BQB INFRA TECHNORIUM PVT. LTD.

NOx Reduction

By

Selective Non-Catalytic Reaction (SNCR) System

Contact Details

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BQB INFRA TECHNORIUM PVT. LTD.

Established in 2005, BQB Infra Technorium Pvt. Ltd. has built a great success in the heart of cement plant. Concept of working from basic engineering to detailed project engineering and we bring basic ideas to a wonderful reality.
BQB, a company endowed with one of the best multi-disciplinary talents in the country while taking up projects from concept to commissioning draws its main strength from the in-house expertise in the following areas:

- Feasibility Study
- Inspection and Audit
- Design & Engineering
- Operation & Maintenance of Plant
- Turnkey Projects
- Pyro Process Upgrade
- Alternative Fuel Utilization System
- **NOx & SOx Control**
- Close Circuiting of Ball Mill
- Hot Kiln Alignment
- Cooler Optimization

NOx Control:

- **Introduction:**

The requirements for very high temperatures and oxidizing conditions make cement manufacturing (pyroprocessing) an inherently large generator of NO_X per unit of clinker produced. Fortunately the typical preheater/calciner (PH/C) kiln design includes some features that are compatible with lower NO_X emissions. One is indirect firing, whereby the amount of air introduced through the primary burner into the kiln sintering zone is minimized. Other one is to design the low NO_X calciner to lower the NOx emission.

BQB offer the complete SNCR system using aqueous ammonia reagent has become popular and effective technique for NOx reduction.

Before installing the complete SNCR System, We conduct a specific study for controlling NOx on real time basis for 3 to 5 days with our Ready Portable SNCR System. We place it up with existing monitoring and control system. This exercise will give you a real time data that works as a road map to install a permanent complete SNCR system with Calciner modification.

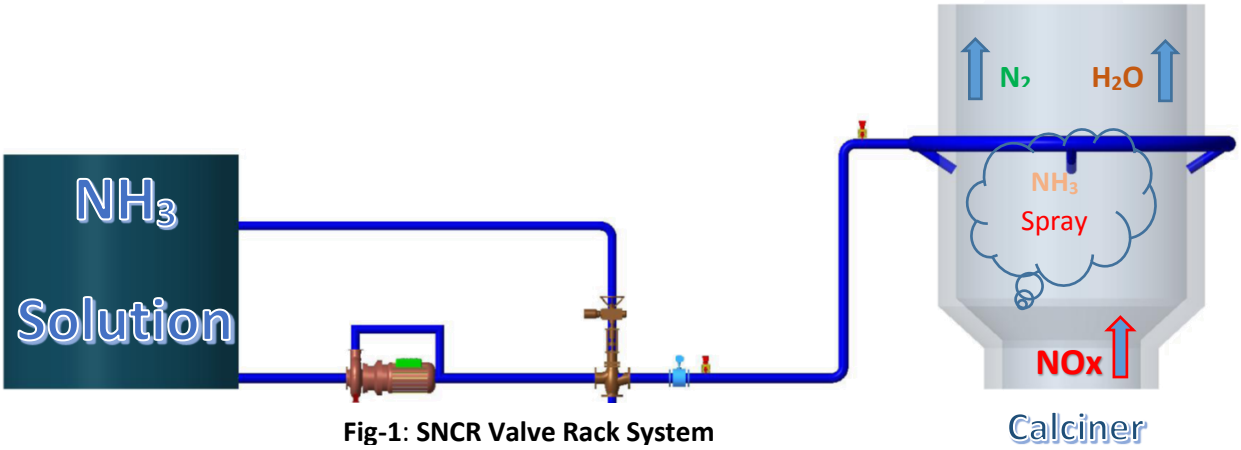

Fig-1: SNCR Valve Rack System

- **Selective Non-Catalytic Reaction (SNCR) System:**

BQB Infra Technorium Pvt Ltd. expert in emission reduction knowledge, product and services. BQB offers complete SNCR system for both new and existing cement plant installation.

It suffices to state that aqueous ammonia (NH_3) is injected at a specific point in the process characterized by a suitable temperature window between 850 and 1050 °C depending on residence time, turbulence, oxygen content, and a number of other factors specific to the given gas stream.

In a selective non-catalytic reduction (SNCR) process of nitrogen oxides, reductants in an aqueous solution (ammonia water, urea) or in gaseous form (ammonia) are injected into hot flue gases. Following the overall post-combustion reactions for molecular nitrogen, water and carbon dioxide are formed. The optimum temperature range, where a noticeable NOx reduction is achieved >800 mg/Nm^3, is between 850 and 1050 °C depending on the composition of the flue gas. Above this temperature range ammonia is oxidised to an increasing extent, i.e. nitrogen oxides are formed.

Urea $\quad$ $NH_2CONH_2 + 2\ NO + ½\ O \Rightarrow 2\ N_2 + CO_2 + 2\ H_2O$

Or for

Ammonia $\quad$ $4\ NH_3 + 4\ NO + O_2 \Rightarrow 4\ N_2 + 6\ H_2O$

At lower temperatures the reaction rate is slowed down, causing an ammonia slip which may result in the formation of ammonia salts in the further flue gas path and may lead to secondary problems. Therefore, the ammonia slip should be kept on a minimum.

The important design and operational factors that affect NOx reduction by an SNCR system are as follows:

- ✓ Appropriate temperature for SNCR.
- ✓ Location of suitable Temperature.
- ✓ Resident time available in optimum temperature range
- ✓ Degree of mixing between injected reagent and combustion gases.
- ✓ Uncontrolled NOx concentration level
- ✓ Molar ratio of injected reagent to uncontrolled NOx

Volume (Steam + CO_2 from extra coal) will affect the production negatively. BQB, having one of the best pyro process know how, possess a unique solution to recoup this loss due to ammonia injection at a nominal cost.

After successful trial run, BQB compiles all the finding observed/collected/measured during the trial run and submit a report. This report serves you as a road map for installing a complete SNCR system and give you a very fair idea about optimized process parameter, economical viability, ROI, risk factor and quality.

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