

26<sup>th</sup> July 2012

### **IPA on Diesel Exhaust Emissions**

Over the last four decades, developments in diesel engine technology have provided an encouraging basis for the promotion of diesel vehicles worldwide.

Several emissions control systems take advantage of the catalytic properties of the platinum group metals (PGM) and play a vital part in controlling releases of carbon monoxide, hydrocarbons, particulate matter, and oxides of nitrogen from diesel vehicle exhausts. These systems, in combination with the use of ultra-low sulphur diesel fuel, will continue to further reduce emissions from diesel engines.

On 12<sup>th</sup> June 2012 the International Agency for Research on Cancer (IARC), a part of the World Health Organization, classified diesel engine exhaust as carcinogenic to humans. This decision followed a review of evidence, including a U.S. study that measured particulate matter from diesel exhaust in underground mines and linked it to lung cancer among workers.

In making this assessment the IARC did not distinguish between emissions from old diesel engines and emissions from modern diesels using advanced emissions control, although it did acknowledge the progress of regulatory action and tighter emissions standards for diesel engines in North America and Europe.

### **The vital role of PGMs for clean air**

The use of catalyst and diesel particulate filter (DPF) technology has made a significant contribution to reducing emissions from diesel engines in recent years, resulting in the cleanest-ever diesel engine-out emissions.

In the DPF, platinum combined with base metal oxides promotes the catalytic reactions that burn away the particulates (comprising mostly carbon soot combined with unburned or partially burned fuel) which the filter has trapped.

To meet tighter legislation on particulate emissions in Europe, DPFs have been used in all new light duty diesel vehicles since 2009, in addition to a diesel oxidation catalyst (DOC). In the DOC, an oxidizing reaction converts carbon monoxide (CO) and unburned hydrocarbons (HC), and a reduction reaction converts oxides of nitrogen (NO<sub>x</sub>) to produce carbon dioxide (CO<sub>2</sub>), nitrogen (N<sub>2</sub>), and water (H<sub>2</sub>O).

This technology has enabled particulate emissions limits to be met that are 80% lower than those in 2005 and 96% lower than the first European diesel emission regulations in 1993.

### **Stricter emission legislation to come**

Stringent emissions legislation in the USA has been met with the fitment of a DPF on heavy duty diesel trucks for the control of particulate matter since 2007. The U.S. Environmental Protection Agency (EPA) indicates that diesel accounts for less than 6% of all particulate matter in the air.

In addition, European legislation for new trucks and buses, due to come into force in 2013, will require fitment of a DPF. Further significant improvements to air quality are anticipated from the introduction of tighter legislation to cover non-road diesel engines such as those used in mining and construction equipment.

Within this sector, diesel retrofit technologies have demonstrated their ability to significantly reduce diesel emissions at reasonable costs without jeopardizing vehicle or machine performance.

One barrier to the wider use of PGM-based emissions control to minimise particulate emissions is the lack of availability of low sulphur diesel fuel in certain markets. Once this problem can be overcome, it is expected that other regions of the world adopt limits similar to those of Europe and North America, thereby enabling the efficient use of PGM after-treatment to reduce harmful emissions.

### **Technology to reduce emissions already exists**

In its recent announcement, the IARC called for wider environmental protection from diesel exhaust. The International Platinum Group Metals Association considers it important to recognise that the technology to control diesel emissions already exists. Moreover, IPA strongly encourages continuing research in diesel engine and catalyst technology to enable legislators to continue to tighten vehicle emission standards worldwide. The development of PGM-based technology supports the automotive industry and its intentions to comply with coming emission legislations. Platinum group metals and their catalytic properties contribute to the promotion of the future health and wellbeing of all.