

## **IMPACT OF GASOLINE QUALITY ON ENGINE PERFORMANCE AND EMISSIONS**

**S. KALLIGEROS, F. ZANNIKOS, S. STOURNAS, E. LOIS, G. ANASTOPOULOS  
and D. KARONIS**

National Technical University of Athens, Fuels & Lubricants Laboratory  
School of Chemical Engineering  
Iron Polytechniou 9, Athens 157 80, Greece  
E-mail: [sskalliq@mail.ntua.gr](mailto:sskalliq@mail.ntua.gr)

### **EXTENDED ABSTRACT**

Gasoline quality in recent years became increasingly important for both technical and financial reasons. Extensive work has been done concerning the role of the fuel characteristics on the actual performance of the engines and mainly its impact on vehicle emissions. Fuel composition will remain one of the critical parameters as the governments continue focusing on zero emission vehicles.

Over the past two decades the European Union has progressively strengthened the emissions standards for most vehicles. Emissions from passenger cars meeting the latest standards enforced in 1996/97, will be 90% lower than the '70s requirements. The new draft directives on vehicle exhaust standards and fuel quality envisage two stages. The new mandatory emission exhaust limits will be applied on the year 2005, and lower levels will follow.

In Greece, two different types of gasoline are sold in the service stations: LRP (leaded replacement petrol) with a Research Octane Number of 96 (96 RON) for the non-catalytic cars and unleaded gasoline with a Research Octane Number of 95 for newer cars equipped with a catalytic converter. Some service stations also sell super unleaded gasoline (Super Plus) with a Research Octane Number of 98.

Unleaded (95 RON) is the cheapest gasoline, and super unleaded gasoline (98 RON) is the most expensive fuel. The price differential (due to taxation differences) is the main incentive for the fuel adulteration.

This paper presents the impact of unleaded gasoline and LRP (based on the current Greek gasoline specifications) to a HONDA CIVIC 1600c.c vehicle. Results are based on the actual gasoline characteristics as found from extensive sampling from service stations in the Athens area during 2000-2002.

**Key words:** Gasoline, Lead Replacement Gasoline (LRP), Emissions