

AIR POLLUTION SYMPOSIUM

Addendum

Terms and specifications for stack emission in South African sugar mills in 1972 are as follows:

- (a) All new boiler installations to have a maximum emission level of 400 mg/m³ — subject to review in five years time.
- (b) All existing dust collection installations to conform to 1000 mg/m³ within four years.
- (c) All present boiler installations to conform to 450 mg/m³ within eight years, concentrations to be determined at standard flue gas conditions, namely, dry, 12% CO₂, 0°C and local barometric pressure.
- (d) All air cleaning equipment installed under the agreement to be reconsidered fifteen years after installation, to assess if still "best practical means" at that stage.
- (e) A factory unable to carry out requirements for technical reasons may apply to the Chief Officer for exemption through the Air Pollution Study Group, which will make recommendations.
- (f) If exemption is sought for financial reasons, a factory is to apply direct to the Chief Officer.
- (g) Each factory will, through the Air Pollution Study Group, present to the Chief Air Pollution Control Officer a plan of action for implementation of the agreement commencing the 1973 off-season.
- (h) All proposed new boiler installations are to be submitted for approval to the Chief Control Officer through the Smoke Study Group. This group will continue to function as a Committee of the South African Sugar Millers Association Ltd.

All proposed designs, specifications or installations should be referred to the Air Pollution Study Group before final decisions are made. The Study Group will have technical information about all the equipment that is available.

Discussion

Collector efficiency at varying loads must be kept in mind. If two boilers are coupled to one collector installation and one boiler is taken off range, the gas velocity in the collector will be halved causing a drop in collector efficiency.

Smuts must be efficiently disposed of after collection otherwise a further pollution problem will be created.

Factory engineers are advised to pay attention to induced draught fans this season and see how they are operating in relation to their design characteristics. Further, quantities of available condensate and waste water should be measured as this will have a bearing on whether wet or dry collectors are installed.

Pilot Plant Investigations

Short descriptions of the two types of pilot

plant scrubbers (Joy Manufacturing Co. at Mount Edgecombe and Brandt Engineering at Jaagbaan) were given and test measurements from the latter plant gave outlet burdens at NTP of 13 and 31 mg/m³.

Peabody Scrubber

Efficiency tests on the Peabody scrubber at Tongaat were carried out shortly before the presentation of the paper and are summarised as follows:-

Values are standardized to 12% CO ₂ at NTP	
Dust loading	44 mg/m ³
Exhaust volume	40,6 m ³ /s
Pressure drop across scrubber	7,0 m bar
Boiler output	36 000 kg/hr

From the scrubber there is a continuous bleed off of sump water which is pumped to irrigation and this prevents a build up of acid, thereby reducing corrosion problems. Stainless steel (Grade 430) has, however, been used in the manufacture of the scrubber and the only corrosion observed has been in mild steel ducting after the scrubber and in mild steel piping circulating the water.

The pressure drop across the perforated plate of the Tongaat collector is 1¼" and across the mis/eliminator 2".

The scrubber cost R20 000, the vibrating screen R4 000, supports and piping R1 500 and with other expenditure the total cost was approximately R35 000. This works out a capital cost of 60c. kg steam/hour.

The effect of sand on blades of ID fans is normally very serious but a stainless steel impeller on the ID fan of a wet scrubber should last indefinitely.

General

Particle size grading results in South Africa are different from those obtained in Australia where the dust is much finer and this merits investigation particularly where dry type collectors are involved.

If smut dumps are established precautions must be taken in connection with spontaneous combustion as this is a real danger.

The four multi-cyclone dust collectors installed at UF have been operating without much maintenance for 17 years but this year R7 000 has been spent on them to repair erosion damage.

At Darnall primary cyclones on the grit refiners have been replaced after two years. Sand in wet scrubbers should be eliminated if possible owing to the damage it causes to nozzles, etc. Cells for scrubbers can be supplied in cast iron which will cut down wear considerably.

In the December 1965 issue of the Chemical Engineer, and December 1971 issue of Chemical Engineering, a number of different scrubbers are compared in respect of maintenance and capital costs.