FEATURES OF COMBUSTIBLE GASES BURNING WITH VARIABLE COMBUSTION PROCESS

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In the article the interchangeability problems of artificial gases and natural gas are considered. Main combustible characteristics of a combustible gas mixture made of producer gas of air gasification and natural gas are analyzed. The optimal part of natural gas in the fuel mixture is determined.

Keywords: ***interchangeability, artificial gases, gas mixture combustion, producer gas.***

Insufficient volume of extraction of natural gas and other fossil fuels leads to the diversification of natural gas to the form of renewable fuels such as biomass.

Direct combustion of solid biomass or biofuels in some cases has a positive economic effect, but it needs costly reconstruction of boilers, also to provide backup fuel and environmental issues leads to the search of alternative gaseous fuels. Producer gas, biogas or other artificial gases can be the alternative.

All artificial combustible gases have significantly different characteristics from natural gas. Because of this, almost all artificial gases are not interchangeable with natural gas. Interchangeability of different types of flammable gas is determined by various criteria, but none of them can make a complex estimation of interchangeability because these criteria are not derived from the fundamental laws but empirical. The possibility of substitutability gases must be analysed on the basis of complex parameters and criteria.

An analysis of the composition and properties of various synthetic gases like refinery gas, biogas or producer gas were determined the parameters that define the characteristics of combustible gases and the possibility of interchangeability and burning in the same gas burners without changing the design and operation mode of the burners. Established that artificial and natural gases are not interchangeable.

The principle of combined combustion of different flammable gases with variable physicochemical characteristics, which uses the principle of kinetic combustion with forced air supply without prior mixing is proposed. The optimal ratio between natural gas and producer gas, which makes possible to organize a steady burning and perform the calculation of a gas burner that should use the mixture of gases as good as pure natural gas. The supply of natural and producer gas is designed through separate channels. The formation of a mixture of gases and their mixing with the air will be done in the burner tunnel and in the furnace. The calculation of the burner to burn producer gas made by air gasification is done.

Performed studies make possible to implement the process of burning generator or other type of synthetic gases in burners, which can also burn pure natural gas. This is useful for the effective use of alternative energy sources in the

form of synthetic gases in combined boiler halls without global reconstruction and high value installations as it is for solid fuel boilers. As the main and alternative fuel are gaseous it helps to reduce the cost of this type of heat sources and increase their availability.