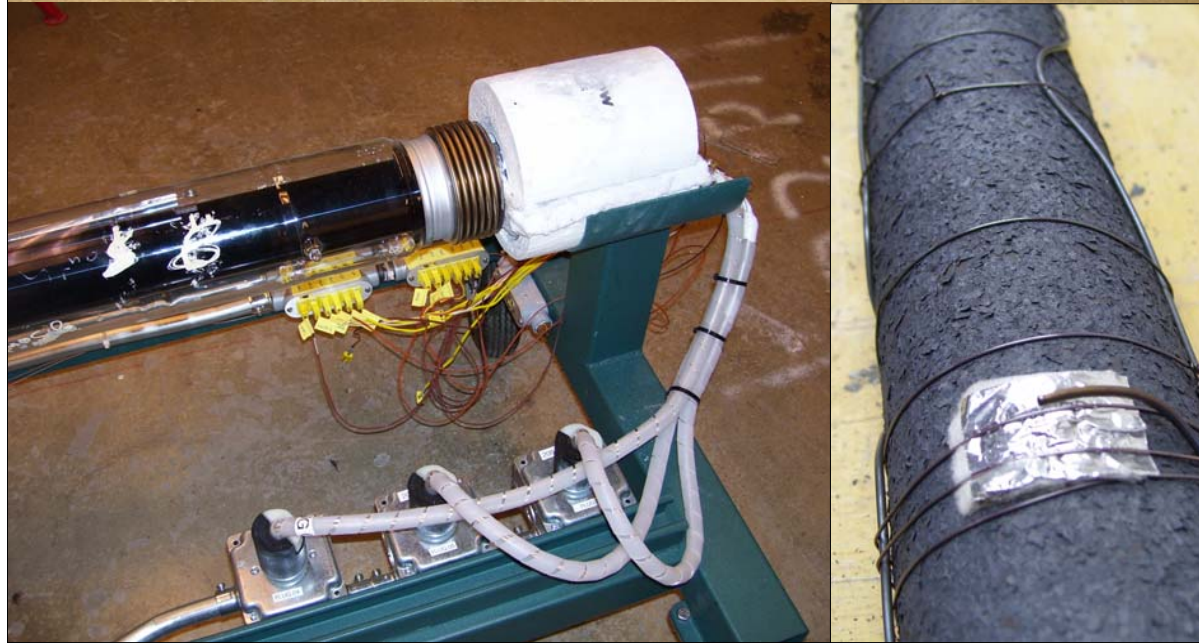
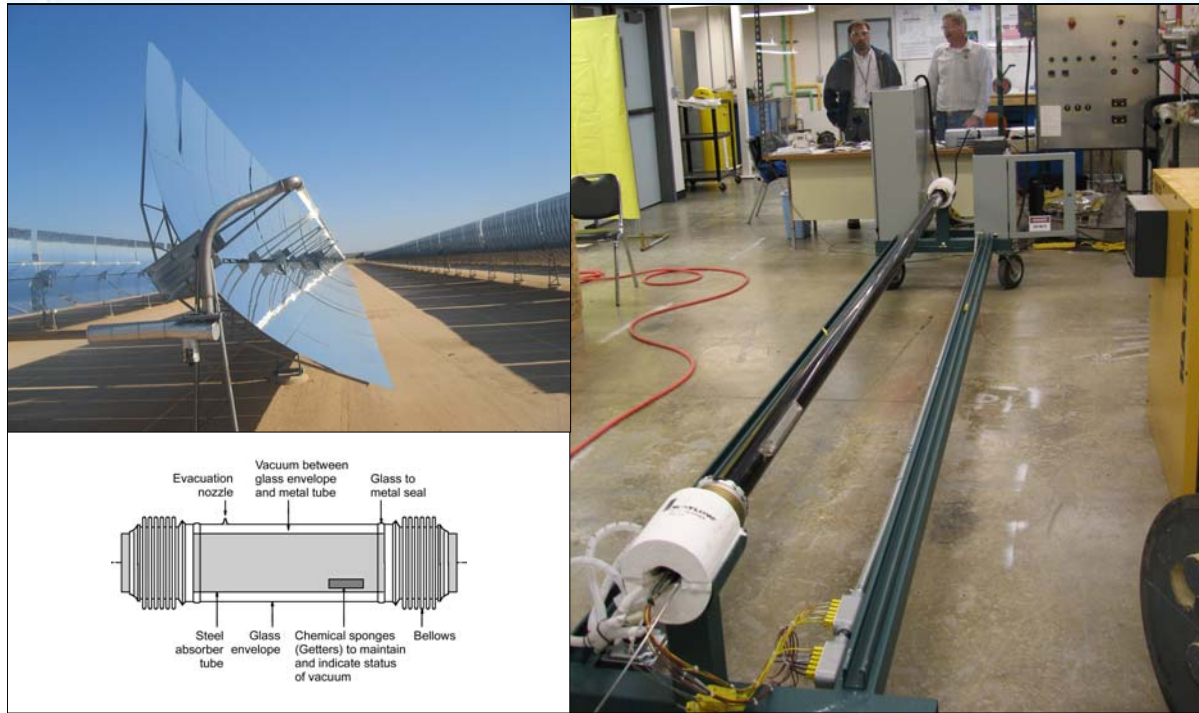


# Parabolic Trough Receiver Heat Loss Testing

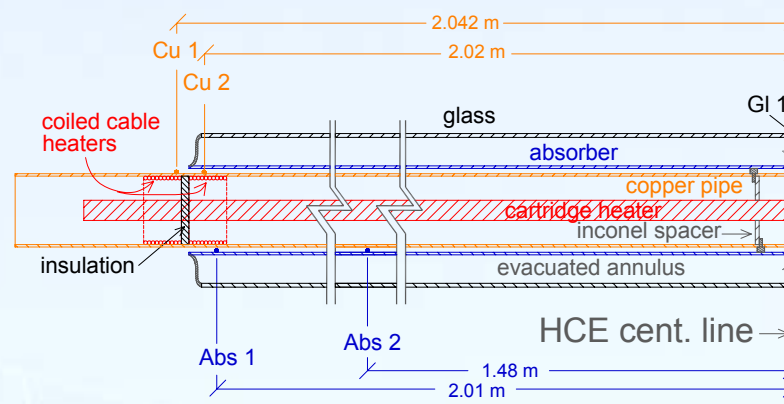
Hank Price, Judy Netter, Carl Bingham, Chuck Kutscher – NREL  
 Frank Burkholder, Michael Brandemuehl – CU-Boulder  
 contact: Frank\_Burkholder@nrel.gov



**Colorado**  
 University of Colorado - Boulder



## NREL Test Stand Schematic North end



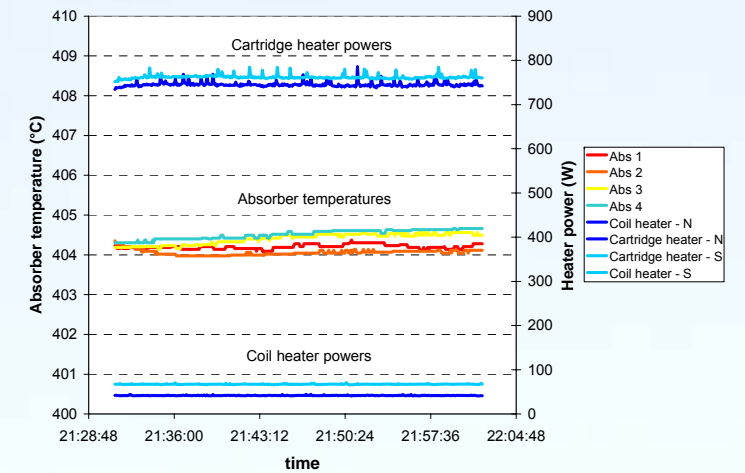
Thermocouple and heater locations - North end of test stand

## Reasons for testing

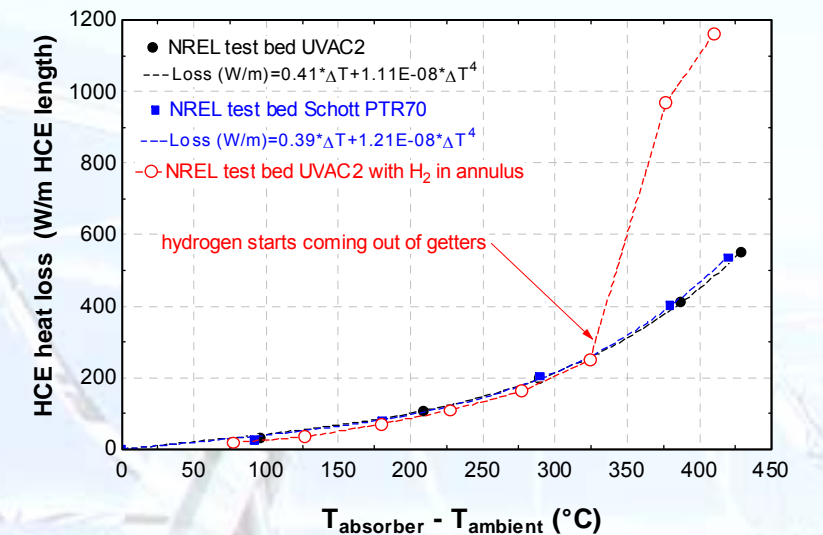
Parabolic trough receivers, or heat collection elements (HCEs), absorb sunlight focused by the mirrors and transfer that thermal energy to a fluid flowing within them. The absorbing tube of these receivers typically operates around 400 °C (752 °F). HCE manufacturers prevent thermal loss from the absorbing tube to the environment by using sputtered selective Cermet coatings on the absorber and by surrounding the absorber with a glass-enclosed evacuated annulus.

This work quantifies the heat loss of the Solel UVAC2 and Schott PTR70 HCEs. At 400 °C, the HCEs perform similarly, losing about 400 W/m of HCE length. To put this in perspective, the incident beam radiation on a 5 m mirror aperture is about 4500 W/m, with about 75% of that energy ( $\approx 3400$  W/m) reaching the absorber surface. Of the 3400 W/m on the absorber, about 3000 W/m is absorbed into the working fluid while 400 W/m is lost to the environment. This is exceptional performance.

## Schott PTR70 steady-state heat loss at $\approx 400$ °C (752 °F)

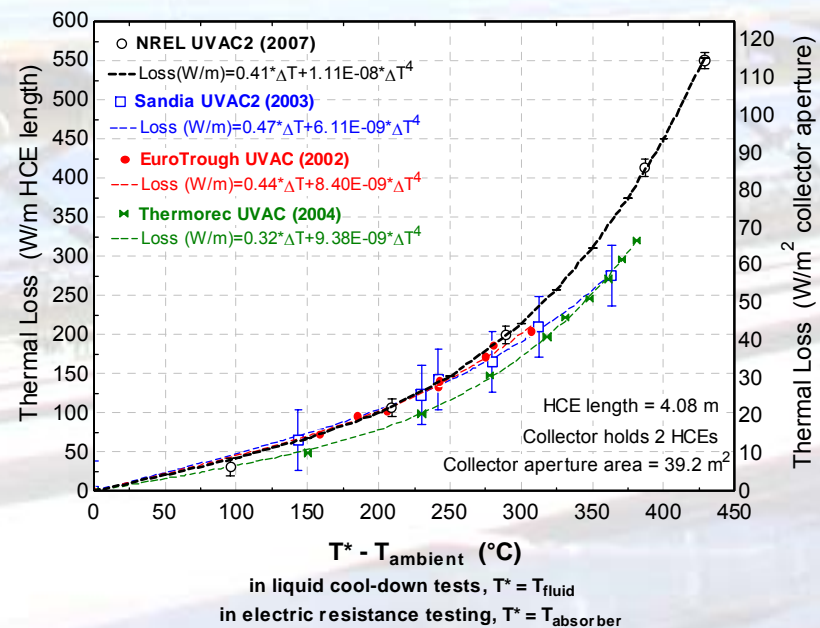


## Results



## Comparison with other heat loss data

### Solel UVAC2



### Schott PTR70

