ELF PERFO MAX

"Unleaded competition fuel for naturally aspirated and turbocharged 4-stroke engines"

Our formulae use pure bases to guarantee naturally stable, long-lasting properties, consistent from one production batch to another. This search for constant and optimum quality ensures you obtain first class performance, in conformity with competition requirements.

"ELF's unleaded fuel provides the highest spontaneous power gains for naturally aspirated and turbocharged 4-stroke engines".

Uses

- **ELF PERFO MAX** is ELF's highest performance fuel for naturally aspirated and turbocharged 4-stroke engines.
- Developed from the expertise gained by ELF Research in WRC and Formula 1, the original formulation of **ELF PERFO MAX** provides a real advantage in the service of your performances. Contrary to **ELF PERFO RALLYE**, dedicated to naturally aspirated engines, **ELF PERFO MAX** is suitable for all highly charges 4-stroke engines.
- **ELF PERFO MAX** is an unleaded fuel that is not conforms to official regulations.
- Adapted everywhere naturally aspirated and turbocharged 4-stroke engines are used:
  - Circuit
  - Rallies
  - Acceleration
  - Hill climbing

Characteristics

		Standard data
OCTANE NUMBERS	RON	106.5
	MON	89
DENSITY	kg/l at 15°C	0.790
OXYGEN	% m/m	12.90
AIR/FUEL RATIO		12.1
VAPOUR PRESSURE	Bar at 37.8°C	0.450
DISTILLATION (°C)	% vol. at 70°C	35

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	% vol. at 100°C	70
SULPHUR	mg/kg	<10
LEAD CONTENT	g/litre	<0.005

Properties

Fuel characteristics	→	Technical advantages	→	Engine benefits
Content in exceptional oxygenated compounds	→	Effect of **natural supercharging** High latent vaporisation heat favouring **mixture cooling** before combustion Increased **volume filling** by charge cooling	→	**Spontaneous power gains (without specific tuning) over the whole range.** **Increased power by optimisation before ignition.** **Excellent engine response in transient phase.**
Exceptional RON and sensitivity (amplitude between RON & MON)	→	**Combination of need s linked to high charging pressures and engine speeds**	→	**Ignition timings can be of turbocharged type and combustion speed responds to the most demanding naturally aspirated engines.**
Complex mixture of the **best oxygenated and olefin compound**s in existence for competition	→	**Combustion speeds** forced to the limits for optimised combustion cycle	→	**Knocking controlled for naturally aspirated engines at the highest speeds.** **Excellent response in transient phase.**
Very low **benzene** and **sulphur** contents	→	Harmless	→	**No special precautions for use** **ELF PERFO MAX respects both health and the environment.**

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Recommendations

- **ELF PERFO MAX** provides **exceptional gains in power and reliability**, without fine tuning.
- Engine mapping must be optimised (Air/Fuel ratio, ignition sequences) to obtain full benefit from this product.
- For use with naturally aspirated engines, ELF also offers leaded **ELF ATMO BOOST** fuel for competition held outside the framework of official technical regulations, and **ELF ATMO MAX**, which conforms to FIA Annex J regulations.
- For use with turbocharged engines, ELF also offers leaded **ELF TURBO BOOST** fuel and unleaded **ELF PERFO RALLYE** fuel for racing competitions not subject to official regulations. ELF recommends unleaded **ELF TURBO EVO** fuel conformed with FIA Annex J regulations.
- **ELF PERFO MAX** is fully compatible with naturally aspirated, turbocharged and 2-stroke engines.

Storage

To preserve its original properties and comply with the Health and Safety rules pertaining to fuels, **ELF PERFO MAX** must be handled and stored away from sunlight and bad weather and properly resealed in its drum after each use, to avoid loss of the lightest particles.

Glossary

RON & MON: RON & MON characterise the resistance to knocking (see definition) of a fuel used in a spark-ignition engine. RON is representative of the functioning of an engine running under cold and low speed conditions, while MON is representative of an engine running under warm and high speed conditions.
Used for competition, MON is commonly used to describe a fuel's anti-knocking capacity.
Higher octane levels allow engines to run more efficiently under severe, high speed conditions (high rotation speed, high compression ratio).

KNOCKING: Knocking is the result of non controlled fuel combustion in the engine. Sometimes revealed by a characteristic 'pinking' noise, these detonation phenomena often damage the engine.
There are two ways to prevent knocking: tuning the ignition timing and/or using a fuel with better anti-knocking characteristics (RON/MON and combustion speed).

CHARGE COOLING: The amount of energy needed to vaporise fuel depends on the latent vaporisation heat. This phenomenon leads to cooling the intake air which in turn generates internal supercharging.

COMBUSTION SPEED: It characterizes the fuel's reactivity in the combustion process. The higher the combustion speed, the more effective it is, and the greater the power produced by the engine, via a better cycle yield.

OXYGEN CONTENT: Oxygenated compounds naturally contain high levels of octane and generally improve engine filling capacities thanks to the cooling effect on the admitted air flow (see definition). Others also have remarkable combustion speeds.

DENSITY (or dimensional weight): Usually measured at 15°C and under 1 bar, given in kg/litre (or in kg/m3), this is the density of one litre (or 1000 litres) of fuel.
A fuel's density increases as its temperature drops.

VAPOUR PRESSURE: Usually measured at 37.8°C (Reid vapour pressure), by bar (or Pascals), with its distillation curve, this dimension characterises a fuel's capacity to evaporate. This property comes into play when the petrol is mixed with the air intake and for cold engine starts. If the vapour pressure is too high, it can cause 'vapour lock'.

AIR/FUEL RATIO (stoichiometric ratio): This ratio characterises the respective fuel and combustive (air intake) quantities necessary for theoretically ideal combustion. In practice, the engine tuner will usually ensure that the air/fuel ratio corresponds to a value between 1.10 and 1.20, or the theoretical value in relation to the real value.