FREQUENTLY ASKED QUESTIONS

1. What does PROCONVE phases P7 and L6 mean?

PROCONVE is the Program for Automotive Vehicle Air-Pollution Control. The PROCONVE P7 (for heavy-duty vehicles of above 3.5 tonnes) and L6 (for light vehicles of up to 3.5 tonnes) phases set lower vehicular emission levels that require more sophisticated engine technology.

To work properly, these innovations require vehicles to be supplied with ultra-low sulfur content fuel (ULSC).

2. Does PROCONVE foresee emission limit reductions for gasoline-fired engines as well? What changes would be made to the fuel?

On January 1, 2014 a new emission limit came into force for new vehicle homologation (PROCONVE L6). Also as of January 1, 2014, the maximum sulfur content in all gasoline sold on the Brazilian market (regular and premium) was reduced from 800 mg/kg to 50 mg/kg (S-50 Gasoline).

The ANP (National Petroleum Agency) also determined the mandatory blending of additives in Regular and Premium Gasoline (S-50) to be marketed from July 1, 2015. The mandatory blending of additives aims to attain a level of deposit formation on intake valves as measured in tests pursuant to a methodology to be adopted by the ANP.

At the service stations, the products are still called Regular or Premium Gasoline.

Petrobras Distribuidora markets the new Regular Gasoline (S-50) at its more than 7,500 service stations, the largest network in Brazil.

Podium Gasoline has already been meeting the regulation scheduled to enter into force on 1 January 2014 since 2002.
3. Will service stations need to go through some adjustment? Tank and facility cleaning or replacement?

Cleaning service station tanks before the first receipt is a recommended practice, since from 2014 all gasoline will have a maximum sulfur content of 50 mg/kg (or ppm).

At the service stations, the products are still called Regular or Premium Gasoline.

4. Do Regular and Premium Gasoline (S-50) have expiry dates?

It is not possible to determine the expiry date for products sold in bulk. In the case of gasoline, it is not advisable to stock the product for more than three months without rotation. However, the product must be subjected to technical analysis for recertification before any further action can be taken.

5. How to differentiate the new Regular and Premium Gasolines (S-50) from the previous versions?

Regular ULSC Gasoline (S-50) has been distributed nationwide since January 1, 2014 and fully replaced the previous version. Premium gasolines are based on this one. Premium ULSC Gasoline (S-50) also completely replaced the previous version of Premium Gasoline.

At the service stations, the products are still called Regular or Premium Gasoline.

Besides the clear, colorless looks in production, which become slightly yellowish or orange due to the mandatory addition of anhydrous ethanol, the new Regular or Premium Gasoline (S-50) may have a different odor from gasoline previously available because of advanced refining processes used to produce them.
Petrobras Distribuidora offers the new Regular Gasoline (S-50) at its more than 7,500 service stations, the largest network in the country, and maintains the “Eye on the Fuel” quality assurance program at its network of participating stations.

Podium Gasoline has already been meeting the regulation that will enter into force on 1 January 2014 since 2002 and will undergo no change.

6. What are the features of Petrobras' new Regular and Premium Gasolines (S-50)?

- Product with a maximum sulfur content of 50 mg/kg parts per million (ppm);
- Octane: minimum of 87 (AKI), 82 (MON) and a minimum of 91 (AKI) for S-50 Premium Gasoline;
- Smaller distillation endpoint (max of 215ºC and no longer 220ºC);
- Aromatic content of 35% and 25% of olefin (max volume).

7. What is octane?

Octane is a measure of gasoline combustion quality. The higher, the better.

The performance of the gasoline is mainly dictated by octane, measured by the anti-knock index (AKI). This property is obtained during the production process. In Brazil, both regular gasoline and gasoline with additives currently have an AKI of 87. Premium gasoline has an AKI of 91.

The octane rating can be measured by the anti-knock index (AKI). AKI is equal to 
\((\text{MON}+\text{RON})/2\), where MON is the octane measured by the Motor Method (ASTM D2700), and RON the octane measured by the Research Method (ASTM D2699).

Petrobras produces and markets the high-performance Podium Gasoline exclusively through its network of service stations. It has an AKI of 95 (the highest octane in the world), and a maximum sulfur content of 30 mg/kg (or ppm).

8. Do Regular and Premium Gasolines (S-50) continue having a percentage of anhydrous ethanol?

The ethanol content in gasoline is determined by the existing regulation, which will continue in effect.

9. What are the features of Petrobras' new Regular and Premium Gasolines (S-50)?

- They enable the introduction of new vehicles fitted with cutting-edge emission handling technologies;
- It is possible to reduce exhaust emissions from a few engines manufactured from 2009, reaching up to 60% of nitrogen oxides (NOx), to 45% of the carbon monoxide (CO), and up to 55% of the hydrocarbons (HC);

- Very low deposit formation on valves, fuel injectors, and in the combustion chamber: less engine wear and longer lubricant service life, maintaining energy efficiency.

10. Where is the ULSC gasoline produced?

Twenty-one new units were built at nine refineries to produce ULSC gasoline: Duque de Caxias, RJ (Reduc); Betim, MG (Regap); Paulínia, SP (Replan); Cubatão, SP (Rpbc); São José dos Campos, SP (Revap); Mauá, SP (Recap); and in São Francisco do Conde, BA (Rlam); Araucária, PR (Repar), and Canoas, RGS (Refap).

11. What contribution does ULSC make to vehicle emission control?

Modern vehicles, such as those currently existing on the U.S. and European markets, are equipped with advanced technology and are fitted with after-treatment exhaust gas systems that afford minimum pollutant emission levels.

However, these systems operate at top efficiency only when the gasoline sulfur content is no more than 50 mg/kg (or ppm).

Therefore, gasoline with ultra-low sulfur content (ULSC), provided by Petrobras from 2014, will allow for actions to be initiated by environmental agencies for the future adoption, in Brazil, of limits on vehicle emissions similar to current European and U.S. regulations, resulting in an improvement of air quality in the Brazilian cities.

It should be clarified that gasoline additives do not reduce vehicle emissions. What reduces emissions is vehicle technology. Gasoline additives keep engine deposit formation at low levels, contributing to maintaining, over extended periods of time, the emission levels the vehicle had when new.

12. What is Petrobras’ position and involvement in the discussions on the mandatory inclusion of additives in Regular Premium ULSC (S-50) gasolines?

Petrobras collaborated with the regulator agency (ANP) and with the normative authority, the Brazilian Association of Technical Standards (ABNT), in developing the methodology to evaluate additive efficiency.
This testing methodology, which Petrobras has already been using since 2012, as well as other methods that have existed since 1994, were developed at Petrobras’ Research Center (Cenpes) and have been used to develop the gasoline Petrobras has produced and marketed at its service station network, such as the Podium Gasoline.

13. Who would provide the additive? What is its proportion in S-50 Gasoline?

Mandatory additive blending aims to attain a low level of deposit formation on intake valves in tests pursuant to a methodology to be adopted by the ANP. The additives will be developed and supplied by various manufacturers located in Brazil, who must certify their products through the test defined under an ABNT standard and report the results and the proper dosage for S-50 Gasoline to the ANP.

All gasolines must have detergent/dispersant additives, and these additives afford the main benefits to the gasoline. Thus, all gasolines have equivalent performances in controlling the formation of engine deposits.

Including other additives to complement the package will be a decision each distributor will have to take.

14. What is the basic composition of the additive?

Manufacturers do not reveal the exact composition. In general, it can be said that additives consist of:

a) active substance (a polymer).

b) a fluidizer (mineral oil or a synthetic product).

c) solvents to facilitate dissolution in gasoline.

What gasolines with additives typically have is a package that may include other components, such as anti-corrosives, demulsifying agents, friction reducers, etc.

15. How does the additive work?

There are two types of effects:

a) keep-clean

b) clean-up.
The effect depends on the concentration of the active element, and gasolines with additives usually use the keep-clean dosage, avoiding deposit formation on engine parts. The clean-up effect is achieved with products sold in small bottles at service stations, which aim to dissolve the deposits.

However, we must emphasize that the benefits they afford is long-term engine conservation.

16. Do additives reduce the vehicle's fuel consumption?

Any reduction in consumption is negligible or zero. Fuel consumption is more influenced by the way one drives, by road conservation and traffic than the by the characteristics of the additives.

17. Does gasoline with additives increase engine power?

Engine power is a characteristic that is defined in its design. Using the appropriate fuel allows for a better use of engine power. Simply using additives does not provide this. Sulfur content (S-50) also does not interfere with this.

The performance of the gasoline is mainly dictated by octane, measured by the anti-knock index (AKI). This property is obtained during the production process. In Brazil, regular gasoline and gasoline with additives both currently have an AKI of 87. Premium gasoline has an AKI of 91.

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18. What about cars that have never been fueled with gasoline with additives? May engines that have never used gasoline with additives have nozzle clogging issues? Is it true that the ingredients in the additives loosen sludge and impurities from the combustion chamber?

Gasoline with additives must have a keep-clean, and not a clean-up dosage. The cleaning effect for vehicles that have never used gasoline with additives is expected to be very slow. Therefore, engines should not have any problems. The benefit of including additives in gasoline is achieving long-term engine conservation.