APPLICATION OF FLAMMABILITY DIAGRAM FOR PLANNING OF LOW-NOx FUEL GAS COMBUSTION MODE

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Abstract: The possibility to apply the triangular flammability diagram for combustible gases for visual comparison of diffusion combustion modes at various degrees of diluting an oxidant and a combustible gas itself with inert components is demonstrated. Assuming that the flame front temperature as well as the temperature in the postflame zone affect the formation of nitrogen oxides and, at other conditions being equal, a reduction of the flame front temperature lowers the concentration of nitrogen oxides, a perspective of the combustion technology involving the dilution of air (or combustible gas) with inert components is outlined in contrast to the technology of staged combustion of a combustible gas in pure air. An example of a burner design is given for burning a combustible gas in air heavily diluted with recirculation flue gas. Experimental results on the formation of nitrogen oxides in such combustion modes in an industrial boiler are also presented.

Keywords: flammability diagram; diffusion combustion; flue gas recirculation; nitrogen oxides

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