

A World First For Fiat - The "Tetrafuel" Engine

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Ever since it created the first vehicle powered by an engine running on alcohol in Brazil in 1979, the upward trajectory of the Fiat Car Company has been marked by its trend-setting attitude to design and development.

Now, once again, the group innovates with the use of the fuel, by launching the new Fiat Siena 1.4 Tetrafuel, the first vehicle in the world that can use four types different of fuel: ethanol 100%; Brazilian gasoline (that contains a 20% of alcohol); pure gasoline, like that used one in different Latin American and European countries; and natural gas.

In addition to being able to use different fuels, the key to the great technological innovation of this new Fiat model is the automatization of the process, through an exclusive electronic system, by which the usage of these fuels is alternated, based on conditions, and without any input from the driver. This means that the onboard computer decides what fuel is to be combusted at any given moment, allowing the driver to concentrate on his driving, without needing to think about the fuel type the car uses or about any different controls that he might otherwise have to operate, related to the particular fuel type being used. In other words, the driver does nothing, the computer does it all for him!

Developed by Magneti Marelli (nowadays considered the leader in the market of injection systems with a market share of 45%), the electronic management system selects the optimal fuel combustion settings based on each situation, giving priority to the driver. Indeed, when the onboard sensor makes a fuel change, it does it in such a way that the driver will hardly notice, if at all, guaranteeing constant driving conditions and fuel yield in any road conditions. This way, the condition and longevity of the car is protected, even when natural gas is used, and in addition the fuel savings are constantly promoted.

Naturally, with the objective of cutting running costs, the first fuel the system will use will be a natural gas type fuel, whenever available. But, when the sensor detects a situation in which greater acceleration is needed, the interchange to liquid fuel is made automatically. The motor will use the natural gas again whenever the system detects that it is the most advisable fuel for that moment.

The Tetrafuel system is based on technology called "SFS" or "Software Sensorial Flexfuel" that began its development in 1999 using 100% Brazilian engineering. "We have invested 25 million dollars to make possible SFS and TetraFuel in the Brazilian market", declared Silvrio Bonfiglioli, engineer and representative of the Magneti Marelli Mercosul.

With Tetrafuel, the intelligent management of fuel usage will be preinstalled at the factory, thereby eliminating a series of necessary technical changes and special equipment for its installation, including replacing the operation button for the system that nowadays exists in Fiat models that are not equipped with the Tetrafuel "multi-fuel" system, to be replaced by the technology of Magneti Marelli.

The TetraFuel system is without a doubt one of the best but simplest tools to reduce the high levels of air pollution and contamination in urban centers. This pollution problem affects most of the countries in the world, because of the ever increasing number of vehicles on the road. "The system will be a success in South America and will give rise to an important evolution for European markets, since it will allow the diminution of the carbon dioxide emission (CO₂), as well as the dependency on petroleum" declares Bonfiglioli.

The SFS computer program is installed in a control box, almost like a simple switchboard. The SFS identifies and quantifies the mixture between the alcohol and the gasoline in the tank, thanks to the information that it receives from the sensors in the fuel injection system, with the Lambda signals created by the system then controlling the engines detonation, rotation speed and temperature sensors.

Based on this information, the program determines the amount of fuel that will have to be injected into the motor and also the moment at which the spark must be created to ignite the mixture in the most efficient manner.

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