Low Emission Zones

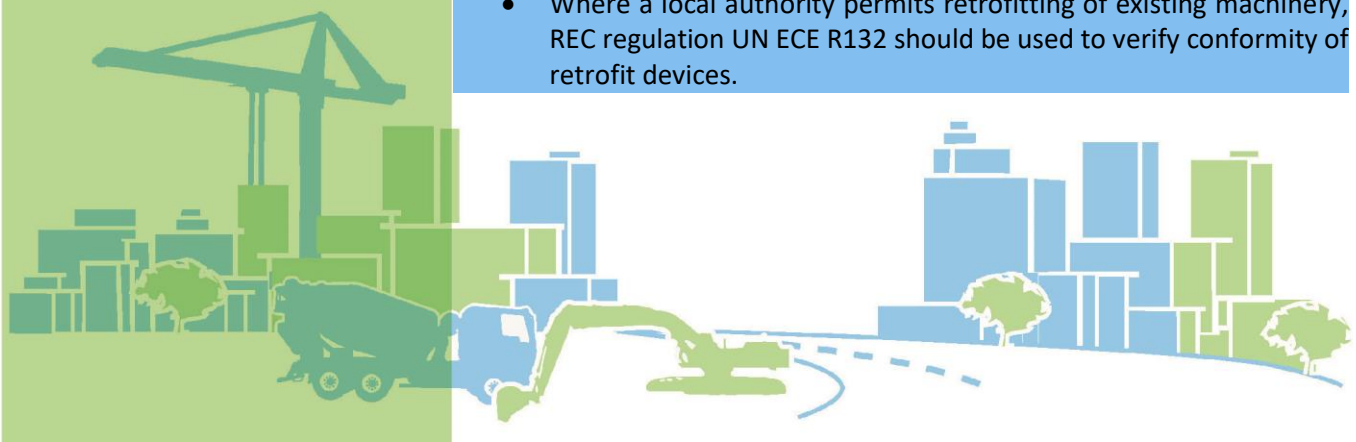
and retrofitting

EXECUTIVE SUMMARY

- Local Authorities may define Low Emission Zones (LEZ) in (urban) areas limiting the use of construction equipment based on their environmental performance.

- Construction equipment complying with the latest EU engine emission stages should always be allowed to operate in LEZ as they represent the state of the art and fulfil the latest requirements as agreed by the EU Member States. The use of such machines should be encouraged by financial incentive schemes.

- Where a local authority permits retrofitting of existing machinery, REC regulation UN ECE R132 should be used to verify conformity of retrofit devices.



Introduction

Directive 2008/50/EC on Ambient Air Quality requires EU Member States to ensure that the concentration in ambient air of certain pollutants (sulphur dioxide (SO_2), nitrogen dioxide (NO_2) and oxides of nitrogen (NO_x), particulate matter (PM_{10} and $PM_{2,5}$), lead, benzene and carbon monoxide (CO)) does not exceed limit values specified in the Directive. Where there is a risk that the levels of pollutants will exceed one or more of the alert thresholds, Member States have to draw up action plans to reduce the risk or limit the duration of such an occurrence. Most commonly these action plans are drafted and implemented by local or regional authorities.

Action plans may include Low Emission Zones in (urban) areas within which there are restrictions on the use of cars and heavy duty vehicles. These restrictions may be time based or may require a certain level of environmental performance. Construction equipment [(1)] is also increasingly included in action plans. CECE describes its position regarding LEZ requirements for construction equipment in this document.

EU emission limits

From 1 January 1999 engines placed on the market for use in construction equipment have been required to comply with the EU non-road engine emission Directive 97/68/EC.

Stricter limits have been imposed through a sequence of stages, leading to substantial reduction in the emission of NO_x and PM. For example, emission limits for engines meeting EU Stage IV within the power range of 130-560 kW (applied from 1 January 2014) are now more than 95% lower than the Stage I equivalent, which is a massive reduction in just 15 years (see Figure 1).

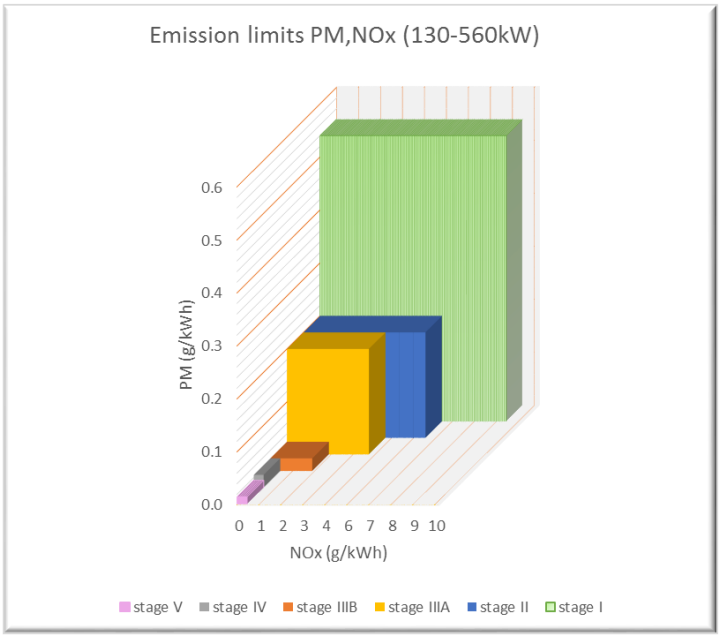


Figure 1
Note: Stage V additionally includes a PN limit of 1 x 10^{12} #/kWh.

On 14 September 2016 the Regulation (EU) 2016/1628 (Stage V) was adopted replacing the current Directive 97/68/EC. This new legislation further tightens emission limits from 1st January 2019 onward by introducing:

- A limit on particle number (PN) for engines used in the majority of new construction equipment (power classes 19-560 kW), together with a further reduction on particulate matter (PM). The introduction of the PN limit is expected to require the use of Diesel Particulate Filters (DPFs).
- Limits for the largest (>560 kW) and smallest (<19 kW) engines that are used in construction equipment.

The Regulation also requires a close integration of the engine and its after-treatment system in order to ensure that environmental goals are achieved over a range of ambient conditions and operating profiles, together with measures to prevent tampering or lack of appropriate maintenance. For example, not replenishing Diesel Exhaust Fluid (also known as urea or AdBlue) for the deNOx system will lead to a loss of functionality of the machine.

Setting the criteria for Low Emission Zones

For construction equipment, the environmental criteria to be used defining a LEZ should be an existing emission limit for PM or NO_X, or PM & NO_X, taken from an emission stage in Directive 97/68/EC. Engines complying with the specified emissions limits should not be required to be modified with any particular technology, for example by installation of a DPF.

If an authority requires construction equipment to achieve the environmental performance of Stage V, only the use of machines fitted with engines approved to Regulation (EU) 2016/1628 would fulfill that goal.

In any case, construction equipment that meets the EU emission stage in force at the time of the application of the LEZ, should not be subject to any additional requirements.

Financial incentive schemes or other green procurement initiatives should be used to promote the utilization of machines meeting the latest applicable EU emission stage.

Retrofitting

CECE recognises that it is important that users are able to continue to operate machines with installed engines complying with a previous EU emission stage, and therefore suitable modifications (retrofit) could be permitted in order to achieve the goals of the LEZ. Such modifications should respect the following:

- Only products and technologies that have been type-approved to UN ECE Regulation R132[(2)] and demonstrated to be effective for the application should be permitted.
- The installation of retrofit devices shall not affect the conformity of the machine with other applicable legislation in force at the date of its first placing on EU market, in particular the Ma-

chinery Directive which sets out essential health and safety requirements that are mandatory for the placing on the EU market of the machine.

The compliance of the engine or the combination of engine and retrofit device to the PM or NO_X emission limits or PM & NO_X emission limits required by LEZ can be demonstrated via the engine type-approval number or both engine and retrofit type-approval numbers.

It should be recognised that a retrofitted engine cannot achieve the same environmental performance as an engine specifically built to meet a more demanding emission stage defined in EU legislation which delivers improvements for a range of pollutants.

Process transparency

In the development phase of a local scheme affecting construction equipment, engine and equipment manufacturers should be informed at the earliest possible time to be able to offer suitable advice.

Rental companies and contractors should be timely informed of the conditions of the scheme as soon as the LEZ criteria are set out in order to be able to adapt their fleet.

Recommendations

CECE calls upon Member States, regional and municipal authorities intending to set a LEZ affecting construction equipment to:

- Encourage the use of the latest technologies through initiatives such as financial incentive schemes and green procurement to boost the renewal of the equipment. New machines not only offer better emission performance but also improved safety, enhanced operator comfort, lower noise and higher efficiency.
- Promote harmonisation of LEZ schemes to avoid the creation of multiple unique requirements with similar aims.
- Adopt an approach on strictly technology neutral emission limits from the perspective of engine technology and fuel choice as per Directive 97/68/EC and Regulation (EU) 2016/1628.
- Set criteria that align with published EU engine emission limits.
- Always permit the use of construction equipment that complies with the latest applicable EU emission stage.

(1) For the purpose of this document construction equipment means the non-road mobile machinery used on construction sites.

(2) This regulation, published in 2014 under the UN ECE 1958 Agreement, to which all EU Member States are signatories, sets criteria for operating behaviour, avoidance of safety hazards, noise emissions and installation, in addition to specifying the required emission reduction