

The only proven single step emission control solution for dust, acid gases, NOx and Dioxins

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Problematic:

Combined Abatement of

- 1) Dust,
- 2) Acid gases
- 3) Catalytic removal of NOx (and Dioxins).

3 Problems, 1 solution: Ceramic Catalytic filter with Sorbent and Urea addition.

The Ceramic Catalytic technology is the **only** unique proven technical solution to the above, using one single Process Step

Ceramic Catalytic filter with Sorbent/Urea addition: Gas/Process Conditions and Emissions

<u>Pollutant</u>	<u>Process Conditions</u>	<u>Emissions*</u>
<u>1) Dust</u>	Dust loads treated in excess of 10,000 mg/Nm ³	<5mg/Nm ³ warranty value (in reality <2mg/Nm ³)
<u>2) Acid gases (SOx)</u>	<u>Sorbent addition.</u> Lime Temp window up to 350 C Bicarb Temp window up to 300 C	>95% Typically <10 mg/Nm ³ . VLE = 50mg/Nm ³
<u>3) Catalytic abatement:</u> <u>a) DeNOx</u>	<u>Urea injection.</u> Temp window = 200-350C	>95% VLE = 200mg/Nm ³
<u>b) Dioxins</u>	Temp window = 200-260C	>99% VLE = 0.01ng/Nm ³

* Typical values. Gas composition analysis required on a case by case basis

Benefits

- Rationalisation and simplification of costly equipment chains.
- Space saving (in limited footprint)
- Eradication of process in-efficiencies; cooling and re-heating
- Energy/Temperature remains in the Gas stream
- More efficient usage of sorbent at higher temperature
- Capital and Operational cost savings.

Inherent advantages of Ceramic filtration over Bags/Sleeves

- higher dust removal efficiency
- no risk of damage due to temperature surges
- no mechanical wear (no cage required)
- no particle ingress
- stable pressure drop
- longer life

Inherent Advantages from catalyst, over classical SCR solution

- superior contact/retention time
- protected catalyst
- poison resistance
- longer life /warranty now 3+ years
- Proven track record in varied application areas.

Technical

The gas filter, containing the ceramic catalytic elements functions on the same design and operational principles as a classical bag filter.

Depth impregnation of Vanadium/Titanium Catalyst into the mass of the Ceramic Filter wall.

Conclusions

- Ceramic filter technology is well established with 100's of references worldwide
- Ceramic filters offer efficient hot gas filtration
- Temperature maintained for optimal deNOx
- The ceramic filter protects the catalyst against poisoning by dust particles
- The catalyst is nano-sized ensuring high reaction rates and low emissions even at low temperatures
- Catalytic filters offer combined particulate, SOx and NOx control
- Phased implementation is possible- deNOx can be achieved with catalytic filters or SCR
- Optimal use of valuable space.