Journal of Physics: Conference Series 2018 vol.1058 N1

The algorithm diagram of combustion optimizing of a hydrocarbon fuels variable composition in thermal power plants

Saifullin E., Nazarychev S., Malahov A., Misoedova E., Larionova I.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© 2018 Institute of Physics Publishing. All rights reserved. In modern power engineering, there is a problem of rational and efficient use of hydrocarbon fuels variable composition. The composition of the fuel can vary in time and from different sources. These changes lead to combustion optimum regime shift in thermal power plants. Previously, an algorithm of combustion optimizing of a hydrocarbon fuel variable composition in thermal power plants was developed. According to the algorithm, the fuel and air flows are regulated depending on the outlet temperature of the heat carrier. In this paper, a diagram of the implementation of this algorithm is presented.

http://dx.doi.org/10.1088/1742-6596/1058/1/012059

References

[1] Lieuwen T., McDonell V., Petersen E. and Santavicca D. 2008 Fuel flexibility influences on premixed combustor blowout, flashback, autoignition, and stability Journal of Engineering for Gas Turbines and Power 130 011506

[2] Government Decree of the Russian Federation since 08.01.2009 (edition of 28.02.2017) - ref-separator -

[3] U.S. Environmental Protection Agency, Standards of Performance for Petroleum Refineries, 40 CFR 60, Subpart J, Section 60.101(d), U.S. Government Printing Office (Washington, DC: Electronic Code of Federal Regulations) current as of June 12, 2008

[4] Ismail O.S. and Umukoro G.E. 2016 Modelling combustion reactions for gas flaring and its resulting emissions Journal of King Saud University - Engineering Sciences 28 130-140

[5] Lee C.-L., Hou S.-S., Lee W.-J. and Jou C.-J.G. 2010 Improving cost-effectiveness for the furnace in a full-scale refinery plant with reuse of waste tail gas fuel International Journal of Hydrogen Energy 35 1797-1802

[6] Bykovets A.P., Larionov V.M. and Marchukov E.Yu. 1992 Izvestiya Vysshikh Uchebnykh Zavedenij (Aviatsionnaya Tekhnika) The influence of a steam injection on vibrational burning in a modelled combustion chamber 71-74

[7] Larionov V.M., Saifullin E.R. and Semenova E.V. 2016 Self-exited gas oscillations in Helmholtz resonator type combustor Journal of Physics: Conference Series 669 012047

[8] Saifullin E.R. and Vankov Yu.V. 2015 Optimization of burning process of hydrocarbon fuels with varying specific heat of combustion IOP Conference Series: Materials Science and Engineering 86 012006/

[9] Saifullin E.R., Nazarychev S.A., Malahov A.O., Larionov V.M. and Iovleva O.V. 2017 The heat effect of combustion process depending on fuel composition fluctuations Journal of Physics: Conference Series 789 012045

[10] Saifullin E.R., Larionov V.M., Busarov A.V. and Busarov V.V. 2016 Optimization of hydrocarbon fuels combustion variable composition in thermal power plants Journal of Physics: Conference Series 669 012037

[11] Saifullin E.R., Larionov V.M., Busarov A.V. and Busarov V.V. 2016 Thermal effect of hydrocarbon fuels combustion after a sudden change in the specific calorific value Journal of Physics: Conference Series 669 012043