

**Testing of An Impedance Heating System
for Solar Power Tower Applications**

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**James E. Pacheco
and**

William J. Kolb

**Solar Thermal Technology and Test Departments
Sandia National Laboratories
Albuquerque, NM 87185-0703**

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Abstract

A non-conventional type of heating system is being tested at Sandia National Laboratories for solar thermal power tower applications. In this system, called impedance heating, electric current flows directly through the pipe to maintain the desired temperature. The pipe becomes the resistor where the heat is generated. Impedance heating has many advantages over previously used mineral insulated (MI) heat trace. An impedance heating system should be much more reliable than heat trace cable since delicate junctions and cabling are not used and the main component, a transformer, is inherently reliable. A big advantage of impedance heating is the system can be sized to rapidly heat up the piping to provide rapid response times necessary in cyclic power plants such as solar power towers. In this paper, experimental results from testing an impedance heating system are compared to MI cable heat trace. We found impedance heating was able to heat piping rapidly and effectively. There were not significant stray currents and impedance heating did not affect instrumentation.

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