ELECTROSTATIC PRECIPITATORS FOR RESOURCE RECOVERY PLANTS

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Discussion by

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Mr. Petersen has done a creditable job of presenting the design and operational considerations which are germane to the application of electrostatic precipitators to the effluent gases of municipal incinerators. It must be remembered that it has been only in the last decade in the U.S. that this equipment has been applied to the waste disposal process. A few years ago this writer had the privilege of presenting two papers to this organization entitled “The Use of Electrostatic Precipitators on Municipal Precipitators in Recent Years”. This covered the operational and performance experience on 16 installations in the U.S.A. and Canada. The other, “Solving Corrosion Problems in Electrostatic Precipitators as Applied to Waste Incinerators” dealt with the problem which has been the most common on domestic installations. It must be remembered that the majority of our first generation units, unlike European practice, were applied to refractory furnaces. This necessitated cooling of the gases (usually by evaporative water techniques) resulting in moisture contents by volume as high as 20-25%. This, coupled with the intermittent operating schedule of most of the plants, resulted in major repair requirements after as little as two years of operation. Those large, multiple furnace water wall plants which were installed (Montreal, Harrisburg and Chicago) also proved to afford deleterious operation of the precipitators due to intermittent operation. The effects, however, were not as severe as the refractory furnace experience. Having been to a number of the European installations where continuous operation is the norm, I know that their experience is better.

There is only one technical area where we find ourselves at variance with the paper. This has to do with the behavior of low resistivity particulate and the selection of precipitator gas velocity. Some years ago we subscribed to the same idea. Experience in recent years on wood waste firing in the paper industry has demonstrated that low resistivity particulate (as low as $10^4-10^5$ ohm/cm) can be effectively collected at high efficiency (+99%) with gas velocity in the 3-4 ft/s range. It is essential, however, that the collecting surface rapping system have a sophisticated intensity control capability so that the several treatment zones (in series) can be optimized from a rapping viewpoint. A fixed intensity throughout the unit is undesirable.

The trend in the U.S. at present seems to be toward small or medium size incinerators. If the legislation throughout the country follows that of our western states relative to gasoline emissions, it is our opinion that dry scrubbing systems most probably with fabric filters (possibly with precipitators) will be employed.

AUTHOR'S REPLY

At European precipitator installations for incinerators, low temperature corrosion seems in general to have been less of a problem than high temperature corrosion, and the reason for this is probably greater continuity of operation, as mentioned by Mr. Bump. The occurrence of high temperature corrosion has been reduced in recent years with the improvement in control of the incineration process.
Optimum gas velocity will depend not alone on dust and gas properties, but also on precipitator design. Since there is a major difference in the basic design of the typical U.S. weighted wire or rigid discharge electrode precipitator, and the European rigid frame precipitator, there could very well also be differences in optimum gas velocity between the two types of precipitator.

The European rigid frame precipitator typically operates with a fixed collecting plate rapping intensity selected for the particular application, while the rapping frequency is fully and individually adjustable for each field of the precipitator. With this arrangement, extremely low emission levels, i.e., exit concentrations of 0.004 gr/SCF (10 mg/Nm³) or less, can be achieved as shown by experience.