

## Refinery Continuous Catalyst Regeneration TCD Process Gas Analyzer

### Basics and background

The Continuous Catalyst Regeneration (CCR) units in refineries perform the key function of achieving the catalyst regeneration to ensure optimum process performance. The catalyst regeneration process requires 100% pure nitrogen to ensure optimal performance for maximum process profitability.

If hydrogen or hydrocarbons are present in the nitrogen, the process needs to be regulated.

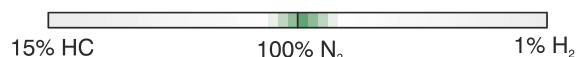


### Solutions – Use of process gas analyzers

The deviation from 100% pure nitrogen can normally be up to 1% hydrogen or up to 15% hydrocarbons, a mixture of approx. 10.5% C<sub>3</sub>H<sub>8</sub> and 4.5% C<sub>4</sub>H<sub>10</sub>. In a thermal conductivity gas analyzer the 2 different impurities of up to 15% HC or 1% H<sub>2</sub> lead to 2 curves with different response gradients.



Therefore the measurement with a single thermal conductivity gas analyzer such as the CONTHOS 3 – TCD can be realized with a range of +15% HC - 100% N<sub>2</sub> - 1% H<sub>2</sub>.



This requires a special linearization of the 2 curves with the midpoint of pure nitrogen being placed at 50% of the instrument's span (12 mA). The span gas is 1% hydrogen in N<sub>2</sub> and is shown as 100% of the instrument's span (20 mA), while 0% of the span (4 mA) can be checked with 15% HC. The special response linearization and placement of zero, midpoint and endpoint enables the optimal regulation of 100% pure nitrogen in catalyst regeneration.

### Conclusions

The special linearization and adjustment procedure of the LFE CONTHOS 3 - TCD for analysis of HC and H<sub>2</sub> in 100% pure N<sub>2</sub> helps

to optimize the Continuous Catalyst Regeneration process in refineries leading to optimal process performance.

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