

Caldo Hot Gas Filtration Technology

● *filtration of gases from biomass gasification processes*

- filtering fuel gas when it is hot has important benefits –
 - *subsequent gas cooling equipment is not subject to fouling by solids*
 - *filtering cold fuel gas will produce a wet or sticky cake*
 - *liquids condensed from the gas do not require filtration*
 - *fuel gas can be burned hot at increased overall thermal efficiency*
- there are several practical problems when filtering hot fuel gas –
 - *the fuel gas will burn easily and oxygen/air ingress must be prevented*
 - *compressed air cannot be used for reverse pulse cleaning*
 - *reverse pulse cleaning involves jets of cold gas that can cause condensation of the fuel gas on mixing*
 - *fuel gas components will condense at cold spots such as the hopper and solids discharge valves*
- Caldo has developed effective solutions to all these problems



Caldo ceramic filter for fuel gas filtration at 700°C. The filter is built in type 304 stainless steel and incorporates trace heating and a metal seated solids discharge ball valve

● *mechanical developments*

- improved footprint utilisation by better layout of elements
- reduced potential for gas leakage by novel design of reverse pulse bars
- spun metal collars reinforce ceramic filter elements at their weakest point

● *filtration of gases for sulphuric acid manufacture*

- converting SO_2 to SO_3 by using a catalyst at 400°C is a key process stage in sulphuric acid manufacture. Filtering the process gas before the catalyst –
 - *avoids high pressure drop caused by solids collecting on top of catalyst*
 - *produces a higher quality of acid*
 - *enables long production runs*
- there are several practical problems when filtering sulphuric acid precursor gas –
 - *the gas has a high dewpoint and will condense on any surface that is relatively cool*
 - *the cold blasts of reverse pulse air cause condensation of the process gas inside the elements during cleaning*
 - *low concentrations of solids, all being desublimates, give very high pressure drop*
 - *choice of solids discharge valves is not obvious*
- Caldo has first hand experience of these problems and has resolved them successfully

Caldo ceramic filter on sulphuric acid plant at YANOS-Slavneft, Yaroslavl, Russia, Jan 2006



● *materials of construction*

- Caldo has supplied large filter vessels in C22 Hastelloy, types 304 and 3CR12 stainless steel, as well as many in carbon steel.

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