With vehicle production growing annually and pressure on manufacturers to reduce vehicle emissions, innovative methods will have to be found to make engines more efficient. The PSA Group has set up with Bekaert a cooperative test programme to measure the impact of Diamond-like Carbon (DLC) coatings on the frictional behaviour of certain components within the valve train of a production engine.
1 Introduction

The European Union is the largest vehicle producing region in the world, accounting for more than 17 million passenger cars in 2007, or 32 % of the global passenger car market. With the increase in the world’s population, the number of cars on the road is set to increase year-on-year until a suitable, alternative mode of transport can be found. As that development is still many years away, the demand for conventional internal combustion-engined passenger vehicles can be expected to continue to grow.

Faced with this inevitability, the European Commission (EC) has developed a programme of Carbon dioxide (CO₂) vehicle emission reduction which motor manufacturers must adhere to, and failure to meet these emission limits will attract financial penalties in the future. In order therefore to avoid the possibility of incurring such fines, manufacturers are working feverishly towards making their vehicles ever-more fuel efficient.

In 2007, global passenger car sales in the Peugeot Citroën (PSA) Group rose to 2.99 million units, of which the European market accounted for almost half, and projected sales for 2008 are expected to rise by a further 5 %. Although global production of motor vehicles is soft right now, the annual production is still expected to exceed 3 % every year up to 2013. PSA global vehicle sales in 2010 are expected to top 4.0 million units, failing to meet the EC’s strict CO₂ emissions targets is not an option, as the financial penalties would be substantial. These penalties would be progressive and although it is proposed that they would not come into effect before 2015, emissions targets of 130 g/km already agreed come into effect in 2012. However, as from 2015 the penalties for emissions exceeding these agreed levels would amount to 95 euros per gram per vehicle (European Commission proposal on reducing CO₂ emissions from passenger cars, September 2008).

Besides the potential financial impact for the market, the car-buying public to-