The European Association of Internal Combustion Engine Manufacturers

EUROMOT

EUROMOT POSITION

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Euromot Position on proposed emissions requirements for CI engines between 19 and 56 kW

Concerning the proposed policy options for the review of the Nonroad Mobile Machinery (NRMM) Directive 97/687EC, as presented by the European Commission – DG ENTR at the 13 Feb public stakeholders meeting, Euromot herewith reiterates its previous position regarding emission requirements for CI engines 19-56 kW and comments on the proposed introduction of particle number count limits for that engine category. This position paper is complementary to our paper as of 15 Sept 2013 on " Amendment of the Nonroad Mobile Machinery Directive 97/68/EC: A perspective on policy options for emissions regulations for CI engines".

1. NRMM engine manufacturers' requests on the development of new legal requirements

Taking into account the characteristics of the non-road engine and machine business, namely substantially smaller market and production volumes than on-highway, a much wider variation in installed power, application and usage and the global nature of NRMM applications, the demands of NRMM engine manufacturers regards the development of new legal requirements can briefly be summarized as follows:

- Long-term certainty in future requirements in order to enable investment for growth.
- Global alignment of emission leading areas to maximise market size and gain economies of scale (EU, USA, Japan), enabling maximum emissions reduction at minimum cost to society.

- Sufficient lead-time prior to introducing new stages to enable cost-effective product development/technology transfer and sufficiently long duration of stages to recover investment.
- Harmonised EU regulation to eliminate or at least minimise inefficient local regulation, either within or between Member States.
- Appropriate transitional provisions that provide sufficient time to enable machine manufacturers to integrate new engine and after-treatment systems into machines, whilst, for engine manufacturers, avoiding large peaks and troughs in engine production.

2. Characteristics of CI engines 19 to 56 kW installed in NRMM

2.1. Operational characteristics and constraints

In general the majority of engines in this power class will be used in compact equipment designed to operate in confined spaces, and consequently any changes that require additional space will have a major impact on the feasibility of the machine to perform its intended function. One very common example is a mini-excavator. This may be designed to fit through domestic doorways (limiting width and height) and operate within a small overall radius (limiting length), whilst requiring a low centre of gravity for stability and excellent all-round operator visibility for safety. This severely limits the opportunity to increase the size of the propulsion system.
In respect to the actual level of emissions to the atmosphere, such equipment as mini-excavators or telehandlers tend to spend a large proportion of their life non-operational, either being transported between jobs, or on the job-site awaiting use. The low annual operating time of such machinery, typically not exceeding 500 hours/year, needs to be taken into account for estimating the contribution of that power category to the overall emissions from NRMM.
Also, the operational life tends to be shorter than for larger machines. This is recognised, at least in part, by the shorter emission durability period (useful life) for variable speed CI engines $19 \leq kW < 37$ of 5000 hours (compared with 8000 hours for larger engines).
Furthermore, and in line with our position paper as of 15 Sept 2013, we would like to reemphasize that this is a power range where there will be alternative forms of power source available, including SI engines operated on gasoline or on gaseous fuels.

2.2. Cost sensitivity

Concerning small equipment, it will generally be of low cost compared to larger equipment, with the engine being a larger part of the entire machine cost than would be the case for larger machines. The machines in which the engines are installed may have little or no electronic control systems, and are likely to be designed for a wider range of operators than larger equipment, with many machines being used on a short contract/hire basis. Consequently, simplicity of operation is a key need.
As a consequence of the above factors there will be a high sensitivity to both the additional cost of more ambitious emission reductions and the impact upon the machine design. The continued demand for these products may be impacted by the ambition for further emission

reductions and it is especially important to ensure that proposing more ambitious limit values than those aligned with the US is justified by a thorough cost-benefit analysis specific to this power category.
Euromot requests confirmation that the technical impact and cost-effectiveness of further levels of ambition has been individually assessed for this power class. Euromot notes that data from engine manufacturers was provided to the European Commission on 16 Sept 2013 in order to support the preparation of the impact assessment on the review of 97/68/EC.

3. Consequences of introducing a particulate number limit of 1 x 10^{12} for engines 19-56 kW

The addition of such a limit in the EU will disrupt regulatory alignment if pursued in isolation from the US authorities. As is the case for the engines in the power range 56 – 560 kW, the technologies chosen by engine manufacturers to achieve the US Tier 4 final limit values for these smaller engines vary. Whilst some manufacturers have already chosen to incorporate a diesel particulate filter (DPF) some have chosen an alternative technology path.
In those cases where a DPF will already be fitted to comply with US Tier 4 final limits the incremental impact of a particle number limit may be relatively small, but for engines and machines using a different technology path the incorporation of a DPF may require a complete re-design with associated high cost and packaging challenges.
Applying a wall-flow diesel particulate filter to engines where this is not already foreseen could result in an increase of exhaust aftertreatment system volume of up to 50-60%. Since the majority of engines in this power class will be used in compact equipment designed to operate in confined spaces, any changes that require additional unforeseen space will have a major impact on the machine design.
To conclude, there will be no contribution from a more ambitious stage of non-road emission regulation if the machines become unattractive for the end-user to purchase, either due to high first cost, high cost of ownership, or constrained functionality in comparison to maintaining existing machines.

Euromot requests European Commission to duly consider that matter and remains available for further discussions

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