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Information
FEM Product Group Cranes and Lifting Equipment
Sub-Group Mobile Cranes

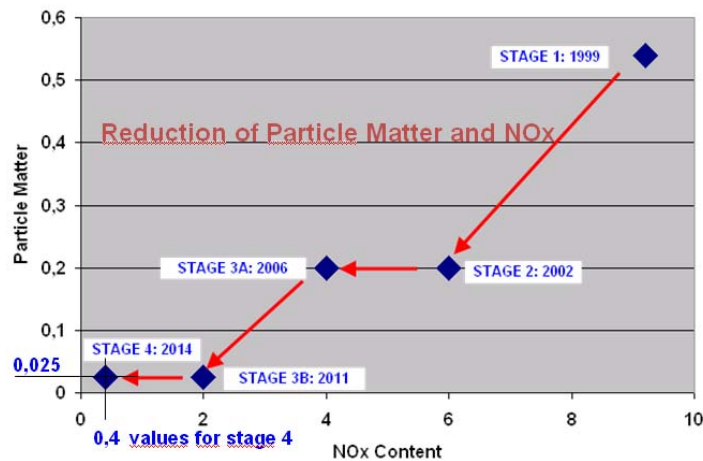
Diesel Emissions – Retrofit of Particulate Filters

Legal Note: This paper should serve only as a reference and overview: it is meant to provide guidance in the assessment of risks related to the retrofit of particulate filters. It neither addresses each and every imaginable scenario, nor is it a binding interpretation of the existing legal framework. It does not and cannot replace the study of the relevant directives, laws and regulations. In addition, the specific features of different products and their various applications have to be taken into account. This is why the assessments and procedures referred to in this paper may be impacted by a large variety of circumstances. Accordingly, a number of other interpretations are also possible.

This information is related to retrofit of mobile cranes with particulate filter. With the ongoing changes in limit values for diesel engine emissions some clarification is required.

SITUATION: In general engines on mobile cranes, which are used for operating the crane, fulfil the requirements of Directive 97/68/EC (Emission of gaseous and particulate pollutants from internal combustion engines).

The emission reduction of particle matter and NO_x in relation to the different stages of legislations is shown in the graph below (diesel engines with power above or equal to 130kW and below or equal to 560kW):



As indicated the level of particulate matter measured in g/kWh will not change when introducing Stage IV; Stage IIIB diesel engines in accordance with 97/68/EC already fulfil the requirements of Stage IV in relation to particulate matter (mass).

Some member states and communities intend to further reduce the particle emission beyond the 97/68/EC by requiring the addition of diesel particulate filters to new machines and to retrofit existing machines.

RETROFIT: The possibility of retrofitting diesel engines with particulate filters is limited by technical reasons as each filter in the exhaust system affects the combustion process and as such the engine will lose the certification according to 97/68/EC (see below). The diesel engine manufacturer will exclude warranty for changes not permitted:

Cranes with engines according to Stage IIIA (and before) – a diesel particulate filter can be added with significant effort (time, costs and design) if permitted by the engine manufacturer; as long as the pressure in the exhaust is not changed significantly the certification of the engine is still valid.

Cranes with engines according to Stage IIIB – Stage IIIB already fulfils the limit value for particle matter (mass) of the next level (Stage IV), see diagram above. In opposite to Stage IIIA the Stage IIIB certification comprises the engine **and** the exhaust system to be certified as a complete unit by the engine manufacturer (see Annex).

Therefore if any changes (including geometry of the exhaust system) are made to the engine and/or the exhaust system a new approval by the engine manufacturer is required. Because the geometry of the exhaust system is specific to each crane model a large amount of certification processes by the engine manufacturers would be required. Due to the low amount of mobile cranes (less than 1000 units in Europe in 2011) in comparison to trucks this is economically not feasible.

Replacement engines are not affected if the engine comply with the limit values that the engine to be replaced had to meet when originally placed on the market.

The term ‘manufacturer’ within the meaning of the EC Machinery Directive:

Furthermore the obligation of the manufacturer regarding performance of the conformity assessment procedure including the risk assessment is to be considered.

If a significant modification of a machine is undertaken, this obligation of the manufacturer must be assumed by the person who is responsible for the significant modification within the meaning of product liability and the EC machinery directive.

NOTE - Retrofitting mobile cranes with particulate filters may affect significant safety requirements e. g. protective guarding of hot surfaces or operator's free view to hazardous areas.

CONCLUSION:

Any change affecting the system consisting of Diesel engine end exhaust bears the risk of losing:

- **certificates, especially the emission certificate and**
- **warranties.**

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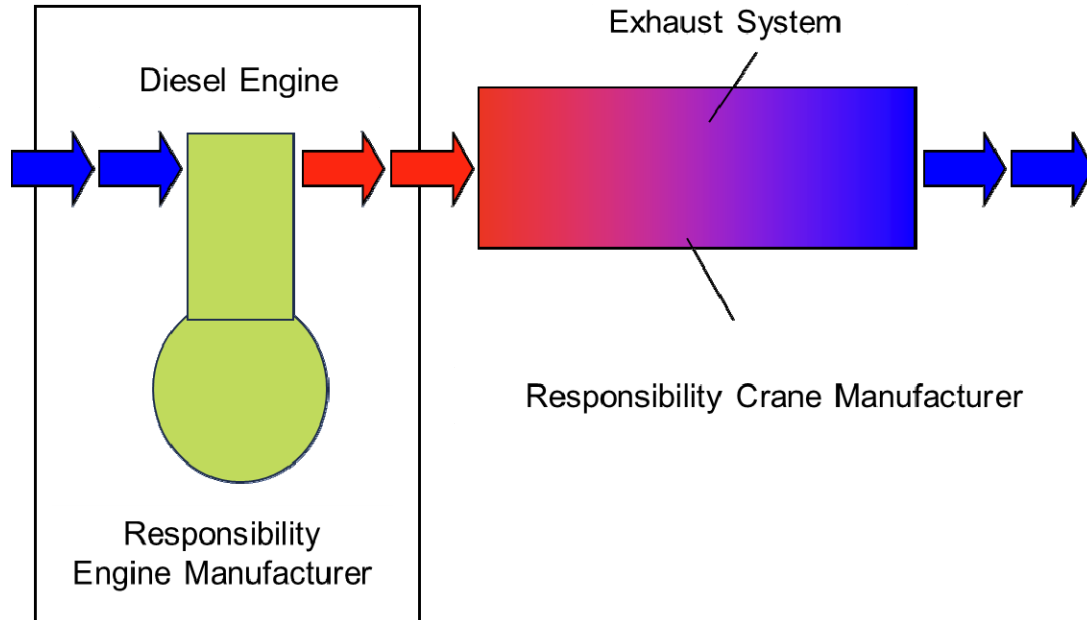
Created in 1953, the European Materials Handling Federation (www.fem-eur.com) represents, defends and promotes European manufacturers of materials handling, lifting and storage equipment including cranes and lifting equipment and particular mobile crane.

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Annex:

Scope of engine manufacturer's certification for 97/68/EC Stage IIIa



Scope of engine manufacturer's certification for 97/68/EC Stage IIIb

