

REVISITING THE QUALITY OF GAS FUEL

A. Kolienko, O. Shelimanova, V. Kolienko

The article is devoted to important issues of interchangeability of combustible gases, which are used for industrial and domestic purposes.

The diversification of gas market causes the situation when different types of artificial combustible gases (biogas or producer gas for example) can be used in gas distribution systems as well as natural gas. It causes the need to check the possibility of using combustible gases with different physical and chemical properties in gas-burning facilities.

So there is a question of combustible gases interchangeability, its quality and compatibility for combustion in the same gas-burning facilities.

A number of criteria that must be invariable during different gases combustion are proposed in article. They include the following: heat output of gas-burning facility, burning velocity which is responsible for torch stability, thermodynamic parameters of fuel and air before burner, parameters of the combustion process, environmental performance of combustion gases. The analysis of Wobbe index changing is done. Formulas for determination the diameter of gas holes and gas pressure before the burner when shifting types of combustible gases, on condition that interchangeability criteria are constant, are given.

It is shown that most of the artificial gases are not interchangeable with natural gas, so to provide the required working characteristics of gas-burning facilities it is necessary to change its construction or use the mixture of gases.

The article presents the results of analysis of natural gas quality certificates. It shows that physicochemical features of natural gas, which is supplied from distribution pipelines, can vary in time significantly. It causes the inappropriate changes in gas-burning facilities performance. The results of studies that show the change degree of the facilities basic characteristics, components of the heat balance and combustion efficiency are given.

It is concluded that natural gas quality and stability of its physical and chemical parameters are some of the most important factors of an effective and safe operation of gas-burning facilities. It is necessary to do permanent monitoring of stability of gas physical and chemical parameters by operating and assessing organizations. The monitoring of gas heating value, density and interchangeability criteria are priorities. The Wobbe index shouldn't vary more than 5% of nominal value which is set for each gas distribution system or gas-burning facility.