



# ELF TURBO EVO

*“Unleaded competition fuel for turbocharged 4-stroke engines”*



*Our formula 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 TURBO EVO has been specifically developed for turbocharged 4-stroke engines, such as Groups N, A and WRC."***

## Uses

- An unleaded fuel for 4-stroke turbo-charged engines, **ELF TURBO EVO**, derived from **ELF TURBO MAX**, has been designed to obtain optimal power from engines by relying on a wider selection of olefins that increases combustion speeds to ensure greater power at low and high engine speeds.
- It **conforms** to Annex J of FIA regulations.
- Optimised within the limits of FIA regulations, the properties of **ELF TURBO EVO** optimise knocking resistance, charge cooling and combustion speed.
- **ELF TURBO EVO**'s specific formulation lowers the octane rating displayed in order to conform to FIA regulations (at the upper limit of annex J) but maintains the rating received by the engine. Therefore it provides better resistance to knocking than other competition fuels with similar octane ratings.
- Especially developed for the following turbocharged 4-stroke engines:
  - Group A & Group N
  - WRC & Rallycross
  - Hill climbing

## Characteristics

		Standard data	FIA /Annex J regulations
OCTANE RATING	RON	101.7	95 to 102
	MON	88.6	85 to 90
DENSITY	kg/l at 15°C	0.770	0.720 to 0.785
OXYGEN	% m/m	3.5	3.7 max
AIR/FUEL RATIO		13.57	



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<b>VAPOUR PRESSURE</b>	Bar at 37.8°C	0.500	0.900
<b>DISTILLATION (°C)</b>	FBP	145	225 max
	% vol. at 70°C	26	10 to 47
	% vol. at 100°C	50	30 to 70
<b>SULPHUR</b>	Mg/kg	6	<10
<b>LEAD CONTENT</b>	g/litre	<0.005	0.013 max
<b>BENZENE</b>	% vol.	0.1	1

## Properties

Fuel characteristics	→	Technical advantages	→	Engine benefits
Composition that lowers <b>measured octane numbers</b> without affecting the <b>octanes actually governing combustion</b>	→	Excellent resistance to <b>knocking</b> for controlled combustion	→	<p>Exceptional reliability under severe conditions (heat / humidity) tested and validated on engine test benches.</p> <p>Permits optimising ignition timing for greater power.</p>
<b>Oxygen content</b> set at the upper limit of regulations	→	<p>Effect of natural <b>supercharging</b></p> <p>High latent vaporisation heat that facilitates mixture <b>cooling</b> before combustion.</p> <p>Increased <b>volume filling</b> by charge cooling.</p>	→	<p>Spontaneous power gains (without specific adjustments).</p> <p>Increased power by optimisation before ignition.</p> <p>Remarkable engine response in transient phase.</p>
High <b>density</b> (upper limit of regulations)	→	High fuel energy content	→	Significant improvement in filling in comparison with ordinary fuels.



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Wider selection of the <b>best oxygenated compounds</b> and <b>olefins</b>	→	<b>High combustion speeds</b> for optimised cycles	→	<b>Boosts power increases.</b> <b>Better use of power at low and high powers</b>
Very low <b>benzene</b> and <b>sulphur contents</b>	→	Harmless	→	<b>No specific precautions</b> <b>ELF TURBO EVO respects both health and the environment.</b>

## Recommendations

- **ELF TURBO EVO** considerably increases power and reliability without fine-tuning.
- Engine mapping must be optimised (Air/Fuel ratio, ignition sequence) to obtain full benefit from this product.
- For use with turbocharged engines, ELF also offers unleaded **ELF PERFO MAX** fuel and leaded **ELF TURBO BOOST** fuel for racing competitions held outside the framework of official technical regulations.

## Storage

To preserve its original properties and comply with the Health and Safety rules pertaining to fuels, **ELF TURBO EVO** 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).





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**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/m<sup>3</sup>), 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 combustible (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.

