

Challenging emissions

The latest EU emissions standards for non-road diesel engines come into force in 2014. BITA's technical consultant, **Bob Hine**, outlines the implications.



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The first European legislation to regulate emissions of Nitrogen

Oxides (NOx), Particulate Matter (PM), Carbon Monoxide and Hydrocarbons (HC) from non-road diesel engines (known as Stage I) was the start of a five-stage process which got underway in 1996.

This year sees the latest EU regulation come into force, Stage IV.

Under EU Stage IV, manufacturers of non-road diesel engines are required to reduce NOx exhaust emissions by 80% compared to the Stage IIIB standards they replace. Engines are also required to use Ultra Low Sulphur Diesel. It should not go unnoticed that significant reductions were achieved through the introduction of stage IIIB from stage IIIA. Here the requirement involved reductions in both PM and NOx/HC levels of 90%.

TWO TECHNOLOGIES

These are stretching targets and present real challenges for engine manufacturers which are utilising two main technology options to reduce NOx and PM to the required levels, each with its merits and drawbacks.

One method is known as

Selective Catalytic Reduction (SCR). SCR injects a reagent into the exhaust gas flow and mixes in a catalytic converter, which reduces or neutralises NOx to harmless nitrogen and oxygen. The reagent is a 32.5% urea and 67.5% water mixture commercially called Diesel Exhaust Fluid (DEF).

The second technology, EGR, dilutes the amount of oxygen in the combustion chamber by mixing the intake air charge with cooled exhaust gas. The result lowers the combustion peak temperature, which reduces the formation and amount of NOx for engine optimisation. This lower temperature increases PM which is filtered out through a diesel particulate filter (DPF). An alternative route for manufacturers is to produce an engine which burns fuel much more efficiently to comply with Stage IV while removing the need for a DPF.

So when will this new regulation begin to 'bite'? For engine manufacturers supplying original equipment manufacturers, there is a two-year period within which engines produced prior to the market placement date specified in the legislation can still be sold.

However, discussions are underway to combine what is known as the 'sell off' with

the 'Flex' allowance periods for engine sales, to avoid the stock piling of engines. It is hoped a final decision on this will be made by the European Parliament this summer.

This means that there will still be plenty of compliant trucks on the market when the new legislations comes into force, particularly where engine power doesn't exceed 56kW, as those engines complying with Stage IIIB regulations are still compliant up to 2016. And, of course, the Stage IV regulations apply to new trucks only, they are not retrospective, so existing trucks will still be able to operate.

We all want to see cleaner, more efficient engines and lower emissions, but given how stretching the latest legislation is, regulators must think hard about what comes next. If new fork lift trucks become unattractive to the purchaser because of high first cost, high continuing cost of ownership, or reduced functionality in comparison to maintaining existing equipment, the consequences for the sales of new fork lift trucks could be serious. ■

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