

## DUST RESISTIVITY LABORATORY

Laboratory resistivity (ohm-cm) of a dust is the ratio of the applied electric potential across the dust layer to the induced current density. The resistivity value for a dust sample depends upon a number of variables, including dust chemistry, dust porosity, dust temperature, composition of gaseous environment (i.e. gas moisture), etc. In working with electrostatic precipitators (ESP), resistivities are encountered in the approximate range of  $1.0 \times 10^4$  to  $1.0 \times 10^{14}$  ohm-cm, with the optimum value for resistivity generally being in the range of  $1.0 \times 10^8$  to  $1.0 \times 10^{11}$  ohm-cm.

Nol-Tec uses Lodge Cottrell's test procedure which is in accordance with IEEE-548, Standard Criteria for the Laboratory Measurement of Fly Ash Resistivity. The apparatus used for testing is a custom built arrangement that utilizes a high temperature oven, a controlled temperature water bath (for gas humidity adjustment), a DC power source, and an electrometer (for current flow measurement). Resistivity values are calculated from the following equation:

$$\rho = \left(\frac{V}{I}\right)\left(\frac{A}{L}\right)$$

where

$\rho$  = resistivity, ohm-cm

$V$  = applied voltage, volts

$I$  = measured current, amperes

$L$  = ash thickness, cm

$A$  = electrode face area,  $\text{cm}^2$

ESP sizing and performance evaluation must always include resistivity as a primary factor. A typical dust resistivity analysis is shown below. Resistivity plots of this type are used as a standard engineering design tool in the ESP industry.

