

AIR POOL PROTECTION FROM EMISSIONS OF THE POWER INDUSTRY

1.1. Reducing nitrogen oxides emissions

1.1.2. Technological methods to reduce nitrogen oxide formation in the boilers during combustion of different types of organic fuel

The list of technological methods of reduce nitrogen oxides

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The first attempt to systematize known at that time the technological methods to reduce NO_x emissions was undertaken in the mid 80-ies [3]. Investigations, carried out in the subsequent period in Russia and abroad, suggest the

refined scheme of technological methods that reduce nitrogen oxides emissions by burning all fossil fuel (Fig. 1.1)

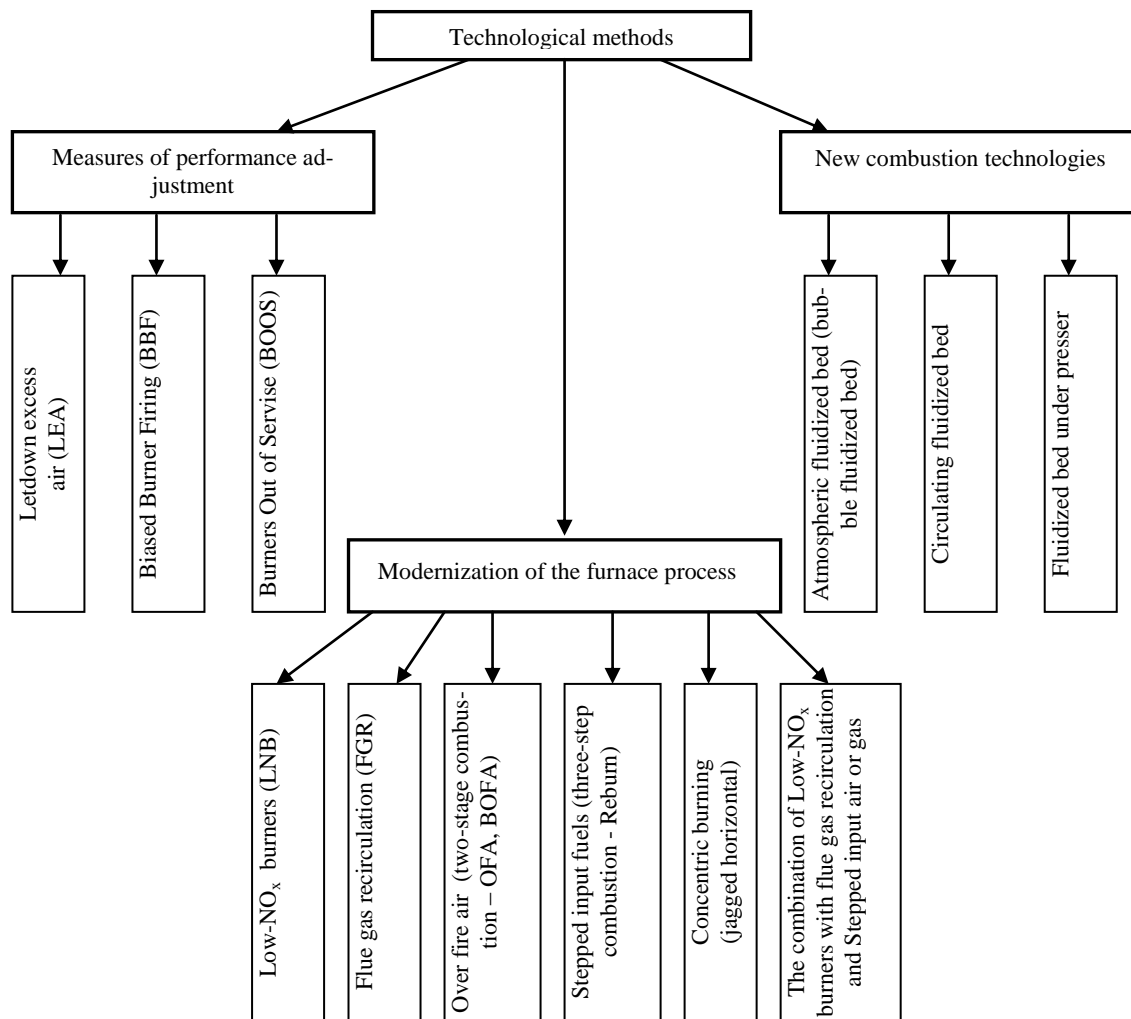


Figure 1.1. Variants of methods to reduce nitrogen oxide NO_x

Shown on the scheme in Fig. 1.1 all the variants are fully consistent with investigated formation mechanisms of thermal, fast and fuel nitrogen oxides. In addition, they are tested in an industrial environment by combustion of different types of fuels in power boilers. The choice of someone or other variant is determined by the necessary degree of reduction of NO_x (taking into account the allowable cost and time during which the boiler can be decommissioned when it comes to reconstruction of existing equipment). In addition, when choosing a method of reducing NO_x emission is necessary to consider (and it is a determinative of the preliminary

analysis) with what consequences for the boiler will have to face operational staff following the introduction of a method of suppressing NO_x .

It is clear that any upgrading of the operating mode and/or construction of the furnace-burner unit must ensure the reliability of the burning process, i.e. stability of ignition in all things of load range of boiler. Danger of furnace screens corrosion, slagging and/or contamination of heating surface should not rise, and should not increase wear tubes of the convective part of the boiler. Introduction of technological methods must not impose restrictions on the fuels, which

were burned in boilers before modernization.

Degree underburning fuel must remain with acceptable limits. In particular, during combustion of the solid fuel content of the combustible in the clag and flay ash should not exceed a value at which focal remnants can still be considered a commodity product. Otherwise, the TPP is not only lose the opportunity to profit from the sale of ash, but will pay a substantial part of the funds in the environment fund for the use of land for storage of ash and slag.

Reducing of NO_x emission must not be accompanied by

significant increases in emission of the toxic pollutants such as polycyclic aromatic hydrocarbons (PAH) or greenhouse gas N_2O .

Implementation of the procedures should not complicate the operation of other gas-cleaning installations or strongly increase the cost of repairs throughout the boiler unit.

Let us consider in more details technological methods of reduce nitrogen oxides emissions which are given on the diagram..