

**EXPLANATORY MEMORANDUM TO
THE NON-ROAD MOBILE MACHINERY (EMISSION OF GASEOUS AND
PARTICULATE POLLUTANTS) (AMENDMENT) REGULATIONS 2006**

2006 No. 29

1. This explanatory memorandum has been prepared by the Department for Transport and is laid before Parliament by Command of Her Majesty.

2. **Description**

- 2.1 These Regulations implement Directive 2004/26/EC. That Directive amends Directive 97/68/EC on the approximation of the laws of Member States relating to measures against the emission of gaseous and particulate pollutants from internal combustion engines to be installed in non-road mobile machinery.

3. **Matters of special interest to the Joint Committee on Statutory Instruments**

- 3.1 None

4. **Legislative Background**

- 4.1 "Non Road Mobile Machinery" (NRMM) consists of any mobile machinery, transportable industrial equipment or vehicle fitted with an internal combustion engine not intended for passenger or goods transport by road. Examples include drilling rigs, bulldozers, forklift trucks, road maintenance equipment, snow ploughs and mobile cranes. Directive 2004/26/EC further tightens NRMM emission standards for new engines in three stages between 2006 and 2012 and extends them to rail and inland waterway vessel engines for the first time. It is the latest European Commission measure that amends Directive 97/68/EC, which created the original legislative framework for compulsory NRMM emission standards in new engines. A more detailed explanation of Directive 2004/26/EC's impact is provided in paragraphs 7.2 and 7.3 below.

- 4.2 These Regulations amend the Non-Road Mobile Machinery (Emission of Gaseous & Particulate Pollutants) Regulations 1999 (S.I. 1999/1053) ("the 1999 Regulations"), which gave effect to Directive 97/68/EC in the UK. Earlier amendments to the 1999 Regulations were made by the Non-Road Mobile Machinery (Emission of Gaseous & Particulate Pollutants) (Amendment) Regulations 2002 (S.I. 2002/1649) and the Non-Road Mobile Machinery (Emission of Gaseous & Particulate Pollutants) (Amendment) Regulations 2004 (S.I. 2004/2034). These implemented Directives 2001/63/EC and 2002/88/EC respectively.

- 4.3 The 1999 Regulations restrict the placing on the market of any engine for use in NRMM unless certain conditions are met. Engines must have been approved by the UK competent authority (currently the Vehicle Certification Agency) and emissions must not exceed the applicable limits. Those limits are identified in the Regulations, by reference to the provisions of Annex 1 to Directive 97/68/EC. Test procedures to be applied by the competent authority are similarly identified. The Regulations contain certain exemptions, set out procedures for type-approval and make provision for enforcement.

4.4 The Regulations are made under powers conferred by section 2(2) of the European Communities Act 1972. The Secretary of State is the Minister designated in relation to pollution reduction measures for internal combustion engines.

5. Extent

5.1 This instrument applies to all of the United Kingdom.

6. European Convention on Human Rights

6.1 As the instrument is subject to negative resolution procedure and does not amend primary legislation, no statement is required.

7. Policy background

7.1 NRMM is a small but significant source of oxides of nitrogen and particulate emissions, two pollutants for which the UK has continuing air quality problems. Directive 97/68/EC was the European Commission's first attempt to reduce NRMM emissions. It applied two stages (I and II) of improvements for intermittent speed diesel engines, based on engine power output. The first set of amending Regulations (S.I. 2002/1649) made minor amendments to test procedures. The second set of amending Regulations (S.I. 2004/2034) set emission standards for small, gasoline fuelled utility engines below 19 kW and for constant speed diesel engines.

7.2 Directive 2004/26/EC, and the Regulations implementing it, have a wider remit. They cover railway and inland waterway engines for the first time and tighten standards for other diesel engines in three stages (IIIA, IIIB and IV). Whilst Directive 2004/26/EC sets new emission limits, it does not prescribe how Member States are to ensure that engines achieve them. The Department for Transport expects that certain types of new developing technologies will be required. At Stage IIIA (2006-2008), electronic engine control, improved fuel pumps and other modifications may have to be used. During Stage IIIB (2010-2012), the requirements involve much lower particulate limits. This is likely to require diesel particulate filters, so engines will have to run on sulphur free diesel. From Stage IV (2013-2014) the limits on oxides of nitrogen will be even tighter. This might involve use of selective catalyst reduction after-treatment systems.

7.3 Directive 2004/26/EC also sets transient test procedures which better represent real conditions. Engines must maintain their emission performance over their life time, and this performance must be demonstrated during durability testing as part of the approval process. Special arrangements allow manufacturers time to redesign their products and accommodate niche products made in small quantities, where it might be uneconomic to meet the latest emission standards.

8. Impact

8.1 A Regulatory Impact Assessment is attached to this memorandum.

8.2 There are no impacts on the public sector.

9. Contact

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REGULATORY IMPACT ASSESSMENT

NEW EMISSIONS STANDARDS FOR NON-ROAD MOBILE MACHINERY (EU DIRECTIVE 2004/26/EC)

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1 TITLE OF PROPOSAL

The Non-Road Mobile Machinery (Emissions of Gaseous and Particulate Pollutants) (Amendment) Regulations 2005, implementing Directive 2004/26/EC of the European Parliament and of the Council amending Directive 97/68/EC on the approximation of the laws of the Member States relating to measures against the emission of gaseous and particulate pollutants from internal combustion engines to be installed in non-road mobile machinery.

2 PURPOSE AND INTENDED EFFECT OF MEASURE

2.1 The Objective

The objective of this proposal is to reduce emissions of Oxides of Nitrogen (NO_x) and Particulate Matter (PM) from Non Road Mobile Machinery (NRMM) by introducing three further stages of emissions limits for new diesel NRMM engines, and introduce mandatory emission standards for rail and inland waterway vessel engines for the first time. This will contribute to meeting air quality targets, provide health benefits and maintain some degree of alignment between EU and US standards for the benefit of manufacturers.

2.2 The Background

Clean air is an essential ingredient of a good quality of life. European, international and national legislation sets legally binding health and ecosystem based objectives that the UK and other countries have signed up to achieve.

Latest projections, which include already agreed measures, predict difficulties in achieving EU legally binding air quality objectives for concentrations of nitrogen dioxide (NO₂) and particles (PM₁₀) in a number of areas in the UK, mostly in urban areas. The objective for ozone (O₃), of which NO_x is one of the two main precursors, is also unlikely to be met in a large part of England. 122 Local Authorities (LAs) in Great Britain have declared Air Quality Management Areas (AQMAs) for NO₂ and/or PM₁₀ and are implementing air quality action plans to work in pursuit of these objectives. Although NRMM emissions are small when compared against emissions from transport they are not insignificant, and as tighter emission standards take effect for road vehicles the relative significance of NRMM emissions will increase unless further measures are taken to reduce emissions from this sector.

In addition to concentration based objectives, the UK is signed up to a legally binding ceiling on total annual emissions of NO_x (1167 kilotonnes to be achieved from 2010 onwards) under the EC National Emission Ceilings Directive. DEFRA, in conjunction with DTI and DfT, is revising emission projections for 2010-2025. There are considerable inherent uncertainties in estimation of future emissions; projected NO_x emissions for 2010 are being carefully assessed as there is a significant risk that the UK will not meet its target. In addition the National Emission Ceilings Directive is likely to be reviewed in the near future. There is likely to be increasing pressure from Europe to agree further reductions in NO_x emissions to reduce the human health effects of NO₂, ozone and particles, and to reduce the environmental effects of nitrogen deposition.

Directive 97/68/EC sets mandatory emissions standards which must be met by new NRMM engines. This includes engines for machinery such as bulldozers, excavators, forklifts, loading shovels, portable generator sets, portable air compressors etc, but, at present, specifically excludes ships and railway locomotives. Agricultural tractor engines are also excluded from the scope of this directive being covered by a separate directive (2000/25/EC)

The existing directive sets two stages of emissions limits for new diesel engines, regulating the maximum allowable emissions of NO_x, PM, hydrocarbons (HC) and carbon monoxide (CO). Stage I is already in force for all engine categories and Stage II has now entered into force for almost all engines. Stage I & II are predicted to bring about major reductions (>50%) in emissions from this sector of machinery. Both Stages are aligned with provisions in US regulations thus allowing manufacturers to sell the same products in both markets.

2.3 Risk assessment

The proposed Stage IIIA, IIIB & IV standards reduce NO_x and PM emissions: the two main pollutants emitted by diesel engines of continued air quality concern.

2.3.1 Short term health effects

Air quality has serious implication for people's health. DoH's Committee on the Medical Effects of Air Pollutants (COMEAP) estimated the number of deaths and hospital admissions for respiratory diseases affected per year (in 1996) by PM₁₀, NO₂ and Ozone. They were:

PM₁₀ - Deaths brought forward: 8,100 (GB urban).
Hospital admissions (respiratory) additional or brought forward: 10,500.

NO₂¹ Hospital admissions (respiratory) additional or brought forward: 8,700.

Ozone² - Death brought forward: between 700 and 12,500 depending on threshold for health effects. Hospital admission (respiratory) additional or brought forward: between 500 and 9,900 depending on threshold for health effects.

COMEAP has also recently concluded that PM₁₀ may be associated with cardiovascular hospital admissions.

2.3.2 Long term/chronic health effects

Whilst emissions have decreased substantially since 1996, COMEAP have also said that long-term exposure to air pollutants is likely to damage health. Such effects are not included in the above figures and could substantially increase the magnitude of the health effects of air pollution.

There is evidence from the United States that long term exposure to particulate air pollution is associated with a decrease in life expectancy. In 2001 the COMEAP published a report on the long-term effects of particles on mortality (Department of Health, 2001). COMEAP concluded that it was more likely than not that long-term exposure to particles reduced life expectancy. Hence, since 2001 the Interdepartmental Group on Costs, Benefits and Air Quality (IGCB) has followed the COMEAP recommendation and quantifies the long-term mortality effects from reductions in PM₁₀ emissions in any benefits assessment³.

¹ The reliability of the estimate for NO₂ is very much less certain and ought to be considered with care.

² Estimates for O₃ are presented as NO₂ is a precursor for O₃. It should be noted that a large component of O₃ has a transboundary nature. EU wide measures to reduce emissions of precursors, such as Euro standards, would eventually benefit the UK as well. Latest health studies indicate that no threshold might exist for O₃. If this is confirmed the top figure of the range given above will apply.

³ An Economic Analysis to inform the review of the Air Quality Strategy Objectives for Particles, A second report of the IGCB group, Defra, September 2001.

However, these health effects are due to emissions from all sources of which NRMM is only a small part. Recent research has suggested that existing UK emissions inventory estimates for the emissions of NOx and PM from the UK off-road sector are underestimated. The findings of this research have been used by the Department to produce a revised off-road emissions inventory, the results of which are presented in this RIA. This has implications on estimates of emissions from other sources. It is therefore likely that there will be changes in the off-road inventory estimates once these implications have been fully considered and discussed. However the figures in Table 1 using the findings of recent research represent our best understanding of the significance of off-road equipment at the present time. A range of figures is provided based on the use of a raw emission estimate (high end) and an estimate corrected using information from off-road fuel consumption surveys (low end). Emissions savings estimates in later sections of this RIA are quoted on a consistent basis with these figures and a range of savings relating to the high and low inventory estimates is given.

	NOx (ktonnes pa)	PM (ktonnes pa)
Diesel NRMM	42 - 79	3.0 - 5.6

Table 1: Annual emissions from a fully Stage II compliant NRMM Fleet [DfT estimate]

	NOx (ktonnes pa)	PM (ktonnes pa)
Diesel Rail Traction	9.7	0.2

Table 2: Current annual emissions from diesel rail traction [Source: NETCEN March 2005]

2.4 Main Provisions of the Proposal

The Directive contains 3 stages of future emissions limits (Stage IIIA, IIIB & IV) applying to equipment already within the scope of Directive 97/68/EC. In addition emissions limits are introduced for the first time for commercial inland shipping engines and rail engines. Engines for recreational water craft are excluded from this directive as their emissions are regulated by a separate directive.

2.4.1 Stage IIIA

Stage IIIA will come into force in 2006-8 and will tighten NOx limits by 30-40% relative to Stage II, but makes no reduction in particulate matter (PM) limits other than for the smallest engine category (18-37kW). Stage IIIA is aligned with US Tier III emissions limits and would thus allow industry to offer a single product in both US and EU markets. For small engines (37-75kW) the predicted technology required to meet these limits includes engine modifications, adoption of electronic engine control, improved fuel pumps and limited, uncooled Exhaust Gas Recirculation (EGR). For larger engines which already utilise electronic engine control, the technology predicted to be adopted is engine modifications, common rail injection, air-air charge cooling and limited, uncooled EGR.

The standards proposed for the smallest engine category (18-37kW) are those set in US Tier II legislation. This represents around a 20% reduction in NOx and 25% reduction in PM relative to EU Stage II. Significant further reductions for the smallest engines are considered impractical on the grounds that adding aftertreatment devices would be disproportionately expensive and low power, frequently 2 cylinder engines cannot practically be turbocharged.

2.4.2 Stage IIIB

Stage IIIB will come into force in 2010-12 and tightens PM limits by around 90% relative to Stage II & III, but generally leaves other limits unchanged. It is expected that in addition to the technology described above, this would force the adoption of diesel particulate filters (DPFs) on NRMM. To ensure reliable operation of DPFs fuel of 10 mg/kg sulphur (virtually 'sulphur free') would need to be adopted (NRMM currently uses gas oil which is regulated to 2000 mg/kg sulphur, falling to 1000 mg/kg from 2008).

While DPFs have been developed successfully for the on-road sector and there has been some international experience of traps on non-road equipment, the wide variety of applications in which NRMM engines are used means that further work will be required to develop DPFs suitable for all machinery types.

2.4.3 Stage IV

Stage IV tightens NO_x limits by 75% on >75kW engines, this is expected to force the adoption of Selective Catalytic Reduction (SCR) de-NO_x after treatment systems in addition to DPFs. These systems rely on the addition of urea to reduce the NO_x over a catalyst. There is therefore a risk that users will not keep urea tanks filled up (tanks might need refilling as frequently as once a month), in which case NO_x emissions could be increased to around the levels of a Stage IIIB engine.

2.4.4 Rail & Inland Shipping Engines

The proposal also includes emission standards for all railcar and locomotive engines irrespective of their maximum power. These standards apply provisions similar to, or slightly more relaxed than the Stage IIIA and IIIB 130-560kW NRMM engines. Expected technology requirements are similar to those for 130-560kW NRMM engines.

For inland shipping all engines above 37kW power for commercial inland shipping use are covered, but not those for use in recreational and sea-going vessels. The proposed standard is aligned with the recently published US Tier II marine engine standards, but with 2 year later implementation dates. These standards are predicted to lead to adoption of electronic fuel injection control and keel cooling of charge air and therefore will not require any changes in fuel quality to ensure its reliable operation. The proposal also includes provisions on recognition of Central Commission for Navigation on the Rhine (CCNR) engine emissions approvals. These provisions are dependent on CCNR formally accepting the equivalence of approvals to the directive.

2.4.5 Flexibility

NRMM covers a wide variety of machinery including many specialised applications produced in extremely low volumes. Regular redesign of products which sell in very small numbers is prohibitively expensive. For this reason flexibility provisions are included which allow engine manufacturers to sell a small number of old specification engines. This provides a supply of engines for low volume products allowing equipment manufacturers to delay redesign. This scheme does not apply to engines for rail vehicles or inland waterway vessels since these are all essentially low volume, but high value, products.

2.4.6 Durability

The Directive also introduces emissions durability requirements for NRMM engines requiring manufacturers to demonstrate at the type approval stage that the emissions performance will be maintained across several thousand hours of operation. The exact procedures for demonstrating this are left at the discretion of the manufacturer and approval authority.

2.4.7 Transient Test Cycle

For Stage IIIB a new transient test cycle for particulate emissions testing is introduced (to reduce testing burden the same cycle may optionally be used for gaseous emission testing also). This cycle is intended to better represent the NRMM operating conditions under which peak particulate emissions occur.

2.4.8 Replacement Rail & Inland Shipping Engines

Replacement engines for rail and inland shipping purposes will be required to meet the latest set of emission standards. While this is unlikely to present problems for inland shipping applications it has the potential to cause problems for rail engines. The additional technology required to meet the emission limits in the Directive will make engines larger, meaning that existing railcars and locomotives may need to be re-engineered to accommodate them, significantly increasing the costs to the machinery owner.

3 Options

3.1 Identifying the Options

This is a "single-market" Directive which sets mandatory requirements which the UK is obliged to implement to under EU law. The intention of the Directive is to create uniform emission standards for non-road engines across the EC and therefore the options for implementation are very limited.

3.1.1 Option 1

Do nothing. Do not enact the Directive in UK law.

3.1.2 Option 2

Implement the Directive by regulation.

4 Costs & Benefits

4.1 Business Sectors Affected

The Directive primarily affects manufacturers of engines for the NRMM, rail and shipping which will have to redesign engines to comply with the new standards. In addition machinery manufacturers may have to redesign their products to accommodate new engines the physical dimensions and heat rejection requirements of which may have changed. The UK has three manufacturers of diesel engines for NRMM use and several manufacturers of machinery. Three manufacturers dominate the railcar engine market, one of which part-manufactures some of its engines in the UK. There is also one German owned manufacturer building large locomotive engines in the UK. The UK has three manufacturers of diesel engines for marine use. However the majority of the product range of one of these manufacturers falls below the lower limit of engine power (37kW) covered by the provisions of this proposal.

Machinery users will also be affected by increased equipment and, from Stage IIIB, fuel costs. The main user groups impacted are construction, mining/quarrying, warehousing, agriculture and rail.

4.2 Benefits

4.2.1 Option 1

Economic

Doing nothing, i.e. not implementing the Directive, would bring no economic benefit.

Environmental

This option would result in no environmental benefit.

Social

This option would result in no social benefit.

4.2.2 Option 2

Economic

The Directive has the benefit of maintaining the current broad alignment with US emissions standards thereby continuing to allow manufacturers to sell a common product in EU and US markets. The benefit is twofold for manufacturers selling in both markets, firstly they do not incur the costs associated with developing and producing two different products for different markets and secondly they have larger sales volumes against which to recover their product development costs.

Environmental

The principal purpose of this measure is to reduce NOx and PM emissions, thereby reducing health risks. However it should be noted that a proportion of the equipment covered by this proposal operates outside areas of poor air quality e.g. agricultural machinery. However a large proportion of the machinery does operate in urban areas, e.g. construction equipment, and NOx and PM emissions are not purely a local problem and non-urban NRMM still contributes to background levels of pollution in areas of poor air quality.

The predicted annual emissions savings delivered by each Stage are given in Table 3 (note that these are quoted as cumulative savings rather than incremental savings for each Stage). A range of figures is quoted in line with the range of Stage II inventory figures in Table 1. The savings for each Stage are quoted relative to a 100% Stage II compliant fleet assuming that the entire fleet complies with the new Stage. In practice Stage IV will enter into force before the fleet is 100% compliant with either Stage IIIA or IIIB machinery. Given the long lifetime of some machine types it could take 15 years for the existing fleet to be completely replaced with machinery meeting the new standards. However the average machine lifetime is estimated to be around 7 years so the majority of the fleet will be replaced before this. Table 2 excludes rail or inland shipping engines.

	NOx (ktonnes pa)	PM (ktonnes pa)
Stage IIIA	17 - 32	0.8 - 1.6

Stage IIIB	20 - 37	2.3 - 4.4
Stage IV	27 - 51	2.3 - 4.4

Table 3: Annual emissions savings relative to a Stage II compliant fleet [DfT estimate]

The total emissions from inland shipping are negligible in the UK in comparison to other sources. Therefore the environmental benefits of limits for these engines will also be negligible.

Emissions from the rail sector are more significant but still very small in comparison to other sources. Annual UK emissions savings from diesel rail locomotives (freight and intercity passenger services) and railcars are shown in Table 3. Whilst these are relatively small emissions in and around stations can have a significant impact on local air quality and hence health of those living or working in close proximity to the station. Regulating rail emissions will help rail maintain its credentials as an environmentally sound alternative to road transport.

	NOx (ktonnes pa)	PM (ktonnes pa)
Stage IIIA	5.7	0.05
Stage IIIB	7.1	0.19

Table 4: Annual emissions savings due to rail Stages IIIA & B relative to current once fleet is fully compliant [DfT estimate]

Since railcars and locomotives have a life expectancy in the region of 30 to 35 years, the above benefits will be slow to accrue. However, unlike other NRMM, new replacement rail and inland shipping engines are required by the Directive to meet the latest emissions standards. This is intended to speed up the adoption of cleaner engines in the rail sector. In practice however the high cost of rail engines means that wherever possible they will be overhauled and replaced with a brand new engine only on the rare occasions that they are damaged beyond repair; only in these cases would the environmental benefit be realised. It should also be noted that the above estimates assume no change in the diesel/electric traction split or locomotive/railcar split neither of which is likely to be the case.

A full analysis of the monetary benefits of pollutant emissions reduction requires a detailed benefit assessment that would estimate how changes in emissions impact on air quality concentrations at a detailed spatial level. This would enable a detailed quantification of the health and environmental benefits that arise from improvements in air quality. However in the absence of regional NRMM activity data it is not possible to perform this type of assessment.

As an alternative, it is possible to make use of monetary estimates of damage costs per tonne for the different pollutants and compare the costs with the damage costs saved by the new NRMM emissions standards. Whilst this is less satisfactory than a detailed benefits assessment it is useful as a guide to the relative costs and benefits of the new standards. See Annex A for further information, caveats, etc.

Illustrative damage costs per tonne for PM₁₀ and NO_x have recently been estimated for the transport context. Given that NRMM emission limits would apply UK wide, the appropriate

damage costs are those calculated at that level. These damage costs are presented in Table 4 and can be compared to the estimates of cost effectiveness presented in section 6.

Damage costs per tonne from transport ⁴		
Pollutant	UK national average - £ per tonne	
	Central Low	Central High
PM ₁₀	9,492	59,230
NO _x	173	1,098

Table 5: Damage costs per tonne of pollutant [Source: AEA Technology (July 2004), provisional estimates, discounted values]

It should be noted that these damage costs are a subset of all the potential damages caused by PM₁₀ and NO_x emissions and are therefore likely to be underestimates of the real damage costs per tonne associated with these pollutants. In addition, while this analysis focuses solely on costs and benefits to the UK from UK action, there would be additional air quality benefits to the UK from EU action.

Social

Other than the environmental benefits outlined above there are no additional social benefits identified.

4.3 Costs

4.3.1 Option 1

Economic

By not implementing this Directive there would be a number of costs imposed on the UK. Primarily this is a mandatory Directive which the UK is obliged to implement. Failure to do so would leave the UK open to infraction proceedings and periodic fines from the European Court of Justice that would continue until such time as the Directive is brought into effect in the UK. In addition to this NRMM contribute to UK emissions of NO_x and PM and could contribute to exceedences of binding air quality standards. Failure to meet the binding EU air quality standards for NO₂ and PM would leave the UK open to further fines from the ECJ.

In addition, without controls on emission standards for new engines it is possible that old engines or those built for markets outside the EU or United States could be "dumped" on the UK market. This would place manufacturers building machinery with compliant engines at a competitive disadvantage. Should they respond by marketing machinery built to lower standards they would incur the additional costs of manufacturing machinery to two sets of standards those for the US & EU and those for the UK and developing nations. Consequently the benefits of international harmonisation of emission standards results in lowering development and approval costs for engines, allowing manufacturers to spread development costs, would not be realised.

⁴ There are a number of important caveats to the damage cost figures that are summarised in Annex A. These need to be taken into account in the interpretation of the benefits.

Environmental

While there would be no direct cost of not implementing the Directive the UK would not benefit from the emissions reductions that would result from this measure.

Social

There are no social costs involved in the UK not implementing this Directive.

4.3.2 Option 2

Economic

UK manufacturers of diesel engines for NRMM use and manufacturers of machinery will face increased costs in producing emissions compliant machines. It is expected that these costs will be passed on to end-users. The main user groups impacted are construction, mining/quarrying, warehousing, agriculture and rail. In addition to an increase in equipment purchase cost these industries will face increased fuel costs once Stage IIIB enters into force.

Whilst this Directive does not mandate improved fuel quality, the technology predicted to be required for Stage IIIB is expected to require sulphur free fuel to operate reliably. The Commission have indicated that they will introduce a directive to mandate this fuel quality for NRMM at a later date subject to the requirement for the fuel being confirmed. The oil industry are required to introduce sulphur free fuel for road use from 2005 with all road fuel having to comply from 2009. However to meet the additional demand for sulphur free fuel for NRMM the refiners may have to install additional capacity and production of fuel of this quality is more energy intensive. UKPIA have estimated that this would increase the costs of NRMM fuel by 1.4p/l relative to the gas oil currently used. Additional costs will be incurred in the fuel distribution network to store an additional grade of fuel (sulphur free, dyed gas oil).

4.3.2.1 NRMM Unit Cost Increases

There is a large element of uncertainty in estimating the costs of future emissions limits, especially where these would necessitate the deployment of technology which has never before been mass produced e.g. particulate traps, de-NO_x aftertreatment systems. Available figures on likely costs of these aftertreatment systems vary greatly, however costs of particulate and de-NO_x aftertreatment systems appear to be of a similar order of magnitude. Consequently a very rough estimate of around £920 per system has been used for 75-130kW engines with some reduction in costs for smaller engines and increases for larger engines to account for the physical volumes of the systems varying with engine capacity. This cost is believed to take a reasonably optimistic view of cost reductions for mass production. Available sales data for NRMM is limited adding further uncertainty to total cost estimates. The following figures are therefore supplied only as a rough estimate and it should be noted that they are very sensitive to input assumptions. Estimated unit cost increases for redesigning engines to comply with the standards vary depending on engine power category. The estimated cost increases for the main engine categories, excluding rail and shipping engines, to achieve Stage IV limits are given in Table 5.

	37-75kW	75-130kW	130-560kW
Stage IIIA	£640	£440	£1010
Stage IIIB	£1410 - 1500	£1400	£2450
Stage IV	£1410 - 2360	£2360	£3760

Table 6: Engine unit cost increases relative to Stage II [DfT estimate]

There is an additional cost for modifying existing machinery designs to accept redesigned engines, for common applications this cost increase is estimated to range from £40-220 although it can be much higher for low volume products.

4.3.2.2 NRMM UK Total Costs

The estimated annual cost increases to the UK relative to Stage II machinery, excluding rail and inland shipping engines, is given in Table 7. These are entirely policy costs, there are no significant implementation costs. It seems likely that from Stage IIIB engines will require use sulphur-free fuel to meet the standards. If this is required fuel distributors would need to install new storage tanks to separate this fuel from higher sulphur heating gas oil. Users with a need for both high cost, sulphur free machinery fuel and low cost, high sulphur heating oil would also need to install new storage tanks to separate the two grades. Estimated costs for sulphur-free fuel and associated storage costs are given in Table 7. Storage costs have been amortised over a 5 year period for users and 10 years for distributors. An annual usage of red diesel in the UK in off-road engines of 2 Mt including agricultural tractors has been assumed.

	Cost (£m pa)
Stage IIIA	£35m
Stage IIIB	£69m
Stage IV	£87m
Stage IIIB & IV Fuel Costs	£60m, falling to £33m once storage costs amortised

Table 7: Annual costs to the UK of each Stage (excluding rail and shipping engines) relative to Stage II costs. [DfT estimate]

4.3.2.3 Inland Shipping Costs

The only available information on the cost impact of the inland shipping requirements is that in the US regulations. However it has been suggested that the full development cost included in these figures should not be accounted in the EU due to some of the costs already having been recovered against US sales and the greater sales volume of an aligned US-EU market. For this reason only 50% of the development costs have been used giving unit cost increases of £740-£1,310 (approximately 8-15%) for the most common engines (37-560kW), with the largest commercial marine engines sold in the UK (around 1MW power) increasing by £8,450 (approximately 3%). These costs would decrease substantially after several years once development costs had been recovered. Sales figures purely for inland shipping engines as opposed to coastal shipping engines are not available, consequently total annual costs to the UK cannot be estimated. However based on combined inland and coastal shipping engines sales figures it is clear that total annual costs would be well below £1 million.

4.3.2.4 Rail Costs

No data on cost of compliance with the proposed standards for rail engines is available. However a rough estimate to indicate the order of magnitude of the costs can be produced by assuming that railcar engine unit cost increases are similar to costs for 130-560kW NRMM engines and locomotive engine costs are two to three times higher. Equipment redesign costs have been assumed to be twice as high as for low volume NRMM due to the very low production numbers of rail vehicles. Assuming a uniform replacement rate of existing equipment this estimate gives an annual cost of £0.3m for Stage IIIA and 0.7m for Stage IIIB.

These estimates are low due to the slow replacement rate of rail vehicles. A far more significant cost would be the cost of converting all rail fuel to sulphur free (required to support Stage IIIB technology) this is estimated to be in the order of £5.5million per annum.

Although rail operators might consider passing NRMM costs to passengers, the impact on fare payers is likely to be insignificant. During 2004-05, total revenue from UK rail fares was £4.158 billion. The annual cost of implementing Stage IIIB (including equipment replacement and use of sulphur free diesel) is £6.2 million. That figure amounts only to 0.15% of 2004-05 annual fare revenue.

Environmental

The adoption of particulate trap technology, likely to be required to meet the Stage IIIB limits may result in poorer fuel economy of engines and therefore higher CO₂ emissions, but this is only likely to be in the order of 2%.

Social

There are no additional social costs associated with this Directive.

5 Cost Effectiveness

The following cost effectiveness figures are calculated using the cost of replacing the entire fleet, fuel cost over the fleet lifetime (both in net present value) and the lifetime emissions savings from a compliant fleet of machinery. Costs are split between NOx and PM savings in proportion to the costs of technology adopted to control each pollutant. Where fuel costs are included these are attributed entirely to PM saving.

	NOx (£/tonne)	PM (£/tonne)
Stage IIIA	850 - 1620	1010 - 1930
Stage IIIB	750 - 1430	6800 - 12900
Stage IIIB including fuel cost	750 - 1430	19800 - 37700
Stage IV	820 - 1560	6800 - 12900
Stage IV including fuel cost	820 - 1560	19800 - 37700

Table 8: Estimated cost effectiveness for each Stage excluding rail and shipping [DfT estimate]

Due to lack of data on emissions from inland shipping and costs of compliance with the proposed rail standards it has not been possible to estimate the cost effectiveness of the proposed measures. Given the uncertainty over costs for the rail sector cost effectiveness cannot be estimated with any confidence, however as a broad indicator the above costs and emissions savings would imply cost effectiveness figures in tens of pounds per tonne NOx saved and around £17,000 per tonne PM saved (mainly due to the fuel costs). These compare extremely favourably with other emissions reduction measures due to the long life of rail vehicles and the high number of hours operated per year.

As indicated earlier, it is possible to make use of monetary estimates of damage costs per tonne for NO₂ and PM₁₀ (as set out in section 4) and compare with the estimates of costs per tonne by each scenario. This is not intended to replace a detailed benefits assessment but is useful as a guide to the relative costs and benefits of the emissions standards set out in section 5. On this basis, the estimates for cost per tonne for PM are within the range of the damage

costs per tonne PM₁₀⁵, indeed for Stage IIIA the costs are below the central low damage cost figure. This is an initial indicator that the costs of the proposal would be justified by the benefits. In the case of NO_x control, the cost per tonne estimates are at the high end of the damage cost per tonne for NO₂ or are above the central high cost figure. This initial analysis suggests the costs and benefits for tighter NO_x standards may not be as well justified as for PM. However limitations in the damage cost per tonne estimates, especially for NO_x, renders this comparison less precise. Furthermore, the UK is subject to legally binding total NO₂ emission ceiling (currently under review) and NO_x from NRMM is a significant contributor to total UK emissions.

6 Issues of Equity and Fairness

The requirements apply equally to all engine & equipment manufacturers and importers in the UK and the EU as a whole. User groups with a requirement for both heating oil and machinery fuel, e.g. cereal farming where gas oil is used for grain drying, will bear higher costs than other NRMM users as they will have to either install additional fuel storage facilities when Stage IIIB comes into force in order to store both heating gas oil and sulphur free machinery fuel or use, more expensive, sulphur free fuel for heating purposes as well as machinery fuel.

7 Consultation with small business: the Small Firms' Impact Test

The Small Business Service have been consulted, as have a number relevant trade associations and industry representatives, and it is clear that this regulation will not impact disproportionately on small firms.

8 Competition Assessment

The market affected by this Directive is the UK diesel, off-road engine market. In addition Stage IIIB and IV will create a market for off-road diesel aftertreatment systems. It is not expected to have a major impact on competition despite these markets being dominated by a small number of large manufacturers. The cost impact is expected to be similar across all firms and the proposal is unlikely to affect the market structure. The proposal will not create higher costs for new manufacturers than for existing manufacturers, however it should be noted that set up costs in diesel engine manufacturing are high which has tended to discourage new entrants to the market. The NRMM engine market is not characterised by rapid technological change, changes tend to be in response to legislation. Although the Directive will not restrict the range of products offered by engine manufacturers it could have an adverse affect on the range of machinery produced by equipment manufacturers if redesign cost for niche products are too high. However the inclusion of flexibility arrangements in the Directive is specifically designed to address this issue so restriction in product range should not be a problem.

9 Enforcement and Sanctions

The Non-Road Mobile Machinery (Emission of Gaseous and Particulate Pollutants) Regulations 1999 are already enforced in the UK by the Vehicle Certification Agency. Although this proposal would broaden the scope of the regulations to engines for inland waterway and rail applications, the numbers involved are not significant and the costs of enforcement are not expected to increase. This proposal does not change the sanctions for non-compliance.

⁵ Central high estimate for PM₁₀ is £59,230 per tonne and for NO₂ £1,098 per tonne.

10 Monitoring and Review

Article 2 of Directive 2004/26/EC requires the European Commission to review certain aspects of the Directive. This includes confirming the Stage IIIB and IV limit values and evaluating the possible need for additional flexibilities, exemptions or later introduction dates.

11 Consultation

11.1 Within Government

The Department for Transport have consulted widely within government during negotiation on the Directive, including MCGA, SRA, DEFRA, DTI, Cabinet Office, FCO and the Devolved Administrations.

11.2 Public Consultation

The UK consulted on the Commission proposal in March 2003 including engine manufacturers, major equipment manufacturers and trade associations. The consensus of opinion from those most closely involved is that the most important issue for industry is that of global harmonisation. Manufacturers have stressed that the non-road industry has much lower design resource than the on-road sector and also much lower sales volumes against which to recover development costs, with many niche products. For these reasons they considered it essential to be able to develop a single product for EU & US markets and supported aligning EU with US-EPA standards.

UK manufacturers of engines used for railcar and inland shipping applications are also supportive of the proposal since it aligns these aspects with US requirements. Train operators, however, would have preferred the greater flexibility offered by standards adopted by means of Technical Specifications for Interoperability under the rail interoperability directives. Of the user groups consulted the National Farmers Union expressed great concern at the projected Stage IIIB costs, especially the on-going cost of improved fuel quality.

12 Summary and Recommendation

Option	Total cost per annum Economic, environmental, social	Total benefit per annum Economic, environmental, social
1	Infraction costs, daily fine level unknown	None
2. Transpose Directive by UK Regulation	£147 million falling to £120 million once fuel storage costs amortised	27 - 51 ktonnes reduction in annual NOx emissions 2.3 - 4.4 ktonnes annual reduction in PM emissions

It is recommended that the Directive is transposed into UK regulation. This will benefit engine and equipment manufacturers by ensuring continued alignment of Non-Road emissions legislation with US requirements. In addition it will deliver useful emissions benefits assisting UK in meeting air quality targets and reducing the adverse effects of air pollution on public health. The costs of implementing the directive compare favourably with the monetised health benefits implied by the estimated emissions savings.

13 Ministerial Declaration

I have read the Regulatory Impact Assessment and I am satisfied that the benefits justify the costs

Signature **S.J. Ladyman** Date **9th January 2006.**

Dr Stephen Ladyman
Minister of State
Department for Transport

14 Contact Details

Comments or enquiries regarding this RIA should be directed to;

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Notes on use of Environmental Damage Costs

The values presented in Section 4 of the RIA show the environmental costs per tonne of emissions. A central low and central high value is provided. The range refers to a restricted central range, based only on different analysis (of impacts and valuation) for two key health endpoints (acute and chronic mortality). All values are consistent with the analysis within the forthcoming DEFRA report, entitled 'An Evaluation of the Air Quality Strategy'.

Important Caveats

1. The following notes should be attached to any use of the values:
2. Numbers **only** include costs that occur in the UK - all transboundary pollution and impacts are excluded
3. Values for NO_x include secondary particulate (PM₁₀) formation (nitrates)
4. Values for NO_x do **NOT** include ozone formation and effects
5. The analysis assumes no threshold of effects
6. Future life years lost have been discounted using agreed 1.5% discount rate
7. **Central low** assumes £3100 for death brought forward and £31500 per life year lost, with future life years discounted (1.5%).
8. **Central high** assumes £110000 for death brought forward and £65000 per life year lost, with future life years discounted (1.5%)
9. All chronic mortality impacts use original PM_{2.5} functions for PM₁₀ pollution data.
10. External costs of air pollution vary according to a variety of environmental factors, including overall levels of pollution, geographic location of emission sources, height of emission source, local and regional population density, meteorology and so on. These numbers take these issues into account to a certain degree only.
11. The numbers exclude several categories of impact. They are therefore a sub-total of overall costs. The key areas excluded are:
 - Effects of NO_x on ozone formation (note: ozone effects from NO_x could be positive as well as negative, due to issues with local NO + ozone reactions, and regional precursor levels).
 - Effects on ecosystems (acidification, eutrophication, etc).
 - Effects on cultural or historic buildings from air pollution.
 - Chronic mortality health effects from PM₁₀ on children.
 - Chronic morbidity health effects from PM₁₀.
 - Morbidity and mortality health effects from chronic (long-term) exposure to ozone.

- Change in visibility (visual range).
- Effects of ozone on materials, particularly rubber.
- Non-ozone effects on agriculture.

TRANSPOSITION NOTE

EUROPEAN PARLIAMENT AND COUNCIL DIRECTIVE 2004/26/EC of 21 April 2004 amending Directive 97/68/EC on the approximation of the laws of the Member States relating to measures against the emission of gaseous and particulate pollutants from internal combustion engines to be installed in non-road mobile machinery.

Article	Objectives	Implementation	Responsibility
Article 1(1)	Inserts definition of 'inland waterway vessel' into article 2 of Directive 1997/68/EC.	This provision is implemented by regulation 3(5) & (6) of the Non-Road Mobile Machinery (Emission of Gaseous and Particulate Pollutants) (Amendment) Regulations 2006 ("the 2006 Regulations"). See the inserted reg 2(1)(za) and (1A) of the Non-Road Mobile Machinery (Emission of Gaseous and Particulate Pollutants) Regulations 1999 ("the 1999 Regulations").	The Secretary of State.
Article 1(1)	Inserts definition of 'original equipment manufacturer (or 'OEM')' into article 2 of Directive 1997/68/EC.	This provision is implemented by regulation 3(5) of the 2006 Regulations. See the inserted reg 2(1)(ze) of 1999 Regulations.	The Secretary of State.
Article 1(1), (2)(b), (3), (7)(b) and (8)(c) (see also entry below for Annex 3)	Article 1(1) inserts definition of 'flexibility scheme' into article 2 of Directive 1997/68/EC. Article 1(2)(b), (3), (7)(b) and (8)(c) provide for a limited number of compression ignition ("CI") engines to be placed on the market under a flexibility scheme where they meet the previous (rather than the latest) limit values applying to emissions of pollutants.	This provision is implemented by regulation 17 of the 2006 Regulations. This regulation inserts Schedule 9 to the 1999 Regulations and paragraphs 9 to 13 of that Schedule make provision for approval of flexibility schemes.	The Secretary of State.
Article 1(2)(a)	Amends Annex 8 of Directive 1997/68/EC (which deals with the numbering of type approval certificates).	Annex 8 is already applied by regulation 9(5) of the 1999 Regulations. Regulation 3(2) of the 2006 Regulations amends the definition of "Directive 1997/68/EC" to	The Secretary of State.

		include amendments made by Directive 2004/26/EC. No further provision is required.	
Article 1(4) (see also entry below for Annex 4)	<p>Inserts article 7a into Directive 1997/68/EC.</p> <p>Inserted article 7a(1) to (3) of Directive 1997/68/EC exempts CI engines which meet the requirements of the Mannheim Convention for Navigation of the Rhine.</p> <p>Inserted article 7a(4) directs the technical committee established by article 15 of Directive 1997/68/EC to amend Annex 7 to that Directive.</p> <p>Inserted article 7a(5) provides that auxilliary engines with a power output over 560kW are to be treated in the same way as propulsion engines.</p>	<p>Implementation of article 7a(1) to (3) is by paragraph 15 of Schedule 9 to the 1999 Regulations (which is inserted by regulation 17 of the 2006 Regulations).</p> <p>No implementation required in 2006 Regulations.</p> <p>Implementation of article 7a(5) is by paragraph 4(b) of Schedule 8 to the 1999 Regulations (which is inserted by regulation 17 of the 2006 Regulations).</p>	The Secretary of State.
Article 1(5)(a) and (b)	Removes references to registration of new engines.	There is no system in the UK requiring the registration of new engines. No implementation required.	The Secretary of State.
Article 1(5)(c)	Requires that member States must not issue a Community Inland Water Navigation Certificate under Directive 82/714/EC for an inland waterway vessel the engines of which do not meet the requirements of Directive 1997/68/EC.	<p>The UK does not issue Community Inland Water Navigation Certificates. There is no legislation to permit the issue of such certificates. Instead, the Secretary of State (through the Maritime and Coastguard Agency) issues certificates of compliance with Directive 82/714/EC.</p> <p>Regulation 16 of the 2006 Regulations prohibits the issue of certificates of compliance where the engines of a vessel do not comply with the requirements of</p>	The Secretary of State.

		Directive 1997/68/EC.	
Article 1(6) (see also entry below for paragraph 1(1)(b) of Annex 1)	<p>Inserts article 9(3e) and (4a) in Directive 1997/68/EC. See also following entries for other obligations imposed by article 1(6).</p> <p>Requires Member States to impose restrictions on the placing on the market of, and to require type approval for, engines which are for use in inland waterway vessels.</p>	<p>These provisions are implemented by regulations 5 and 17 of the 2006 Regulations.</p> <p>Regulation 5 inserts regulations 3A to 3C into the 1999 Regulations. These inserted provisions refer to the tables in Schedule 8 of the 1999 Regulations and impose restrictions relating to the placing on the market and type approval of engines for use in inland waterway vessels. These restrictions include the requirement to comply with the emissions limits imposed on an engine falling within a particular category. An engine falls within a given category depending on when it is placed on the market (regulation 3B(3) of the 1999 Regulations) or when the application for type approval is made (regulation 3C(3) of those Regulations).</p> <p>Regulation 17 inserts Schedule 8 into the 1999 Regulations. For details as to the period of duration of the emissions limits applying to a category of engine installed in an inland waterway vessel, see paragraph 4 (and Table 3) of that Schedule.</p>	The Secretary of State.
Article 1(6) (see also entry below for paragraph 1(1)(a) of Annex 1)	<p>Inserts article 9(3h), (3i) and (4a) in Directive 1997/68/EC.</p> <p>Requires Member States to impose restrictions on the placing on the market of, and to require type approval for, engines which are for use in</p>	<p>These provisions are implemented by regulations 5 and 17 of the 2006 Regulations.</p> <p>Regulation 5 inserts regulations 3A to 3C into the 1999 Regulations. These inserted provisions impose restrictions relating to the placing on the market and</p>	The Secretary of State.

	<p>locomotives.</p>	<p>type approval of engines for use in locomotives. The further comments made in the same column of the previous entry also apply here.</p> <p>Regulation 17 inserts Schedule 8 into the 1999 Regulations. For details as to the period of duration of the emissions limits applying to a category of engine installed in a locomotive, see paragraph 5 (and Table 4) of that Schedule.</p> <p>The provisions inserted by article 1(6) also contain exemptions for contracts entered before 20th May 2004 (see articles 9(3h) and (3i) of Directive 1997/68/EC). These are implemented by paragraphs 17 to 19 of Schedule 9 to the 1999 Regulations, inserted by regulation 17 of the 2006 Regulations.</p>	
<p>Article 1(6) (see also entry below for paragraph 1(1)(a) of Annex 1)</p>	<p>Inserts article 9(3f), (3g) and (4a) in Directive 1997/68/EC.</p> <p>Requires Member States to impose restrictions on placing on the market of, and to require type approval for, engines which are for use in railcars.</p>	<p>These provisions are implemented by regulations 5 and 17 of the 2006 Regulations.</p> <p>Regulation 5 inserts regulations 3A to 3C into the 1999 Regulations. These inserted provisions impose restrictions relating to the placing on the market and type approval of engines for use in railcars. The further comments made in the same column of the entry relating to inland waterway vessels also apply here.</p> <p>Regulation 17 inserts Schedule 8 into the 1999 Regulations. For details as to the period of duration of the emissions limits applying to a category of engine installed in a railcar, see paragraph 6 (and Table 5) of that</p>	<p>The Secretary of State.</p>

		Schedule.	
Article 1(6)	<p>Inserts article 9(3a), (3c), (3d) and (4a) in Directive 1997/68/EC.</p> <p>Requires Member States to impose new emission limits (stages IIIA, IIIB and IV) on intermittent speed CI engines which are for use in applications other than inland waterway vessels, locomotives or railcars.</p>	<p>These provisions are implemented by regulations 5, 6(2), 8(2) and (3) and 17 of the 2006 Regulations.</p> <p>Regulation 5 inserts regulations 3A to 3C into the 1999 Regulations.</p> <p>For intermittent speed CI engines, these inserted provisions also restate existing limits for emissions limits applying at Stages I and II. Regulations 6(2) and 8(2) and (3) revoke the existing provisions of the 1999 Regulations that apply to Stages I and II. Certain exemptions depend on compliance with emission limits applying to a previous stage. These are in regulation 7A of, and paragraphs 5, 11(b) and 18(2)(d) of Schedule 9 to, the 1999 Regulations (Schedule 9 is inserted by regulation 17 of the 2006 Regulations). It is for this reason that apparently spent provisions are reproduced in the 1999 Regulations.</p> <p>Regulations 3A to 3C also impose the new emissions limits for intermittent speed engines covering Stages IIIA, IIIB and IV.</p> <p>Regulation 17 inserts Schedule 8 into the 1999 Regulations. For details as to the period of duration of the emissions limits applying to a category of intermittent speed CI engines at any of Stages I to IV, see paragraph 2 (and Table 1) of that Schedule.</p>	The Secretary of State.
Article 1(6)	<p>Inserts article 9(3b) and (4a) in Directive 1997/68/EC.</p>	<p>These provisions are implemented by regulations 5, 6(2), 8(2) and (3) and 17 of the 2006 Regulations.</p>	The Secretary of State.

	<p>Requires Member States to impose new emission limits (Stage IIIA) on constant speed CI engines which are for use in applications other than inland waterway vessels, locomotives or railcars.</p>	<p>Regulation 5 inserts regulations 3A to 3C into the 1999 Regulations.</p> <p>For constant speed CI engines, these inserted provisions also restate existing limits for emissions limits applying at Stages I and II. Regulations 6(2) and 8(2) and (3) revoke the existing provisions of the 1999 Regulations that apply to Stages I and II. Certain exemptions depend on compliance with emission limits applying to a previous stage. These are in regulation 7A of, and paragraphs 5, 11(b) and 18(2)(d) of Schedule 9 to, the 1999 Regulations (Schedule 9 is inserted by regulation 17 of the 2006 Regulations). It is for this reason that apparently spent provisions are reproduced in the 1999 Regulations.</p> <p>Regulations 3A to 3C also impose new emissions limits for constant speed engines covering Stage IIIA.</p> <p>Regulation 17 inserts Schedule 8 into the 1999 Regulations. For details as to the period of duration of the emissions limits applying to a category of constant speed CI engines at any of Stages I to IIIA, see paragraph 3 (and Table 2) of that Schedule.</p>	
<p>Article 1(6)(d)</p>	<p>Inserts article 9(4a) into Directive 1997/68/EC. See also preceding entries for other obligations imposed by article 1(6)(d).</p> <p>The penultimate paragraph of article</p>	<p>This is implemented by paragraph 5 of Schedule 9 to the 1999 Regulations. Schedule 9 is inserted by regulation 17 of the 2006 Regulations.</p>	

	<p>9(4a) provides an exemption for all CI engines which are subject to emissions limits at Stages IIIA, IIIB or IV. This exemption applies if the engine has a production date before commencement of the next Stage of emissions limits and if the engine meets the previous (rather than the latest) limit values applying to emissions of pollutants.</p>		
Article 1(7)(a)	<p>Amends article 10(1) and (1a) of Directive 1997/68/EC.</p> <p>Provides for engines to be exempt in certain circumstances, from complying with the limit values on emissions of pollutants.</p> <p>The first indent of the inserted article 10(1) of Directive 1997/68/EC provides an exemption for CI engines used by the armed services.</p> <p>The second indent of the inserted article 10(1) of Directive 1997/68/EC, together with article 10(1a), provides an exemption for replacement CI engines. Inserted article 10(1a) excludes from the scope of this exemption replacement engines for inland waterway vessels, locomotives or railcars.</p>	<p>This is implemented by regulations 5, 11 and 17. Regulation 5 inserts regulation 3B(1)(b) and 3C(4) into the 1999 Regulations. These inserted provisions introduce the exemptions contained in Schedule 9 to those Regulations. Schedule 9 is inserted by regulation 17 of the 2006 Regulations.</p> <p>The first indent is implemented by paragraph 2 of Schedule 9 to the 1999 Regulations.</p> <p>The second indent and paragraph (1a) are implemented by paragraph 7 of Schedule 9 to the 1999 Regulations. Regulation 11 of the 2006 Regulations gives effect to this exclusion.</p> <p>The third and fourth indents are implemented by</p>	<p>The Secretary of State.</p>

	<p>The third and fourth indents of the inserted article 10(1) of Directive 1997/68/EC provides an exemption for CI engines used for launch and recovery vessels.</p>	<p>paragraph 3 of Schedule 9 to the 1999 Regulations.</p>	
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