WTERT Corrosion Research

The Waste-to-Energy Research and Technology Council is conducting research on the corrosion phenomena in boilers of waste-to-energy facilities. The objective is to explore ways for reducing corrosion in WTE boilers.

Corrosion in WTE units

- Corrosion is the cause of shutdowns in WTE plants and a major operating cost.
- Corrosion sensitive areas are: waterwall above refractory lining in the combustion chamber, evaporator screen, and superheaters.
- Corrosion is mostly associated with chlorine, and consists of active oxidation and salt-mixture induced corrosion.

Corrosion Resistance Test

- Objective:
  1. Determine corrosion rate of various metals under controlled conditions.
  2. Characterization of corrosion products

- Selected alloys: SA178A, SA213-T12, SA213-T22, Comenoy 88, NSSER-4 (from Japan), and Inconel 625.
- Control variables:
  1. Waterwall
     - Gas temp.: 1600-2000°F (870-1090°C)
     - Metal temp.: 540-550°F (280-290°C)
  2. Superheater
     - Gas temp.: 1200-1600°F (650-870°C)
     - Metal temp.: 750-850°F (400-450°C)
  3. Atmosphere
     - HCl, SO2, O2, CO2, CO, N2, and Water vapor
  4. Salt deposit

- Analyses:
  1. Mass loss corrosion rate measurements
  2. Corrosion product analyses
     - Scanning Electron Microscope (SEM) / Energy Dispersive X-ray (EDX)
     - X-ray Diffraction (XRD)