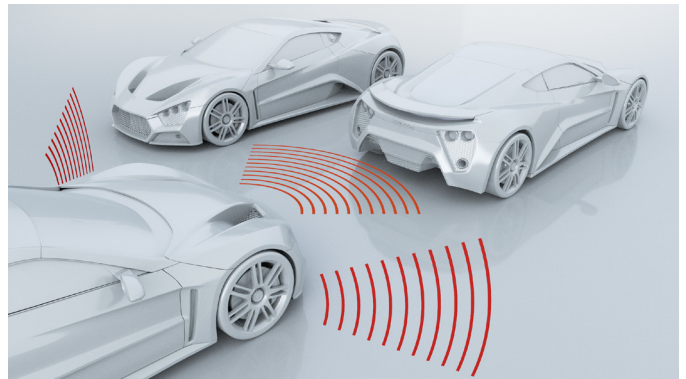
The marking must also include, in the vicinity of the circle, the four-digit sequential number, referred to as ‘base approval number’, preceded by two figures indicating the sequence number assigned to the most recent major technical amendment to the Regulation. Currently, this is ‘05’, or the 5th amendment.

In the example of Figure 1, the above approval mark affixed to a vehicle or ESA shows that the vehicle type concerned has, with regard to electromagnetic compatibility, been approved in the Netherlands (E 4) according to Regulation 10 under approval number 05 2439. The approval number indicates that the approval was granted according to the requirements of Regulation 10 as amended by the 05 series of amendments.

If an electrical or electronic system has been approved as part of a whole vehicle test then that system does not require “E” marking. However, aftermarket products, replacement parts, and ESAs will need to be “E” marked. This includes items like in-car entertainment systems, electrical devices that plug into cigarette lighter sockets (including mobile phone chargers) and after-market alarm systems or lighting accessories.

### REFERENCES

- 1 UNECE Home Page: <http://www.unece.org/info/ece-homepage.html>
- 2 UNECE Regulation 10 Download (English): <https://www.unece.org/fileadmin/DAM/trans/main/wp29/wp29regs/R010r4e.pdf> also, for multiple language choices: [http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L\\_.2017.041.01.0001.01.ENG](http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2017.041.01.0001.01.ENG)
- 3 UNECE/TRANS/WP.29/78/Rev. 6 (English): <https://www.unece.org/fileadmin/DAM/trans/main/wp29/wp29resolutions/ECE-TRANS-WP.29-78r6e.pdf>



Care to learn more about AMETEK CTS?  
We look forward to speaking with you!

## CONTACT US.

AMETEK CTS GmbH  
E-Mail [newsletter.cts@ametek.com](mailto:newsletter.cts@ametek.com)  
Web [www.ametek-cts.com](http://www.ametek-cts.com)

Please feel free to contact any of our  
worldwide offices for additional info.