

Göteborg, January 1997

SYSTEM ROTAMIX®

A cost efficient method to reduce NO_x and SO_x with simultaneous improvements of the combustion.

Background

The past decades attention towards dangerous environmental pollution's have been aroused. An obvious way to reduce pollution's is changing to cleaner fuels. Further, particle bound pollution's can be separated with different types of electrical or mechanical filters. Flue gases can also be washed in a scrubber, leaving leachate as a residue.

An obvious procedure is reduction of some unwanted bi-products directly at the source, i.e. in the furnace. In recent years the knowledge of combustion mechanisms have improved, which has given us the opportunity to influence the production of unwanted pollution's.

Laminated flow

The first conditions are created where the fuel is gasified. Irregular fuel supply can create asymmetrical zones and flow of unburned gases. Irregular supply or poor mixture of combustion air can create zones with too high or too low oxygen levels, resulting in asymmetrical combustion temperature, affecting the gasification of the fuel.

Through the boiler rise a laminated flow containing both burnt and unburned gases. Uneven temperature makes mixing of the flue gases more difficult, the term is that the flow is laminated. The hottest gases "glide" the fastest way out of the boiler. With our technique we create turbulence and break the laminated flow. (Compare adding sugar to your coffee. If you don't stir, the sugar stays on the bottom.)

When the gases are on the way up through the boiler the reaction don't stop where the flames end. Only part of the reaction provides visible light. The temperature is still high and we have not reached chemical balance.

MOBOTEC

Combustion, Control and Fluid Dynamics

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ROTAMIX®

Via our system ROTAMIX, i.e. admixture and mixing of air, fuel and reducing chemicals, NO_x- and SO_x- reduction can be obtained with simultaneous reduction of CO and O₂. Theoretically it is simple, but building and optimising the system demands a lot of experience.

Through specially asymmetrically placed air nozzles the volume of the furnace is rotated. The flue gases are well mixed with the added air, making a flue gas whirl. This procedure creates turbulence and rotation in the entire furnace. The creation of laminated flow is avoided and we can more effectively use the entire volume of the furnace for the combustion process.

When even higher reduction grades are acquired, the greater advantage with the ROTAMIX technique is that it can be used with reducing chemicals. A result of rotation intermixing is that a more homogenous furnace temperature is obtained. The chemicals can be used more effectively, providing lower NH₃- slip. The chemical consumption is also reduced, resulting in even lower NH₃- slip and lower N₂O- production.

The chemicals are supplied via lances of a "simple" model. With an easy hand movement the lances can be removed for inspection, if necessary even during operation.

ROTAMIX assures an effective mixture of the chemicals in the flue gases. The lances are automatically regulated and the chemicals are injected into the boiler where the temperature is the most suitable. The amount of chemicals are adjusted via the furnace temperature and fuel flow/ steam production.

AT LAST....

We have the knowledge and take total responsibility regarding guaranteed emission levels.

Our idea is based upon a complete understanding of combustion, furnace equipment and the use of reducing chemicals. We have a wide experience in controlling and optimising all the components in the combustion process, with a minimum of unwanted pollutants.

ROFA® and system ROTAMIX® are part of system ROKAD® and are registered trademarks. ROTAMIX® is a patented procedure containing rotation intermixing of air and/or reducing chemicals.