

Application Notes V-cone flowmeter

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Application Flow measurement of heavily contaminated gases in an energy experimental station

Customer TPS Thermal Processes AB, Studsvik, Sweden

THE PROBLEM

TPS is an experimental station for the power generating industry. TPS have especially focused their research towards processes for biogas using wood products from energy forests etc. as fuel. Also they have been heavily engaged in incinerators where garbage is burned. The research is targeted towards both new energy sources as well as environmental aspects of their processes.

TPS had the problem of wanting to measure the unfiltered exhaustgases directly after the burner. All their attempts with other flow meters had failed due both to erosion and clogging since the exhaustline contained 20-60 kg/h. Another complication was that deposits in the exhaust lines after having built up suddenly could come loose and fly down the pipe line. Several 10 kg per minute could for a short period of time travel down the pipeline and thus upset any flowmeter mounted downstream.

THE SOLUTION

Since TPS had heard of the good results of the use of the V-cone in the power industry especially on dirty gases the local rep Ansko was approached to see if the V-cone could do the job under such difficult conditions.

The arguments were whether the meter would give a signal at all and how long time it would take until the pressure ports which are open to the dirty gas would clog up.

Since there were some real good results from coke oven gas which is a very dirty gas Ansko offered TPS a trial meter.

TPS ran the meter in a project and came back to after just a week of operation and told that the flow signal was gone. The process had to run for another week without the meter giving any flow signal for unknown reasons. After having taken the V-cone meter out of the line it was found that the support of the cone had been eroded so much that a hole into the pressure line had developed and thus created a loss of signal.



This problem was discussed with McCrometer the manufacturer of the V-cone and since there was an information about a new coating technology for steel that was used in coal fired power plants and other places where erosion occurred McCrometer made a V-cone where the surface of the cone and the support were coated with this material which gives a hardness 4 times the hardness of stellite and also bonds to the base material unlike using conventional methods of hardening steel.

After the meter had been calibrated it was shipped to TPS and put into the same location for evaluation.

TPS reported that there was hardly any wear of the support or surface of the cone and thus the project could continue as planned. Later we were informed that there were some clogging problems but using a periodical purging prevented the meter from clogging.