

Waste gas cleaning

KS 98 application

Control of the catalytic reaction for NO_x reduction

NO_x reduction rates > 90% Load-dependent control of urea batching Detection of disturbances Feed forward control

KEY WORDS

Block heating plants, gas turbines, industrial furnaces, sewage sludge incineration, wood fired plants, pickling plants, pyrolysis plants, chemical plants, thermal soil decontamination, ammunition disposal, incineration of special waste.

DESCRIPTION

For the control of NOx emission, selective catalytic reduction (SCR process) has proved to be the most effective.

Based on this process, the German ENKAT Company develops and manufactures highly efficient waste gas cleaning systems. In a catalyzer, nitrogen oxides are converted into nitrogen and water vapour (both are natural constituents of air) under the addition of ammonia or urea (carbamide).

The process places high demands on the catalyzer (filled 100% with active catalytic material), and the load-dependent dosing of the urea. With an optimally designed plant, up to 90% fewer pollutants are discharged into the environment. This is achieved independent of operating conditions, very efficiently and without any problematic by-products.



Fig.1: Catalytic waste gas cleaning

IMPLEMENTATION

The basis of the catalyzer control system is a ratio controller. To measure the NOx content, the controller adds urea or ammonia to the waste gas flow in a predefined ratio. The flexible structures of the KS 98 are used for fast response to disturbances, especially under varying load conditions (different flow rates) and sudden changes of the NOx content, thus ensuring a constant catalytic reaction.

By means of a linearization curve, the ratio set-point can be matched to the varying load requirements. Moreover, a differentiated input signal can be used to correct the controller's output (feed forward control). For optimum effects, the feed forward control signal must take the following data into account:

- the flow time of the waste gas between the NOx measurement point at the entry of the catalyzer, and the location of the dosing equipment
- the reaction time of the dosing equipment.

These requirements are handled easily with the time-dependent functions in the KS 98 (integration, differentiation, timers, filters, etc.). A further quality increase can be achieved by measuring the output parameters.

Via computing and timer functions, the measured value can be modified, thus chan- ging the effect of the dosing behaviour of the controller.

Similarly, it is possible to search for operational parameters that can be used to minimize an output parameter (CO / NOx).

UNLIMITED VERSATILITY

The flexible configurability of the KS 98 enables the above application to be exten- ded with pre-configured library functions such as password protection, timer, pro- grammer, etc., or even "homemade" partial Engineerings.

With additional operating screens, for example 6-line text display, trend display, and bargraphs, the projecting engineer is able to increase the plant's operational functions.

Moreover, by means of a user-specific menu structure, the transparency of the process data can be adapted precisely to individual requirements.



PMA Prozess- und Maschinen- Automation GmbH P.O Box 31 02 29 D - 34058 Kassel Tel.: +49 - 561 - 505 1307 Fax: +49 - 561 - 505 1710

E-mail: mailbox@pma-online.de Internet: http://www.pma-online.de Your local representative