
APPLICATION OF 1,3-DIPHENYLTRIAZENE AS AN ANTI-DETONATION ADDITIVE TO MOTOR GASOLINE'S

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The article presents an overview of the chemical principle of anti-detonation additives, which are now widely used in gasolines. The most probable reactions that occur with hydrocarbons in the fuel-air mixture when it enters the combustion chamber of an internal combustion engine are considered. These reactions are mainly represented by cracking with the formation of active radicals, which in turn enter into the oxidation reaction with oxygen. Formed in this way, hydroperoxides take part in chain oxidation reactions, which contributes to the effect of detonation combustion of the fuel-air mixture.

In view of this reaction, it is proposed to use 1,3-diphenyltriazene, which belongs to the class of diazocompounds, as an anti-detonation additive for motor gasolines. The principle of anti-detonation effect of this substance is, first of all, the possibility of its thermal decomposition in the temperature range 130-160 °C. In this case, nitrogen, phenyl and aniline radicals will be formed. The phenyl radical, which is one of the most unstable particles, due to its increased reactivity reacts instantly with the most active fuel radicals: atomic hydrogen; methyl and hydroxyl radicals. At the same time, there is a high probability of formation of molecular hydrogen, toluene and phenol among the products of such interactions. These are stable compounds that are not able to continue and maintain the chain oxidation reactions that occur during the combustion of the fuel-air mixture in the combustion chamber of the engine.

Thus, in the reaction zone with the direct participation of phenyl radicals there is a decrease in the concentration of radicals initiating chain oxidative reactions, which leads to chain breakage. Also, a very positive aspect of the use of 1,3-diphenyltriazene is that it can be used in compositions with alcohols or with methyl tert-butyl ether in straight-run gasoline fractions of oil, their mixtures with the fractions of the catalytic cracking and of the reforming. The using of the proposed additive in the composition of gasoline fully meets the requirements of the environmental safety standard Euro-5.

Key words: gasoline, detonation resistance, additives, 1,3-diphenyltriazene, cracking, oxidation, radicals, internal combustion engine

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