

**Mobil Delvac**

**80** YEARS  
of Heavy Duty  
Performance

# Mobil Delvac Guide



# Emission standards for Heavy-Duty Diesel engines

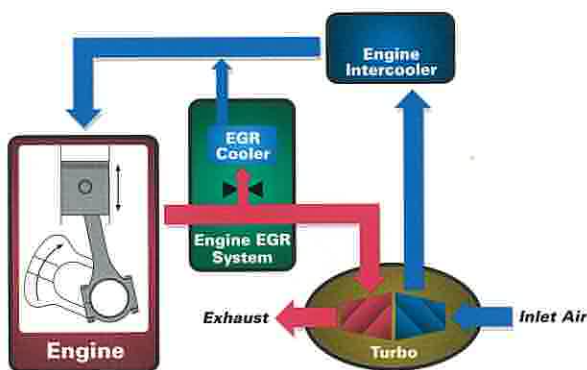
## Brief history

Since 1990 one of the main driving forces behind the development of new engine technologies has been the concern over the environmental and public health impacts of diesel engine emissions.

As heavy-duty diesel emissions standards for nitrous oxides (NOx), solid particulate matter (PM), hydrocarbons and carbon monoxide continue to get tighter and tighter, Original Equipment Manufacturers (OEMs) have been forced to find innovative ways to meet these requirements while still meeting customer needs for power and efficiency.

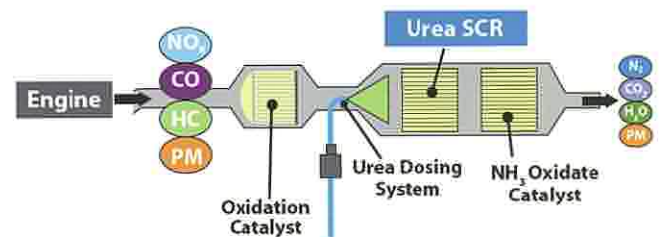
Very early engine modifications were fairly simple and involved changes to the piston and fuel injection system that were often invisible to the buyer. But later, OEMs began incorporating new engine design technologies such as EGR (Exhaust Gas Recirculation), SCR (Selective Catalytic Reduction) and ACERT (Advanced Combustion Emissions Reduction Technology). Although there are variations within most systems here is an overall summary of how they work:

**EGR** - works by re-circulating up to 20% of the exhaust gas – this is metered and controlled by the electronic management system back into the intake system. The goal of introducing EGR systems is to lower the level of NOx in the exhaust.



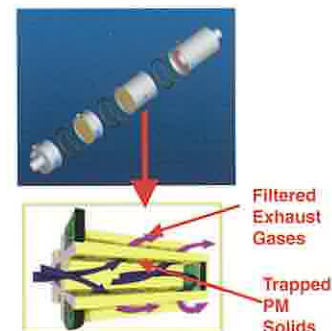
**ACERT** - Caterpillar has taken this approach through the use of its proprietary ACERT system that involves control of engine and fuel injection timing. It is managed by advanced electronic controls, taking advantage of modifications to intake, engine, and exhaust components, in addition to a diesel oxidation catalytic converter, to reduce emissions.

**SCR** - is a technology that injects urea (a liquid reductant agent often called AdBlue) through a catalyst into the exhaust stream of a diesel engine. The urea sets off a chemical reaction that converts NOx into nitrogen and water, which is then expelled out the tailpipe of the vehicle. The aim of this technology is primarily to reduce NOx with a side benefit of burning off PM through higher combustion temperatures.



**DPF / DOC's** - known as Diesel Particulate Filters (DPFs) and Diesel Oxidation Catalysts (DOCs) these devices are installed in the engine's exhaust gas stream to reduce particulate matter from the exhaust gas. In Australia only 2008 engines meeting Japanese JE05 long term emissions standards will require these devices and critically will need to be combined with the use of low "ash" (non-combustible residue that is left behind from metal-containing detergent additives) engine oils.

## Diesel Particulate Filter



With the emergence of these new low emission engine designs and the tough needs of today's transport operators there is always a common thread associated with these changes: greater engine oil performance is almost always required to meet the harsher operating conditions of the new designs.

# A brief history and new challenges

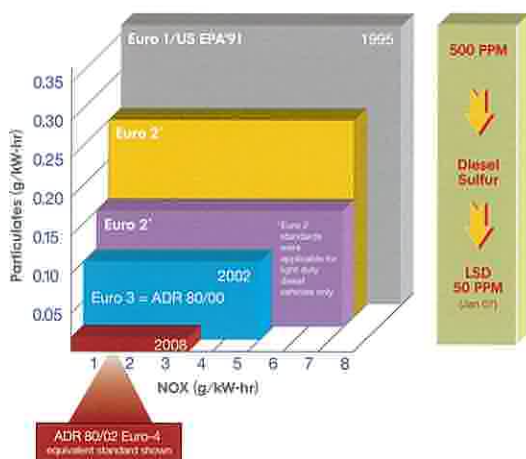
## Today

So, what is happening in Australia in 2008? For more than a decade the primary focuses of emissions standards has been nitrous oxides (NOx) and Particulate Matter (PM). This continues with the latest Australian government legislation known as ADR (Australian Design Rule) 80/02 that is mandated for model-year 2008 on-highway diesel engines.

The background to ADR 80/02 is based on European emissions legislation known as Euro 4, but gives flexibility to OEMs by accepting compliance to alternative standards of US EPA 2004 and Japanese JE05 long term.

As clearly illustrated in the emissions graph, these new reductions are quite dramatic in comparison to previous years which, in turn, represents a significant challenge not only to engine builders, but lubricant and fuels manufacturers as well.

## 2008 Australia On-highway Emission Standards (ADR 80/02)

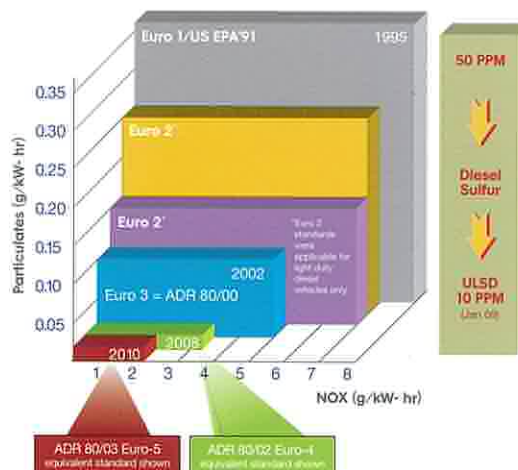


## What does the future look like?

In January 2010 all new models in Australia will have to meet ADR 80/03 (and all models by January 2011), which is equivalent to Euro 5 emission standards with acceptable alternatives of US EPA 07 and Japanese JE05 long term. Again, as you can see from the emissions graph below, this represents a further significant decrease in NOx and will result in further diesel engine changes – for example, a likely increase in EGR rates on EGR engines and a greater use of DPF / DOC's. In conjunction with these ADR changes there will also be a move to Ultra low Sulphur diesel at 10 ppm in January 2009.

With all these new engine designs emerging there is also going to be a greater use of the API CJ-4 and ACEA E6 category oils which were developed to address engine oil performance in low emission engines operating in a more severe environment.

## 2010/11 Australia On-highway Emission Standards



## So, do you need to worry?

Not if you're using our new Delvac product line! Mobil Delvac is successful at extending the life of heavy-duty engines because we start with the proper balance of lubricant performance attributes. Something we call our recipe for extended engine life. It starts with the development of a product that is able to resist degradation and control deposit brought in by increased temperatures. We then make certain it successfully disperses soot and other contaminants. And lastly, we ensure it provides outstanding protection from wear. The correct combination of these attributes enable Mobil Delvac technology to lengthen the life of heavy-duty equipment, whether it's used with low-emissions engines or hard-working older engines.

# Diesel Engine Oil



## Mobil Delvac 1 ESP 5W-40

Mobil Delvac 1 ESP 5W-40 is a fully synthetic supreme performance heavy duty diesel engine oil that helps extend engine life while providing long drain capability and potential fuel economy for modern diesel engines operating in severe applications. Recommended for use in a wide range of heavy-duty applications and operating environments found in the on-road transport and off-road mining, construction, marine, and agricultural industries.

API	CJ-4, CF, SM
Caterpillar	ECF-3
Cummins	CES 20081
Mack	EO-O Premium Plus
Volvo	VDS-4
Mercedes Benz	228.3/228.31
Others	ACEA E7



## Mobil Delvac XHP LE 10W-40

Volvo	VDS-3
Mercedes Benz	228.5/228.51
MAN	MAN 3277 CRT, MAN 3477
ACEA	E7/E6
Others	MTU Type 3.1 Scania Low Ash



Mobil Delvac XHP LE 10W-40 is a synthetic extra high performance diesel engine oil engineered for European high performance, low emissions engines used in severe on-highway applications. This engine oil is designed using high performance base oils and a new advanced additive system that has been expertly engineered to help prolong the life and efficiency of emission reduction systems such as Diesel Particulate Filters (DPF). Fully backward compatible the product will also deliver the same high performance in older conventional European engines.



## Mobil Delvac MX ESP 15W-40

Mobil Delvac MX ESP 15W-40 is an extra high performance diesel engine oil delivering outstanding performance in modern, high-output, low-emission engines including those with Exhaust Gas Recirculation (EGR) and Diesel Particulate Filters (DPF). Fully backwards compatible, Mobil Delvac MX ESP will also deliver the same exceptional performance in older conventional engines. As a result, it exceeds the API CJ-4, CI-4 PLUS and CI-4 service categories.

API	CJ-4, CF, SM
Caterpillar	ECF-3
Cummins	CES 20081
Mack	EO-O Premium Plus
Volvo	VDS-4
Mercedes-Benz	228.3/228.31
Japan	JASO DH-2
Others	ACEA E7



## Mobil Delvac MX 15W-40

API	CI-4, CF, SL
Caterpillar	ECF-2
Cummins	CES 2007B/71/76/72/71
Mack	EO-N Premium Plus
Volvo	VDS-3
Mercedes Benz	MB 228.3
Japan	JASO DH-1
Others	ACEA E7



Mobil Delvac MX is a high performance diesel engine oil meeting the tough demands of modern diesel engines. It delivers excellent soot control, reduced engine scuffing and bore-polishing as well as reduced oil consumption, and is ideal for mixed fleets needing a broad coverage of US, European and Japanese OEM's oil specifications. Now suitable for Japanese engines requiring specification JASO DH-1



### Engine

Mobil Delvac 1 ESP 5W-40  
Mobil Delvac XHP LE 10W-40  
Mobil Delvac MX ESP 15W-40  
Mobil Delvac MX 15W-40

### Fifth Wheel

Mobilgrease XHP 222 Special

### Hydraulics

(e.g. Dump Trucks)  
Mobil DTE 26, Nuto H68

### Universal Joints

Mobilith SHC 220  
Mobilgrease XHP 222

### Differential

Mobil Delvac Synthetic Gear Oil  
Mobilube HD Series range

### Clutch Throw Out Bearings

Mobilith SHC 220  
Mobilgrease XHP 222

### Transmission

Mobil Delvac Synthetic Transmission Fluid  
Mobiltrans HD range

### Steer Axle Wheel Bearings

Mobilith SHC 220  
Mobilgrease XHP 222

### Greasing Points: Tie Rod/Spring Pin Bushing/ King Pins and Chassis

Mobilgrease XHP 222 Special

These are general recommendations only. Please confirm vehicle requirements based on the manufacturer's specifications. Due to continual product research and development, the information contained herein is subject to change without notification.

# POST 2008 ENGINES

	Mobil Delvac 1 ESP 5W-40	Mobil Delvac XHP LE 10W-40	Mobil Delvac MX ESP 15W-40	Mobil Delvac MX 15W-40
<b>SCR</b>				
Volvo	★★★★★	★★★★	★★★★	★★★
Mercedes Benz	★★★★★	★★★★	★★★★	★★★
DAF	★★★★★	★★★★	★★★★	★★★
IVECO	★★★★★	★★★★	★★★★	★★★
Nissan Diesel	★★★★★	—	★★★★	★★★
<b>Cooled EGR (ACERT)</b>				
Caterpillar (ACERT)	★★★★★	—	★★★★	★★★
Detroit Diesel	★★★★★	—	★★★★	★★★
Cummins	★★★★★	—	★★★★	★★★
Volvo	★★★★★	—	★★★★	★★★
Hino	★★★★★	—	★★★★	★★★
Fuso	★★★★★	—	★★★★	★★★
Nissan Diesel	★★★★★	—	★★★★	★★★
<b>Others</b>				
Mack (Cooled EGR)	★★★★★	—	★★★★	—
ISUZU-DPD (Cooled EGR)	★★★★★	★★★★	★★★★	—
Man (Cooled EGR)	—	★★★★	—	—

\*Mobil recommends that vehicle manuals or your OEM be consulted for the appropriate lubrication specifications / recommendations for your equipment.

★★★★★ Supreme Performance		★★★★ Extra High Performance		★★★ High Performance
 Extended Engine Life	 Fuel Economy	 Extended Oil Drain	 Extreme Temperature	 Heavy Load

# POST 2008 ENGINES

	Mobil Delvac 1 ESP 5W-40	Mobil Delvac XHP LE 10W-40	Mobil Delvac MX ESP 15W-40	Mobil Delvac MX 15W-40
<b>SCR</b>				
Volvo	★★★★★	★★★★	★★★★	★★★
Mercedes Benz	★★★★★	★★★★	★★★★	★★★
DAF	★★★★★	★★★★	★★★★	★★★
IVECO	★★★★★	★★★★	★★★★	★★★
Nissan Diesel	★★★★★	—	★★★★	★★★
<b>Cooled EGR (ACERT)</b>				
Caterpillar (ACERT)	★★★★★	—	★★★★	★★★
Detroit Diesel	★★★★★	—	★★★★	★★★
Cummins	★★★★★	—	★★★★	★★★
Volvo	★★★★★	—	★★★★	★★★
Hino	★★★★★	—	★★★★	★★★
Fuso	★★★★★	—	★★★★	★★★
Nissan Diesel	★★★★★	—	★★★★	★★★
<b>Others</b>				
Mack (Cooled EGR)	★★★★★	—	★★★★	—
Isuzu-DPD (Cooled EGR)	★★★★★	★★★★	★★★★	—
Man (Cooled EGR)	—	★★★★	—	—

\*Mobil recommends that vehicle manuals or your OEM be consulted for the appropriate lubrication specifications / recommendations for your equipment.

★★★★★ Supreme Performance		★★★★ Extra High Performance		★★★ High Performance
 Extended Engine Life	 Fuel Economy	 Extended Oil Drain	 Extreme Temperature	 Heavy Load

# PRE 2008 ENGINES

	Mobil Delvac 1 ESP 5W-40	Mobil Delvac XHP LE 10W-40	Mobil Delvac MX ESP 15W-40	Mobil Delvac MX 15W-40
<b>North America</b>				
Caterpillar	★★★★★	—	★★★★	★★★
Cummins	★★★★★	—	★★★★	★★★
Detriot Diesel	★★★★★	—	★★★★	★★★
Mack	★★★★★	—	★★★★	★★★
<b>European</b>				
Volvo	★★★★★	★★★★	★★★★	★★★
DAF	★★★★★	★★★★	★★★	★★★
MAN	★★★★★	★★★★	★★★	★★★
Mercedes Benz	★★★★★	★★★★	★★★	★★★
Renault	★★★★★	★★★★	★★★	★★★
<b>Others</b>				
ISUZU	★★★★★	—	★★★★	★★★
Hino	★★★★★	—	★★★★	★★★
Fuso	★★★★★	—	★★★★	★★★
Nissan Diesel	★★★★★	—	★★★★	★★★

\*Mobil recommends that vehicle manuals or your OEM be consulted for the appropriate lubrication specifications / recommendations for your equipment.

★★★★★ Supreme Performance		★★★★★ Extra High Performance		★★★ High Performance
 Extended Engine Life	 Fuel Economy	 Extended Oil Drain	 Extreme Temperature	 Heavy Load