

# **Appendix B**

## **COMPARISON OF INDIVIDUAL MEASUREMENTS AND PREDICTIONS FOR CFAST**

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For CFAST, this document contains individual comparisons of measured vs. predicted quantities that are contained in NUREG 1824 Supplement 1. The results for each test from each validation set are presented in the following sections and are organized by experimental data set, then by output quantity. Refer to NIST SP 1086<sup>1</sup> for more details on the validation of the model.

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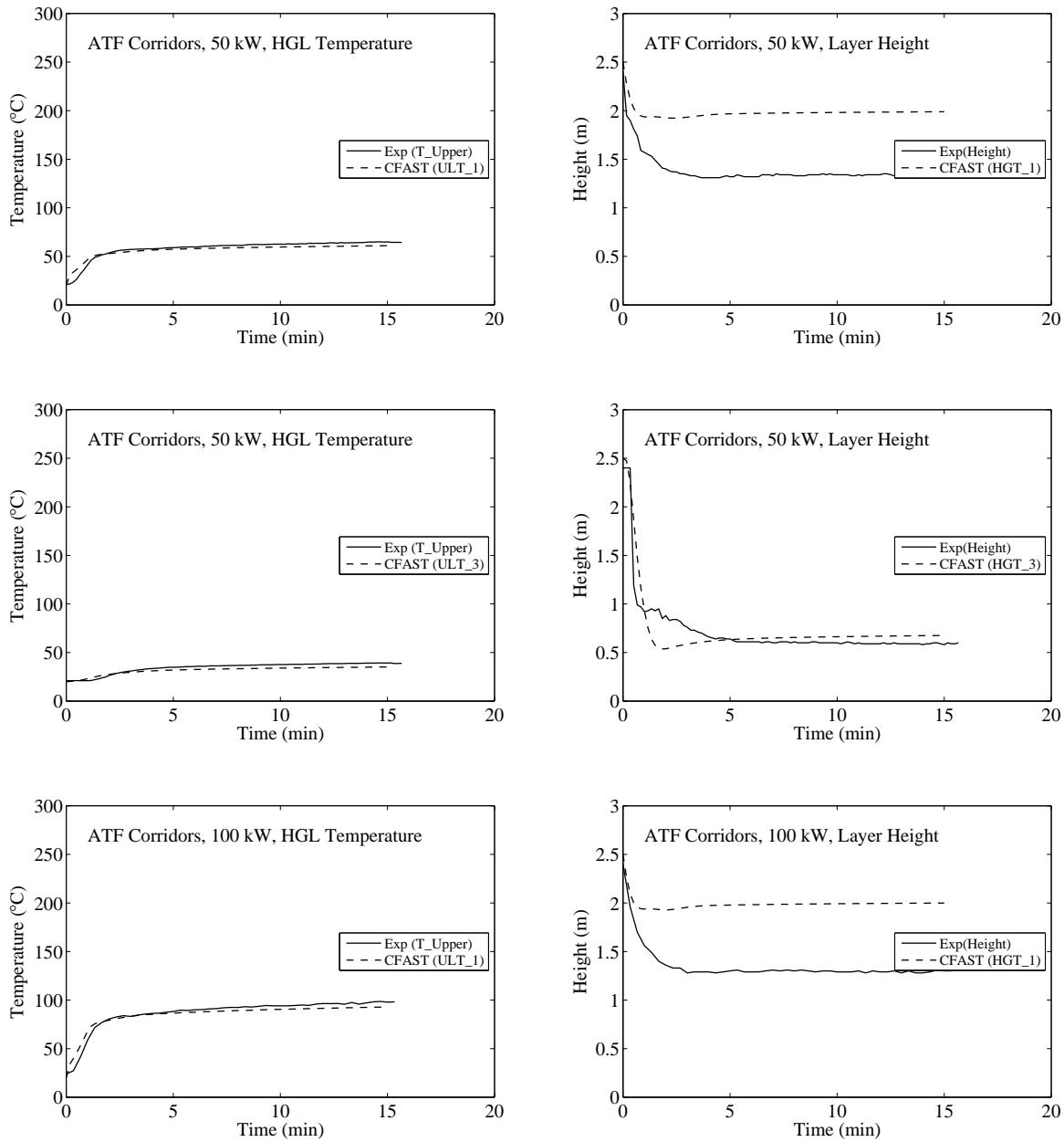
<sup>1</sup>Peacock, R. D. and P. A. Reneke, CFAST – Consolidated Model of Fire Growth and Smoke Transport (Version 6), Software Development and Model Evaluation Guide, NIST Special Publication 1086, National Institute of Standards and Technology, Gaithersburg, MD, 2013.

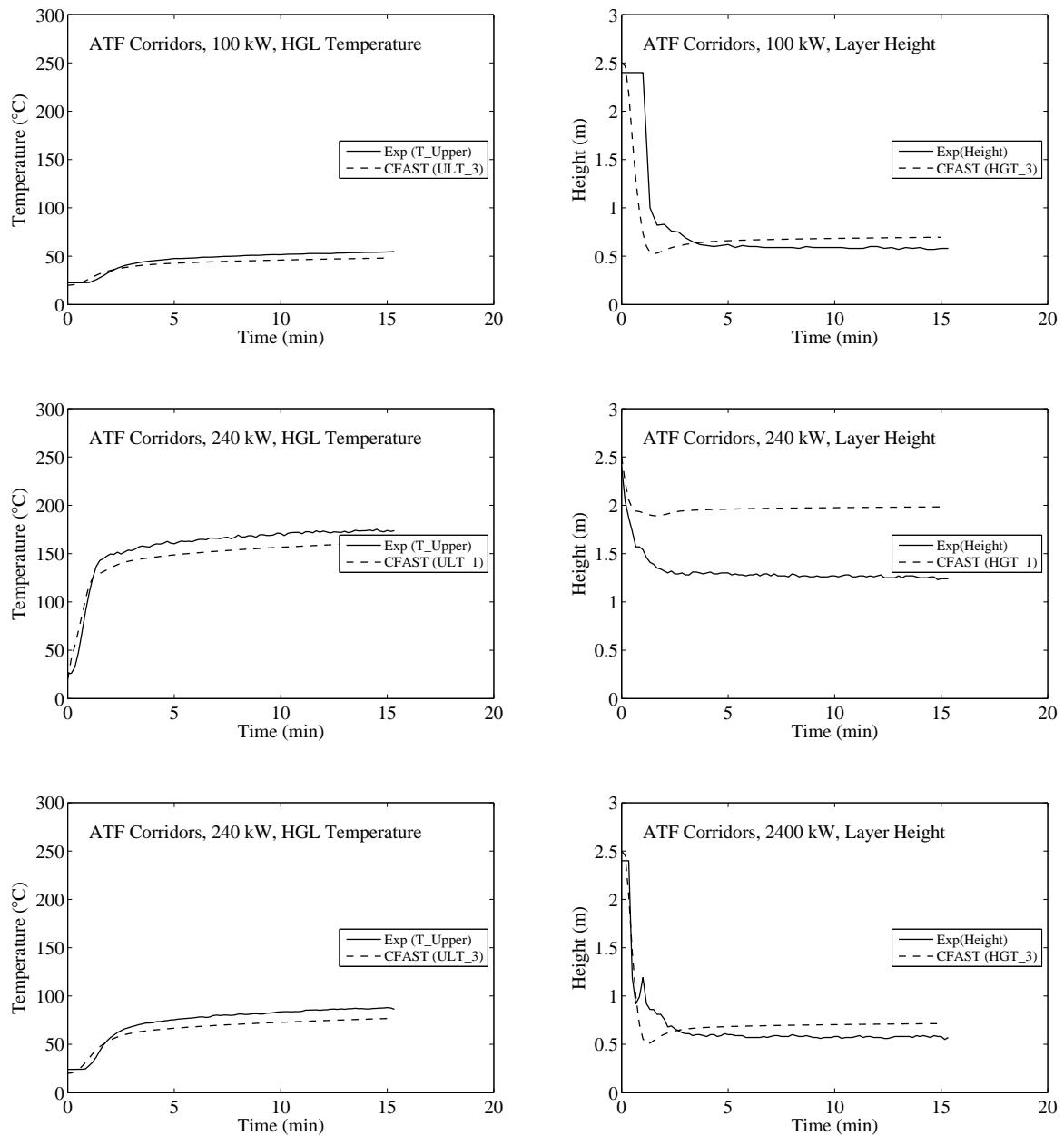
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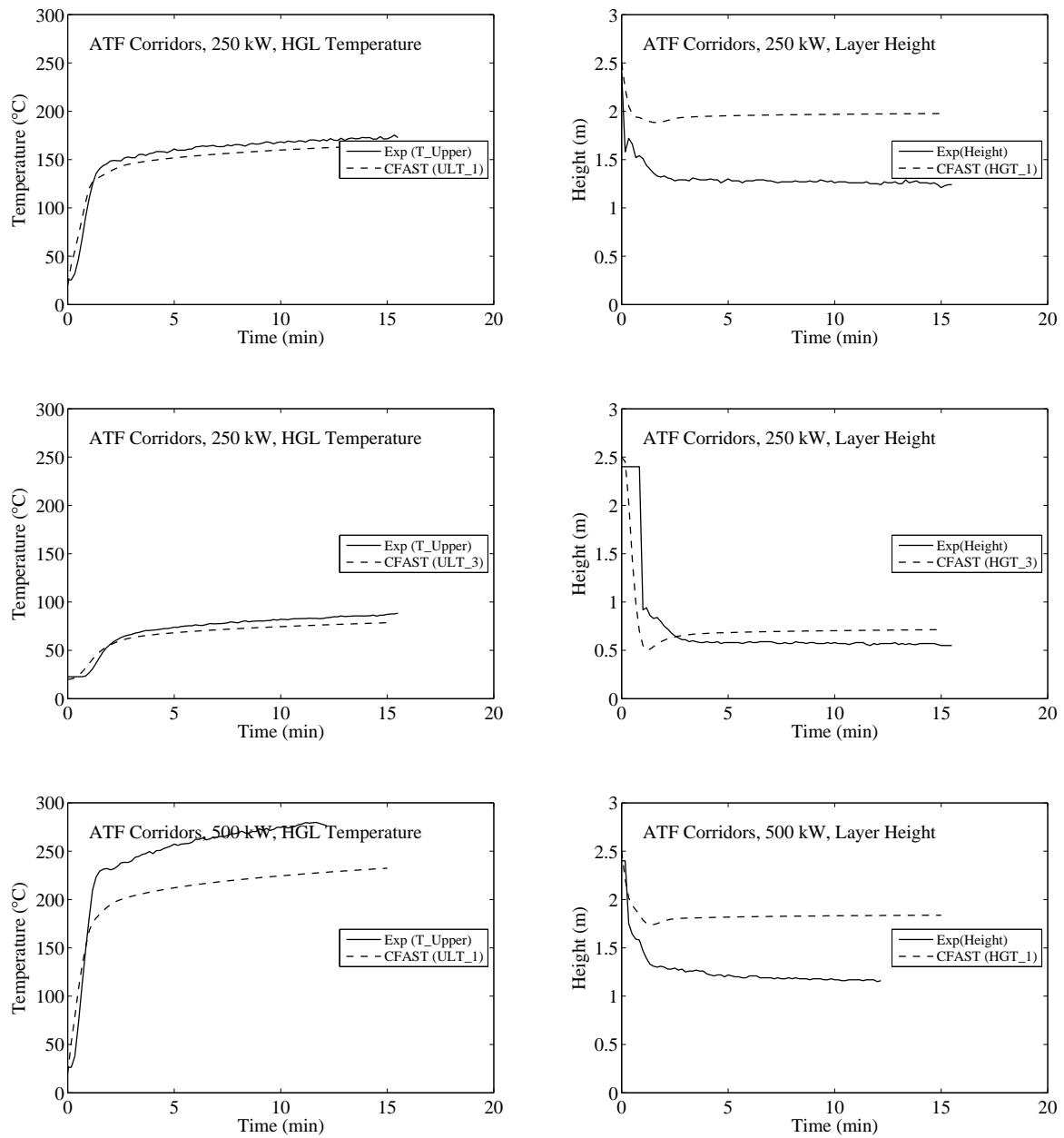
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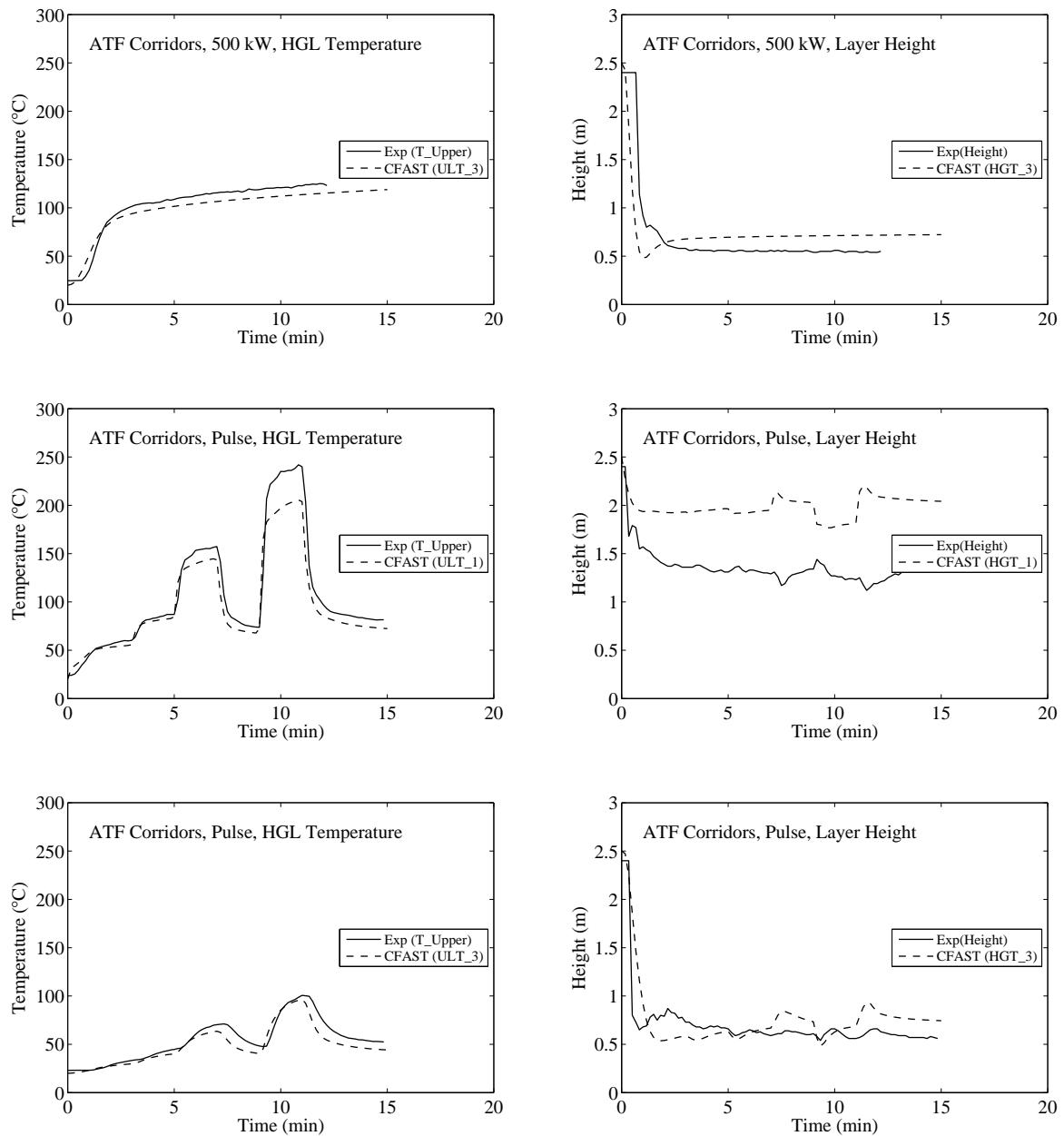
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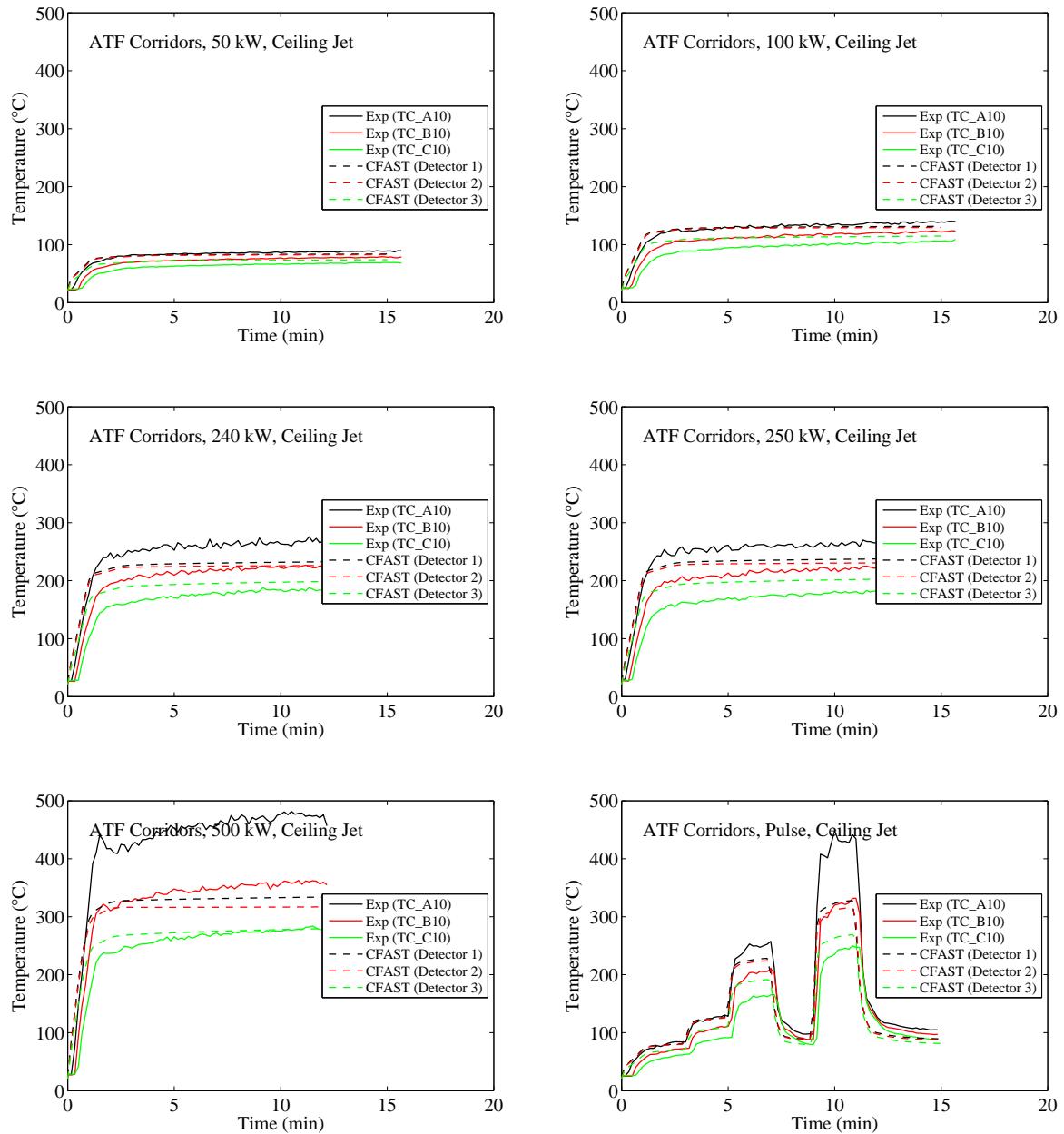
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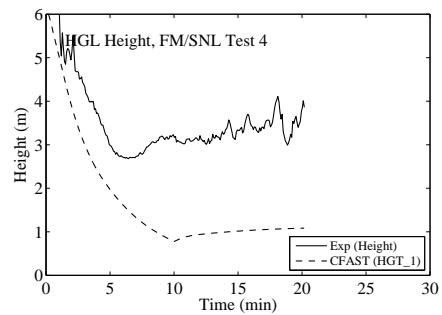
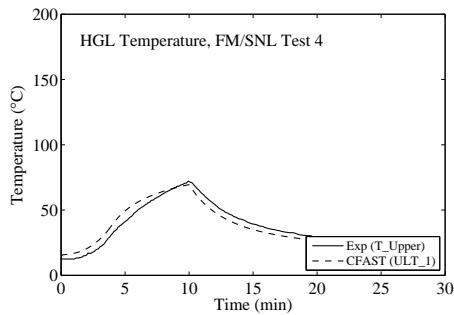
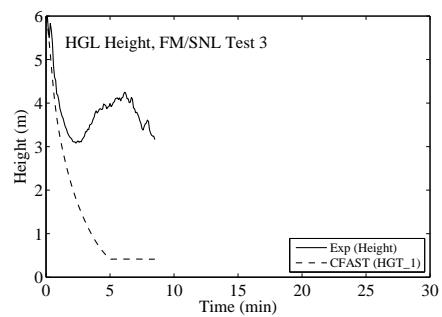
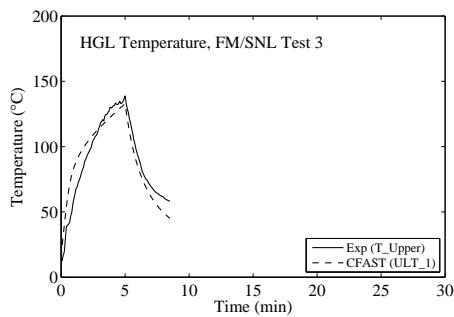
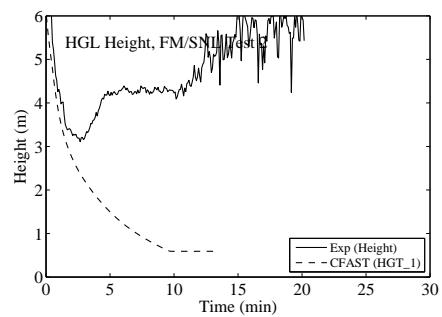
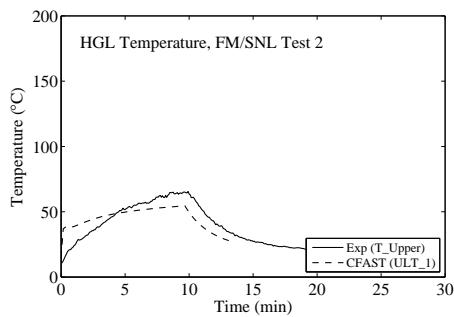
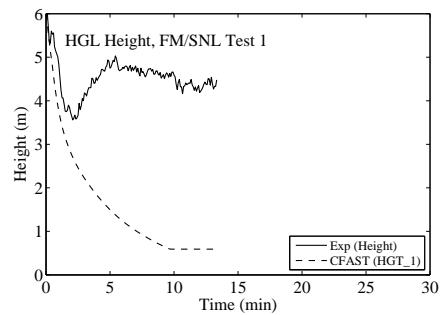
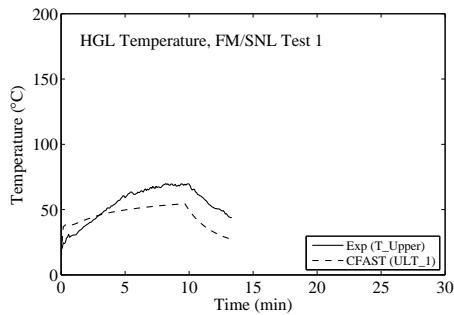


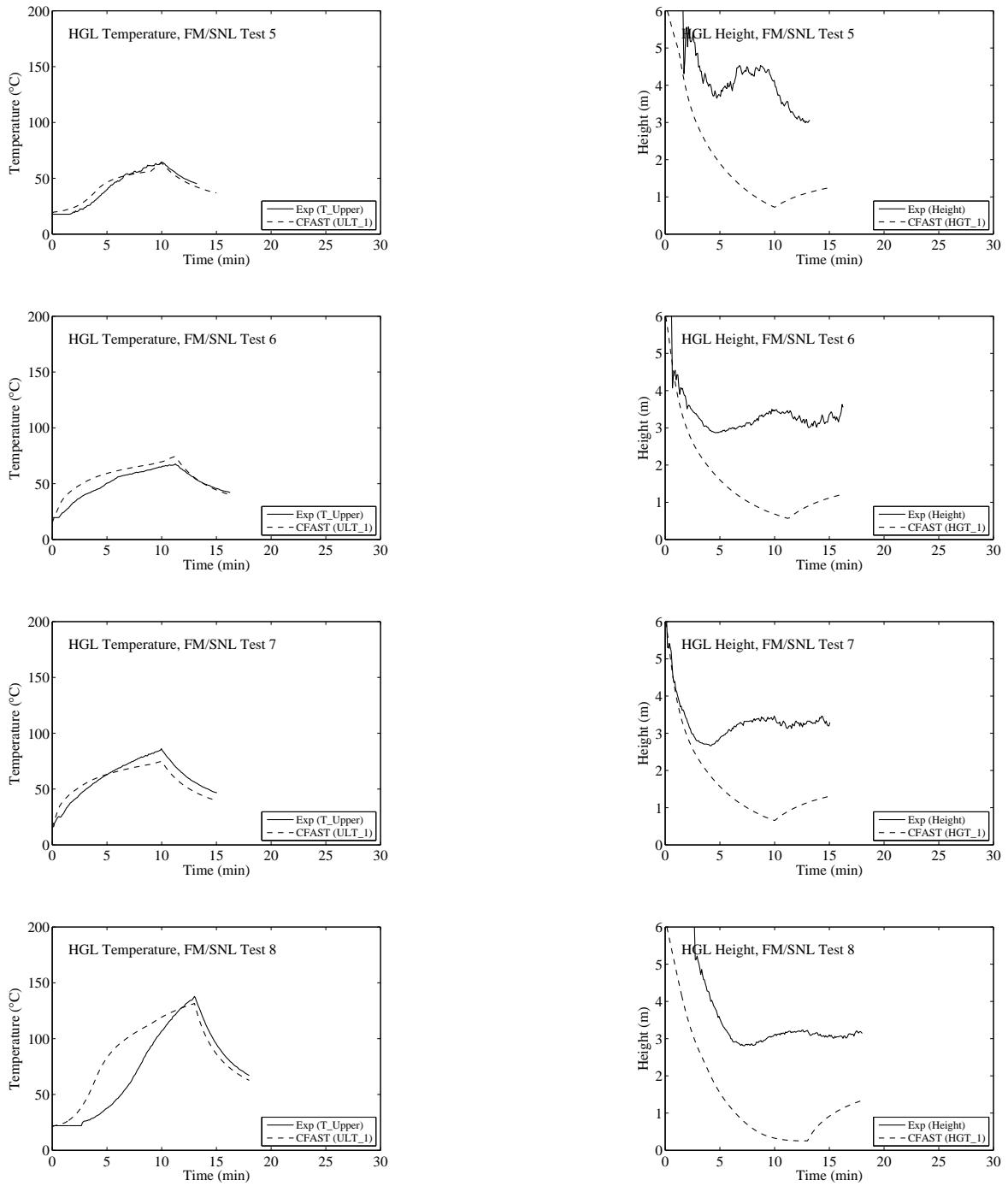


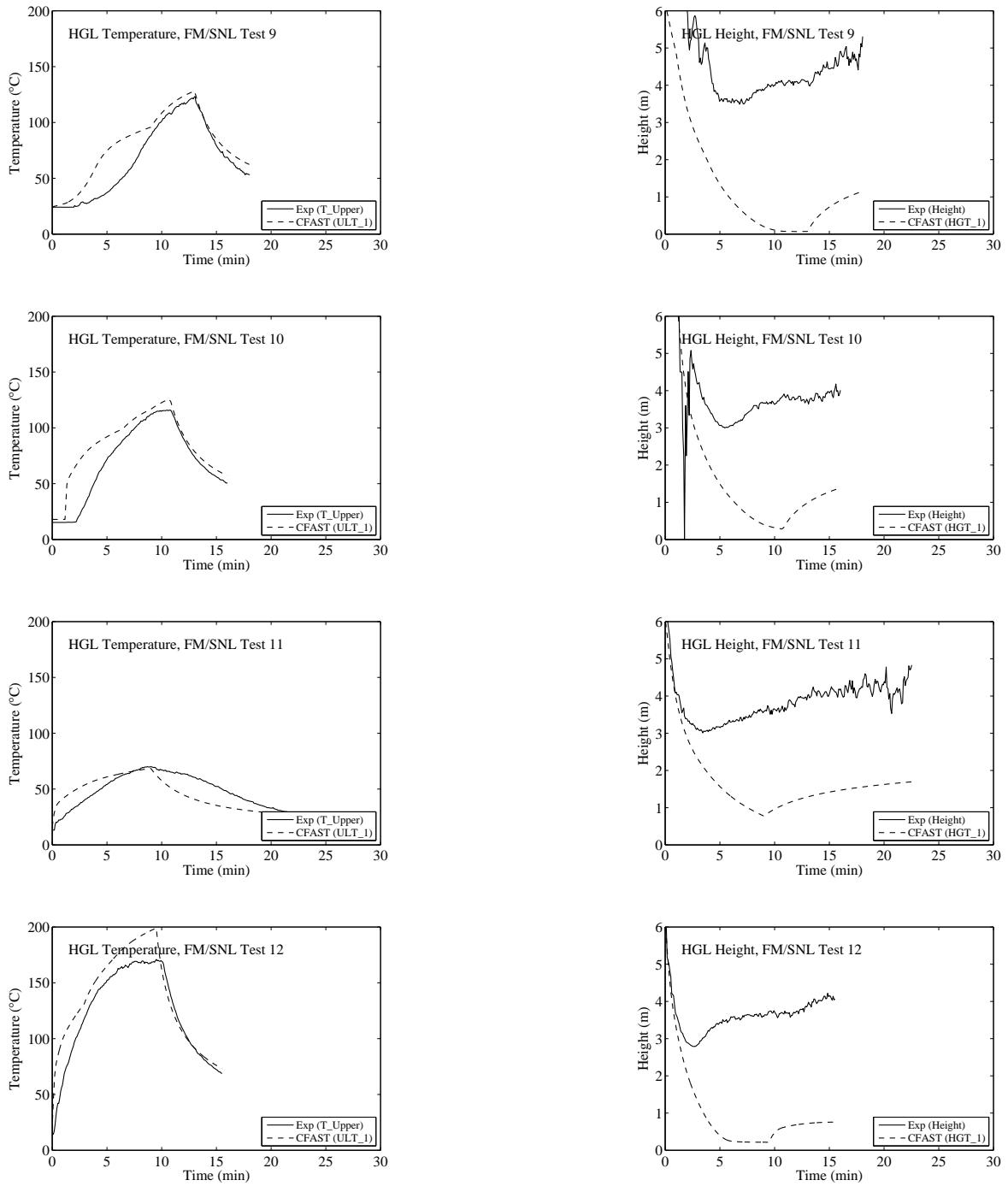


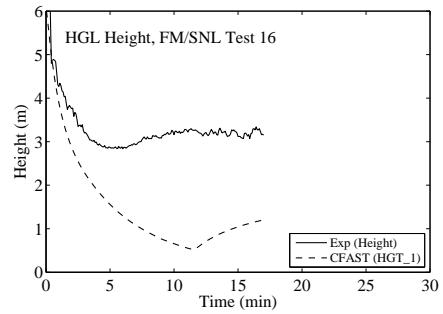
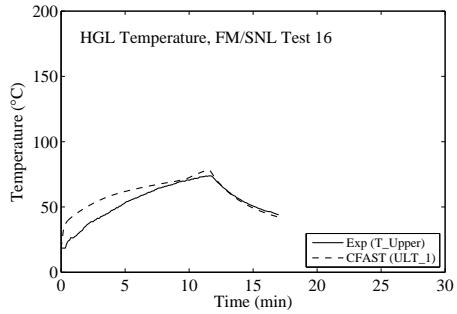
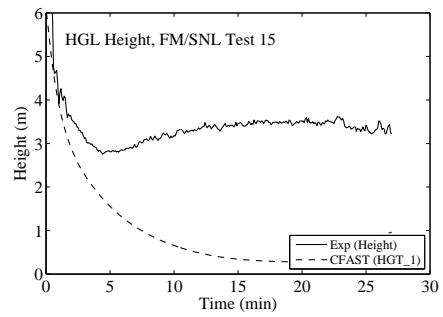
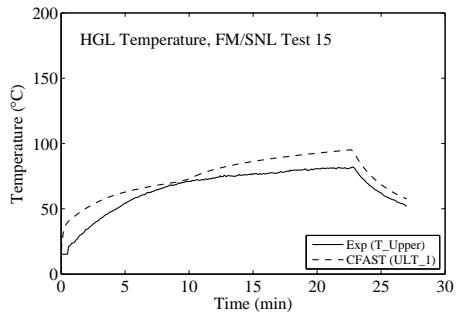
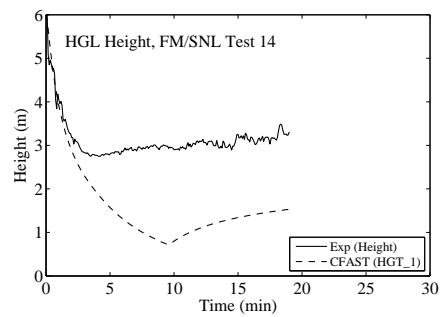
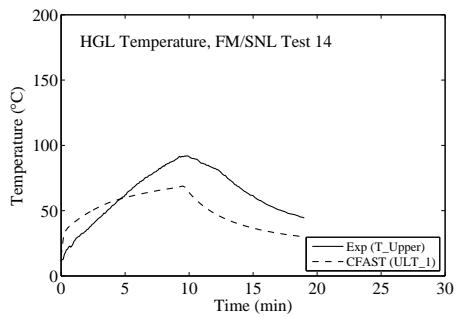
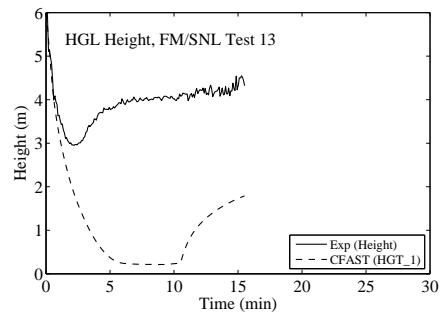
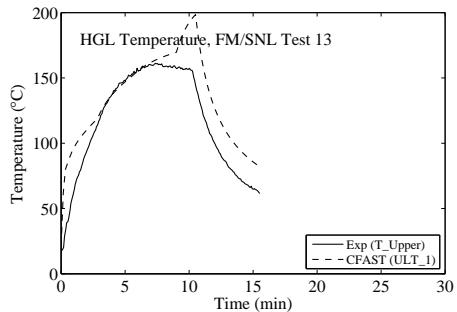


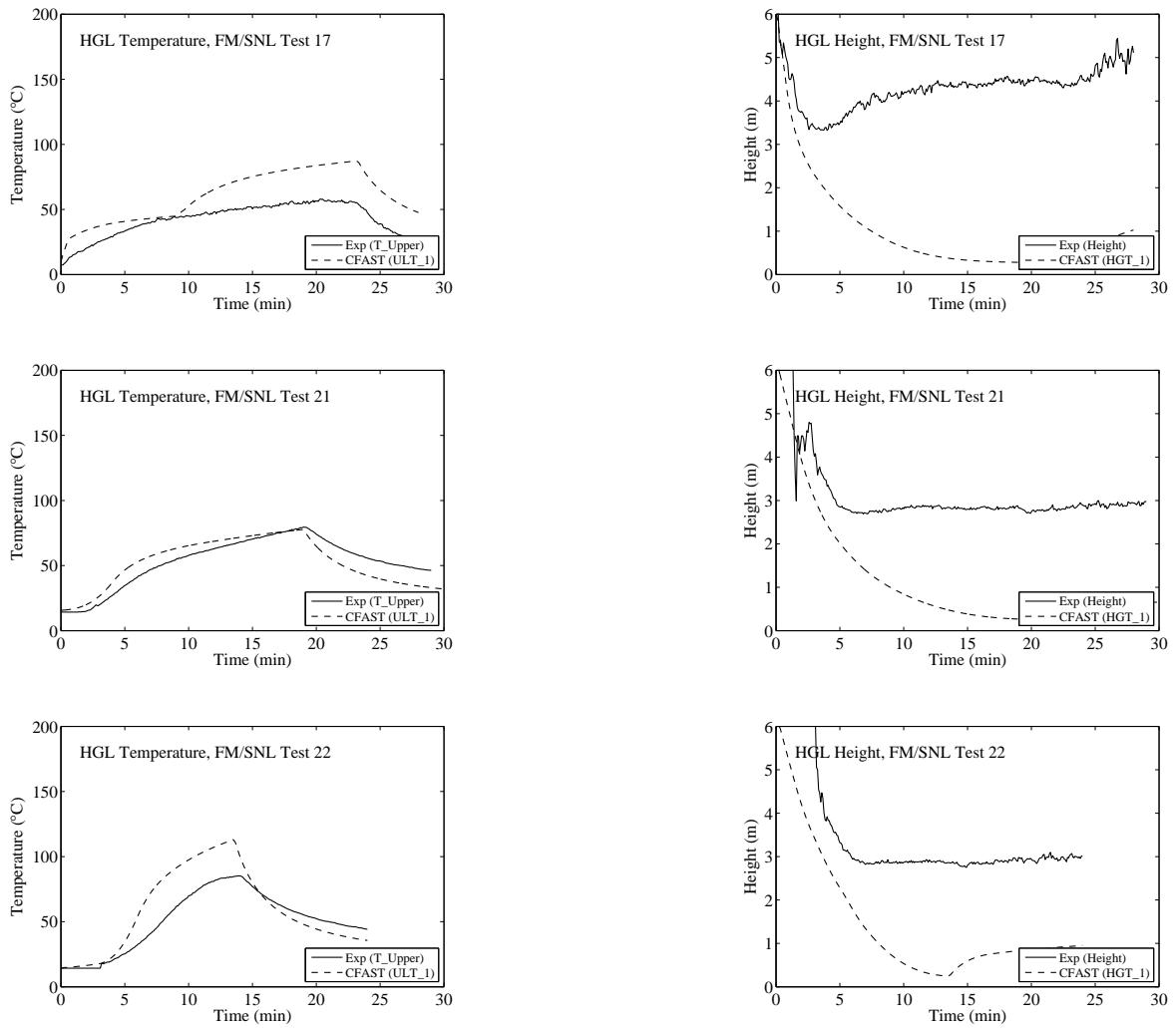
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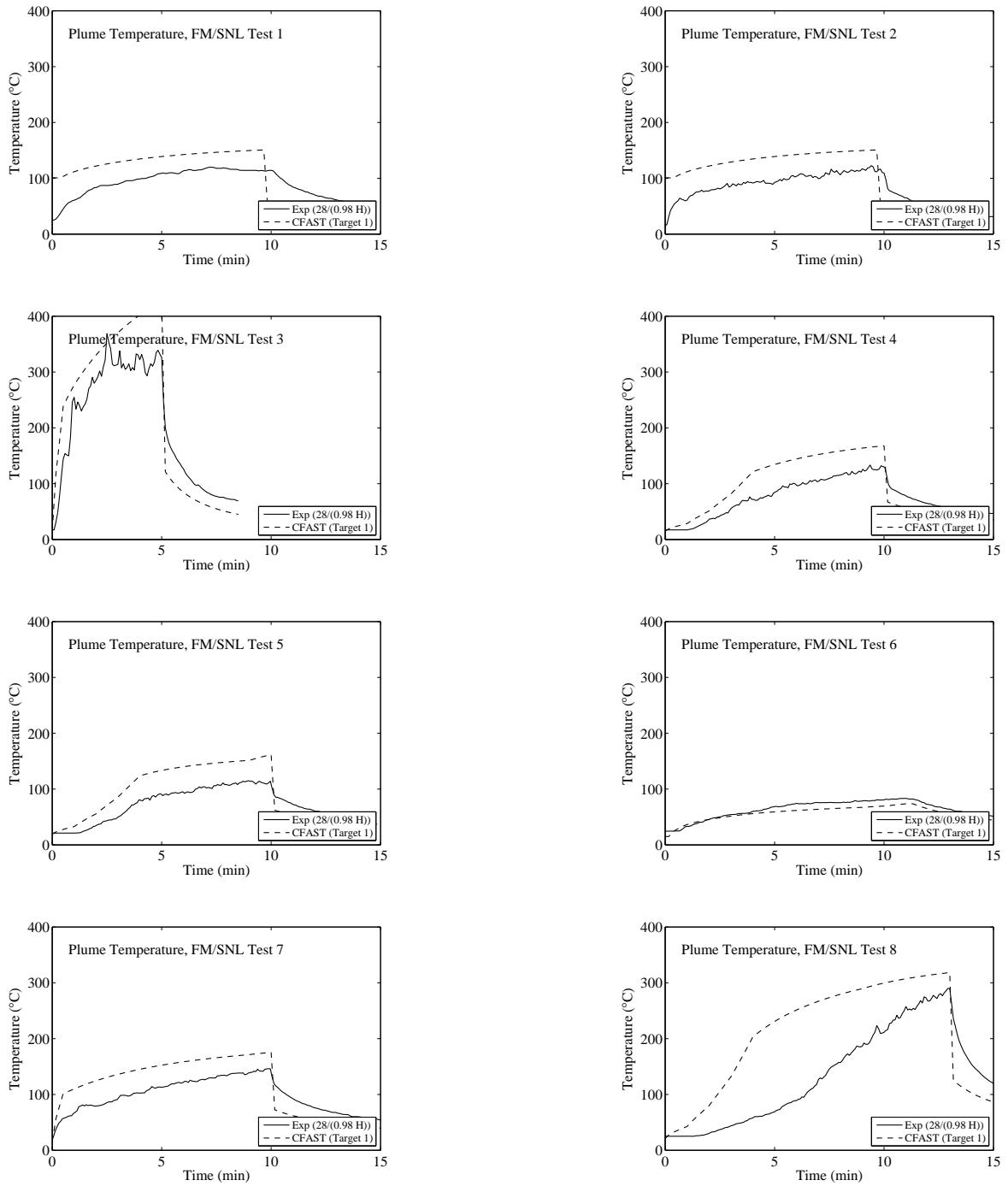


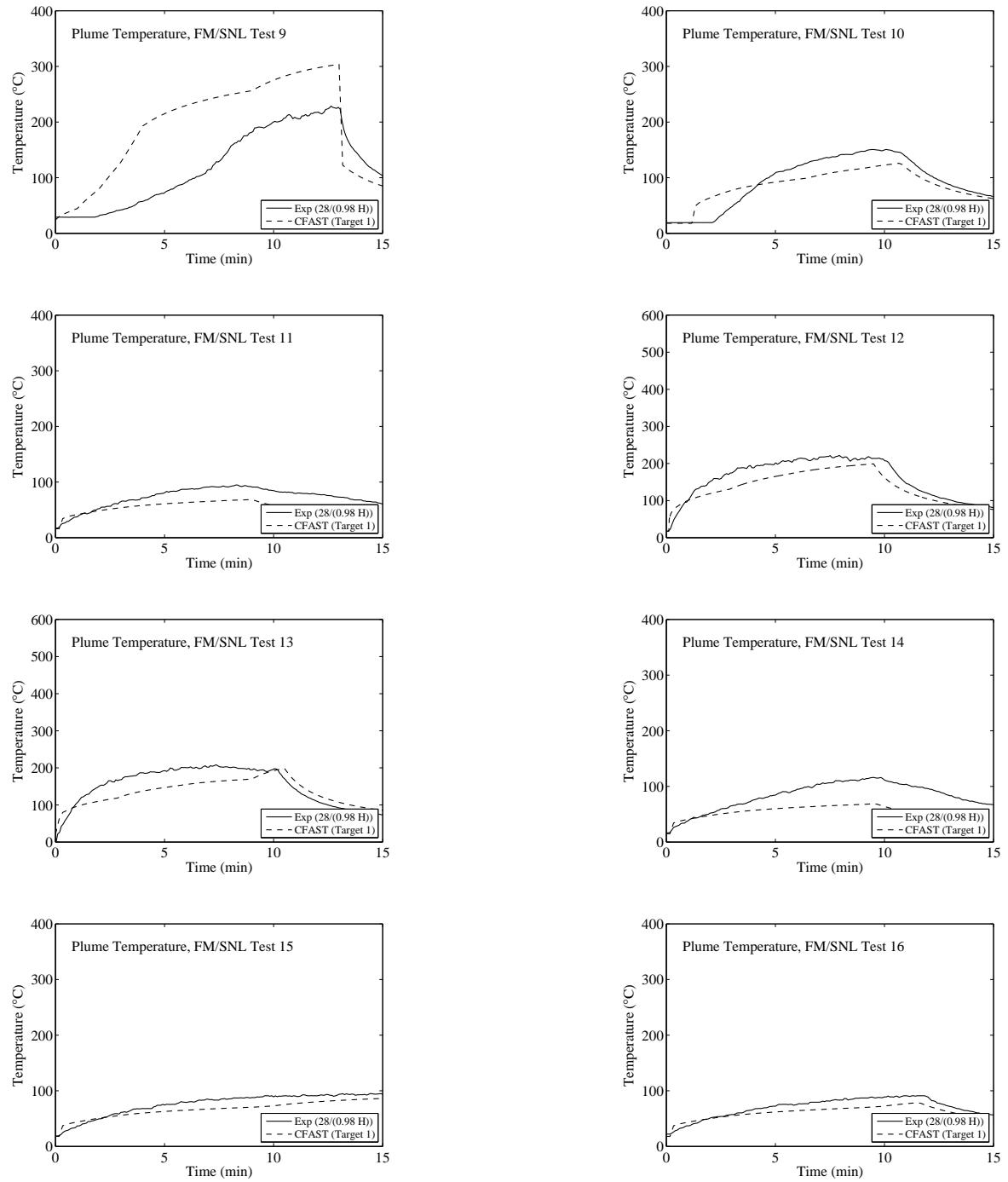


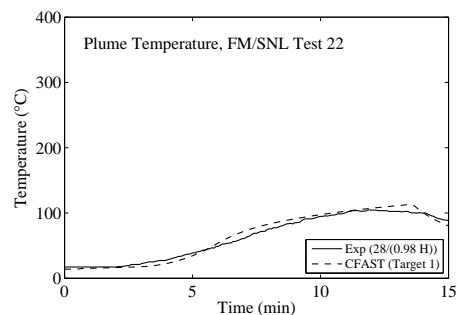
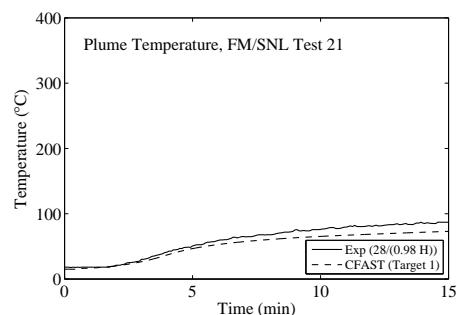
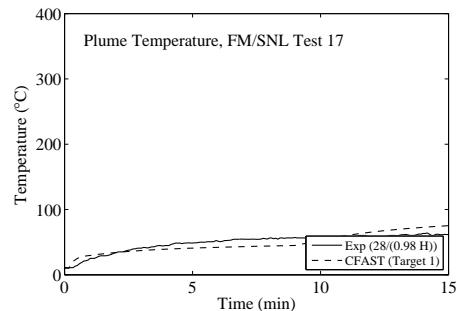


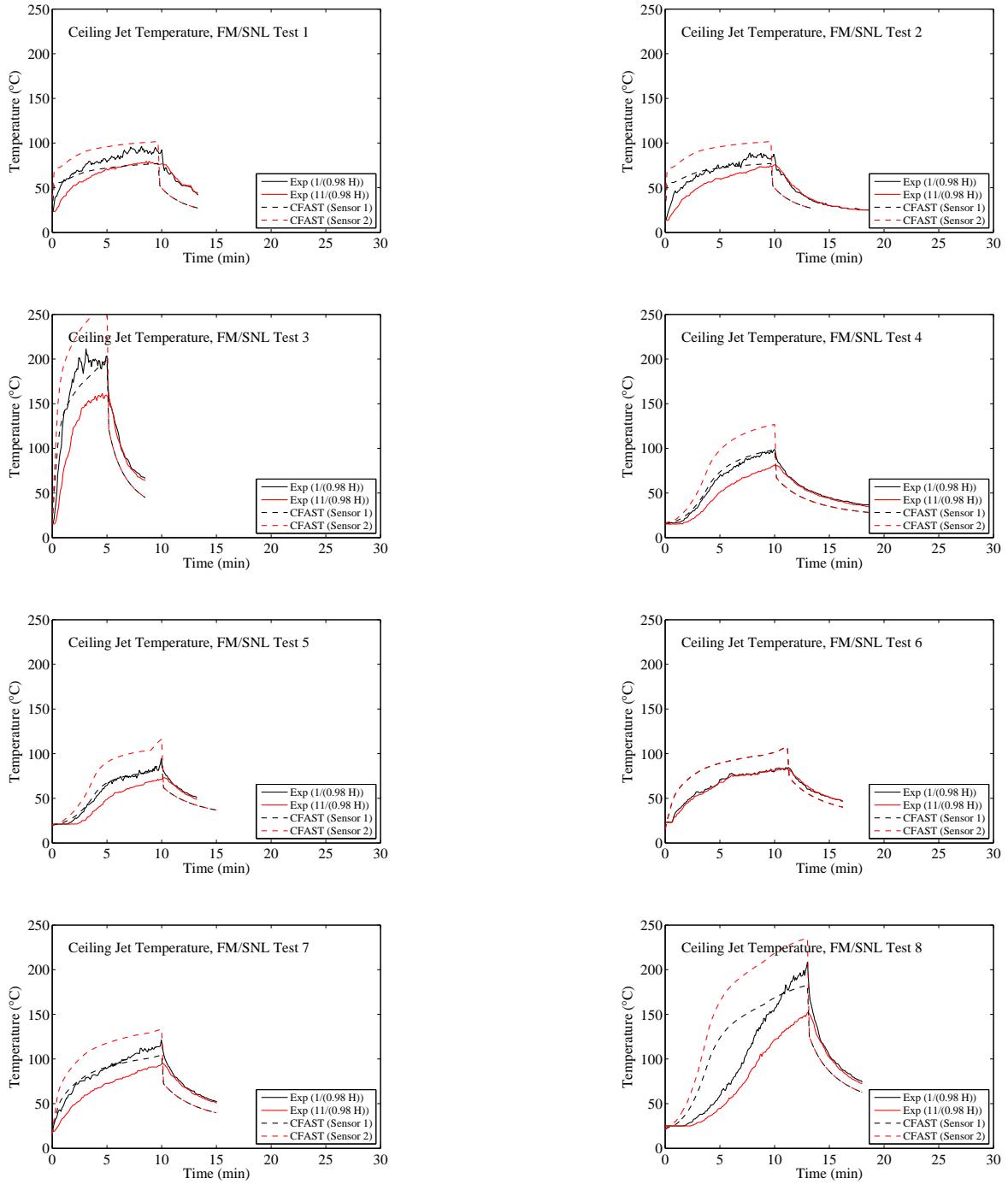


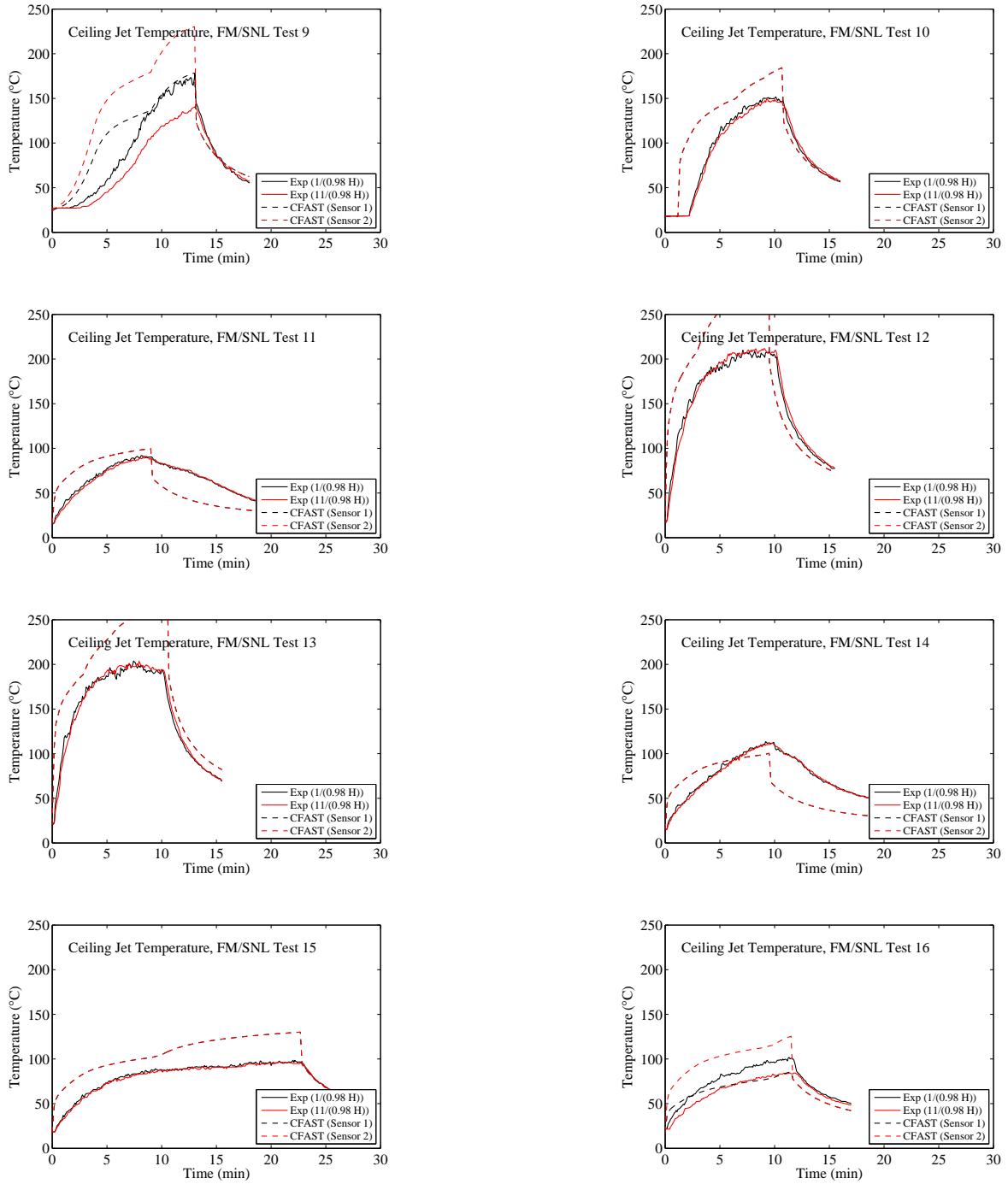


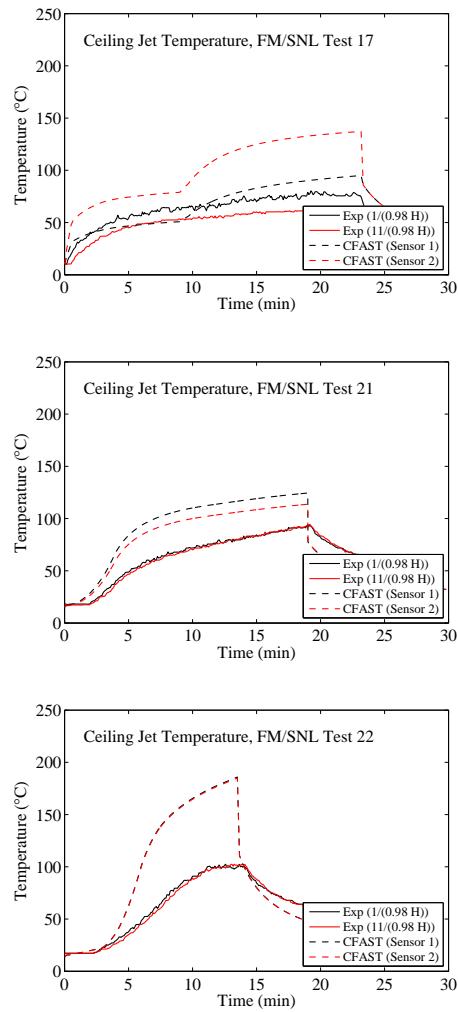




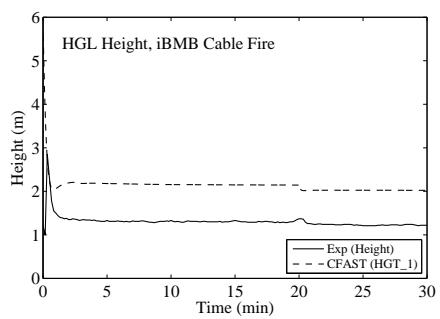
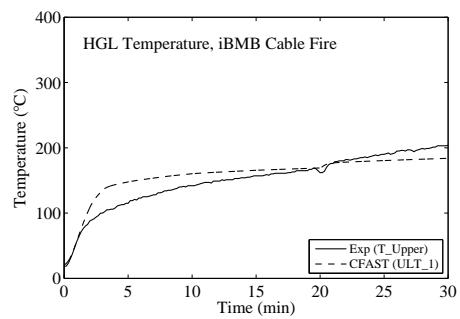
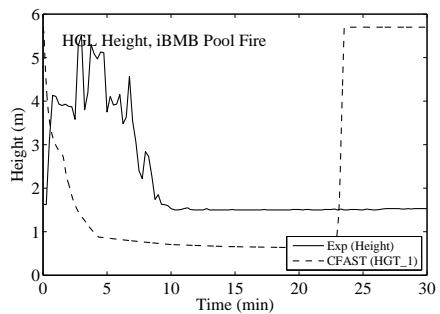
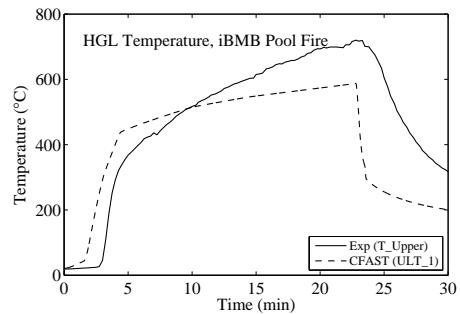




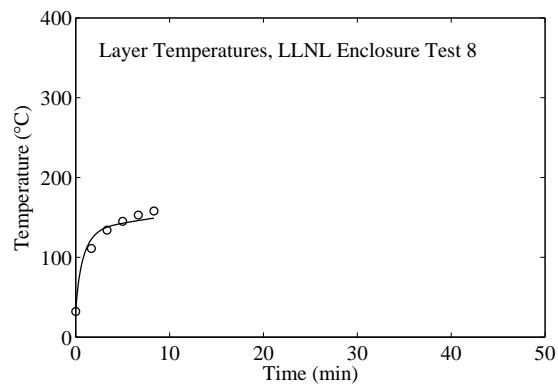
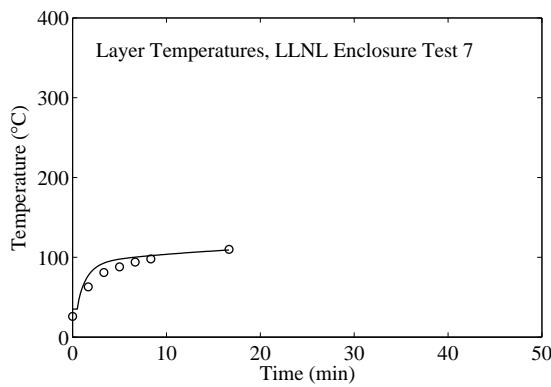
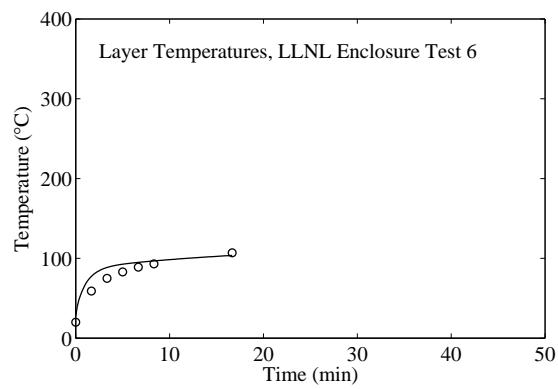
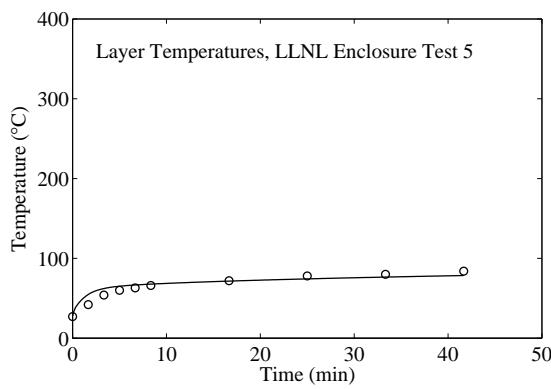
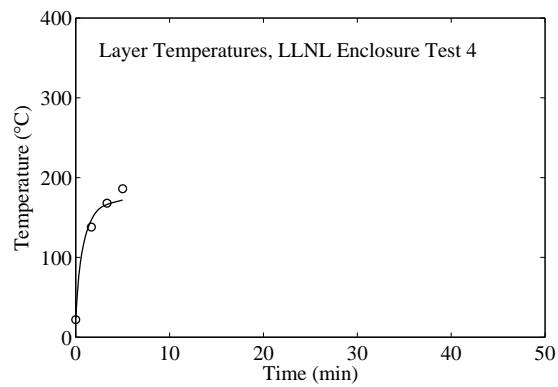
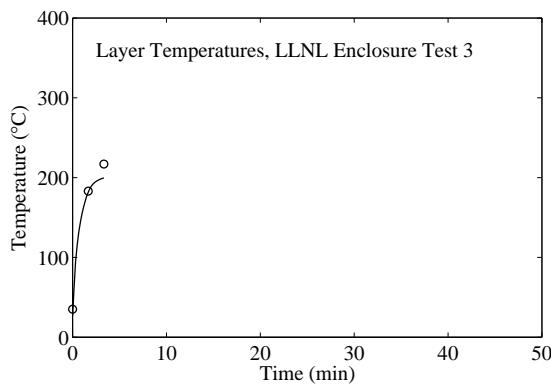
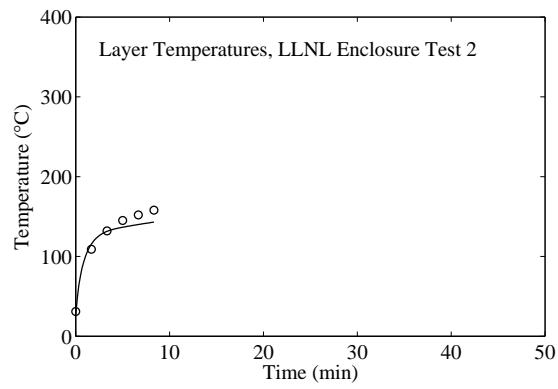
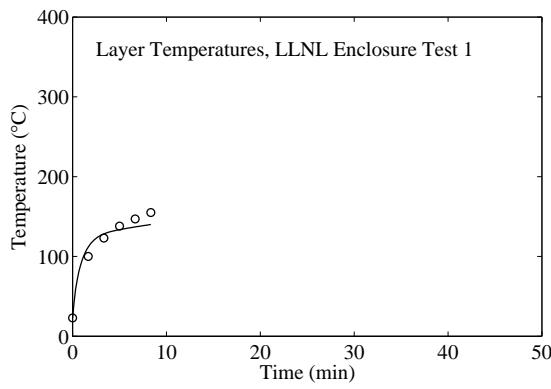




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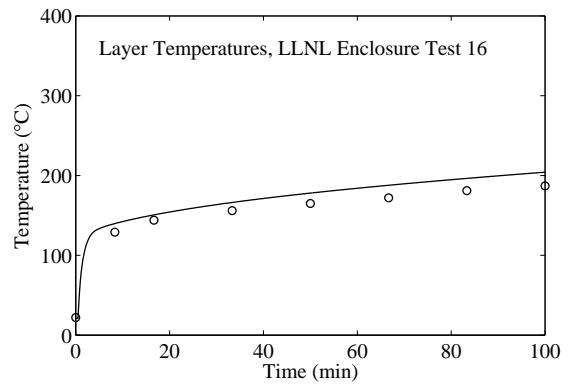
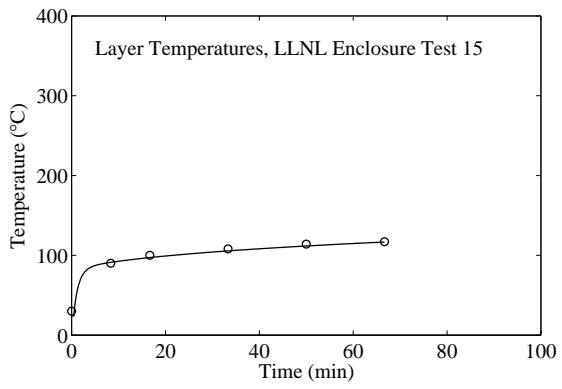
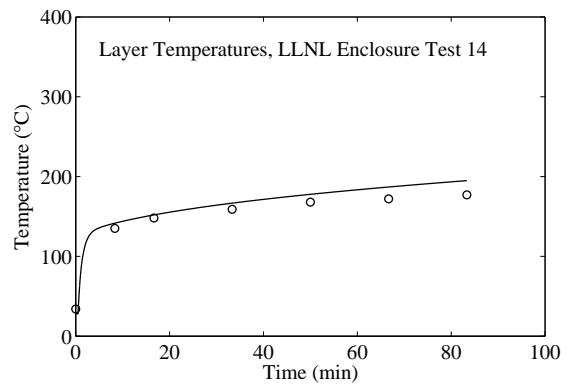
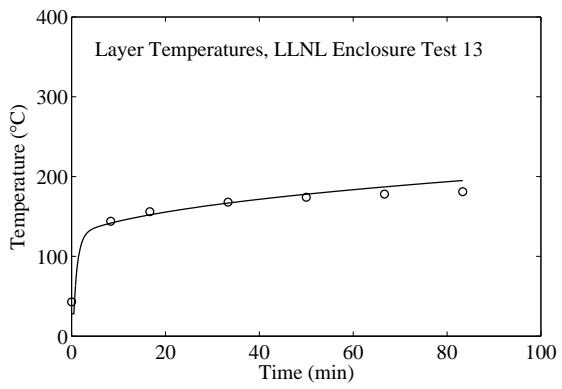
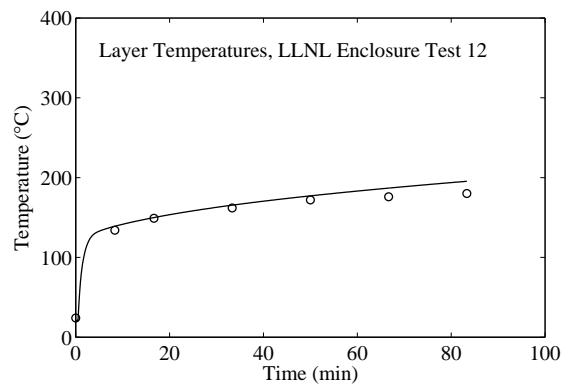
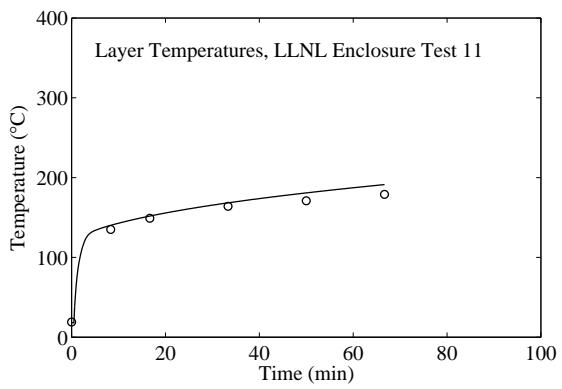
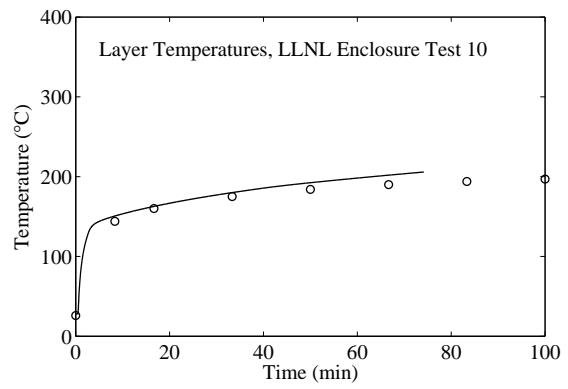
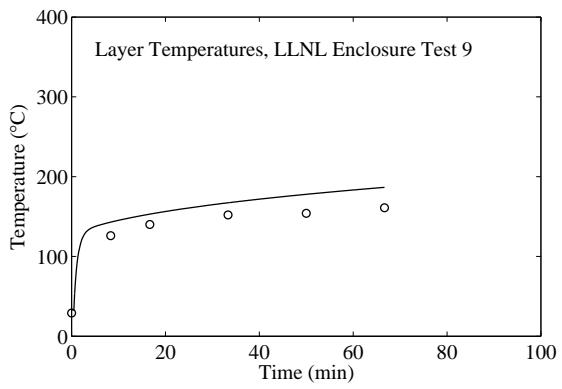


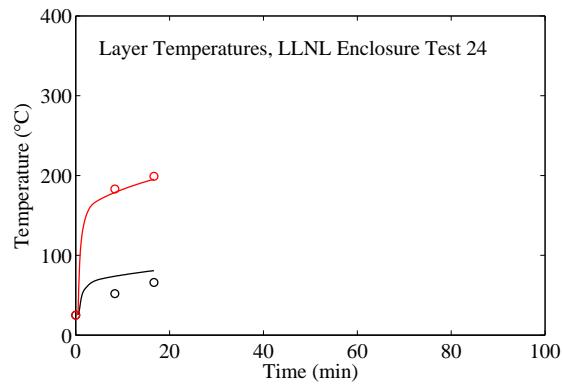
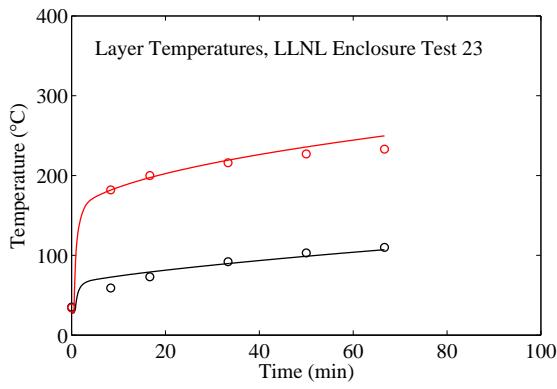
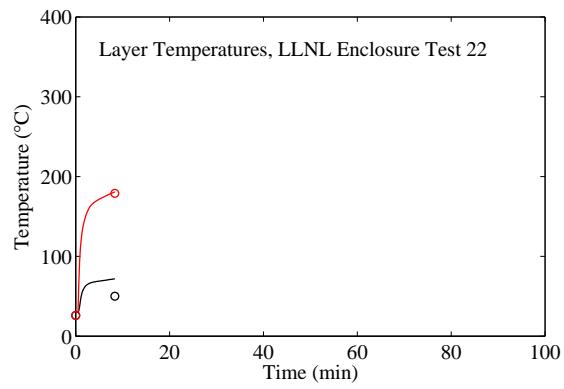
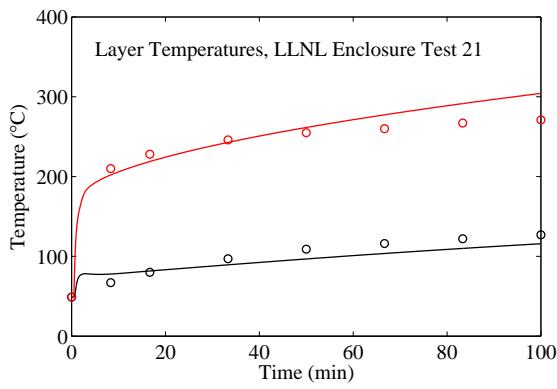
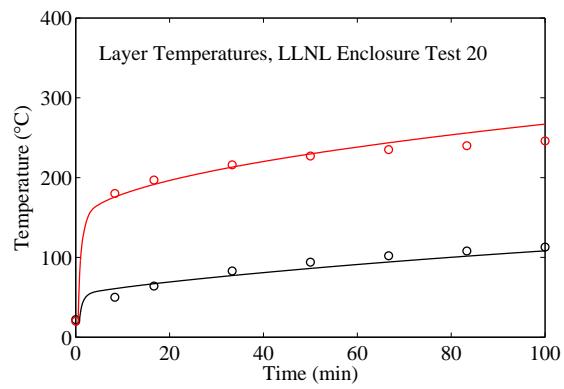
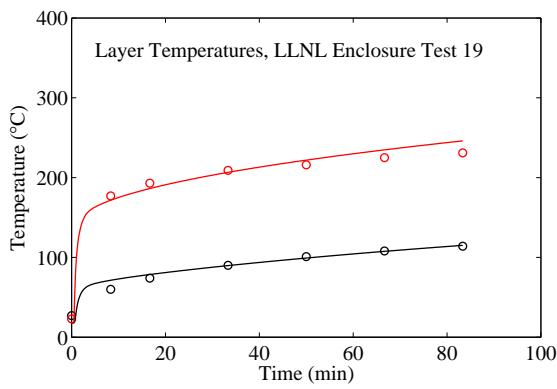
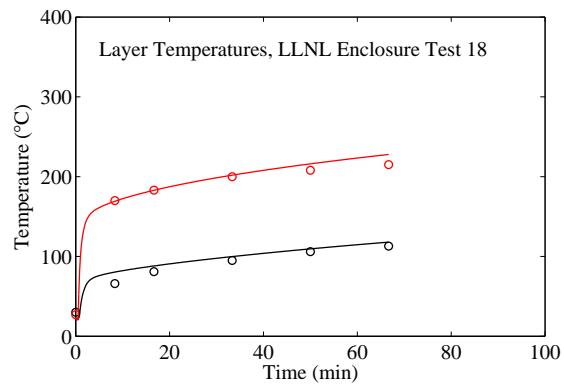
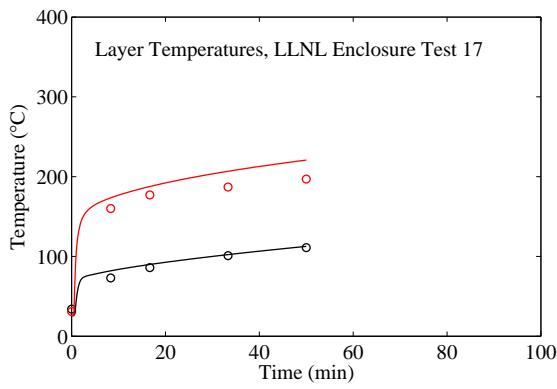
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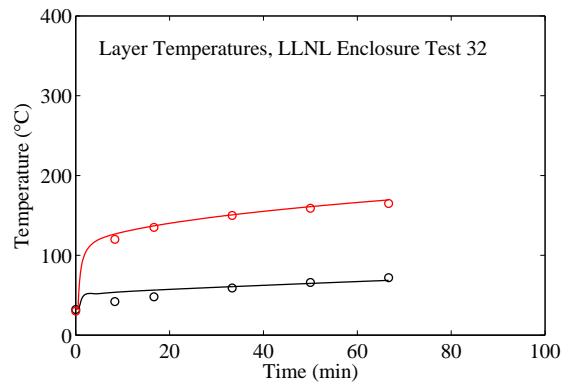
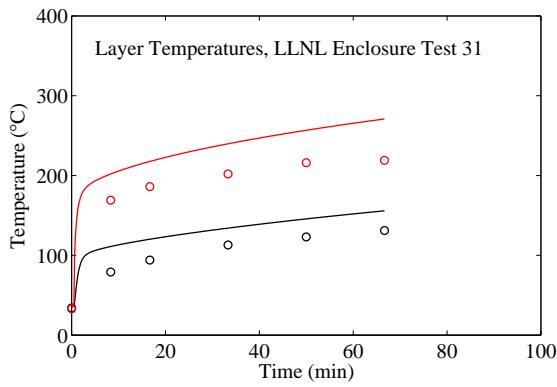
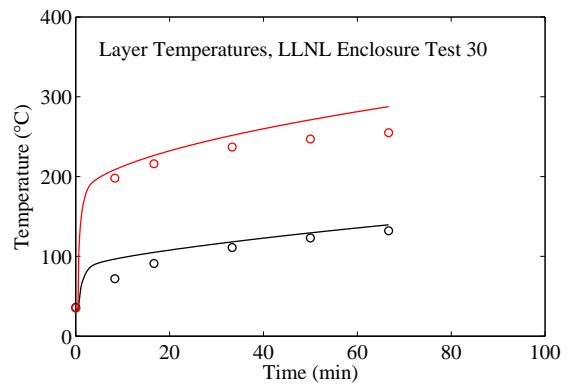
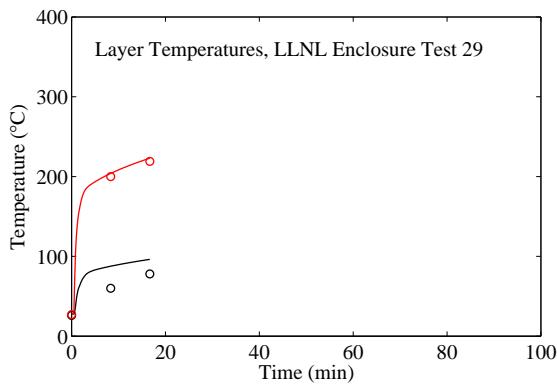
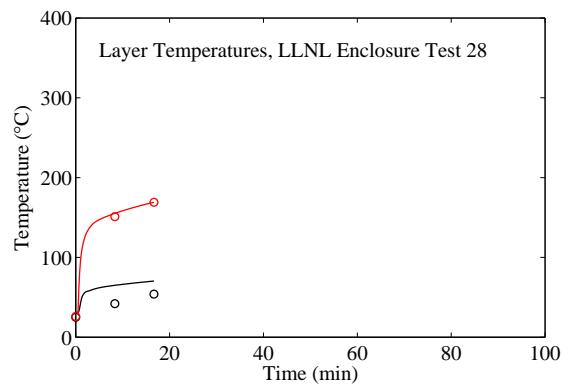
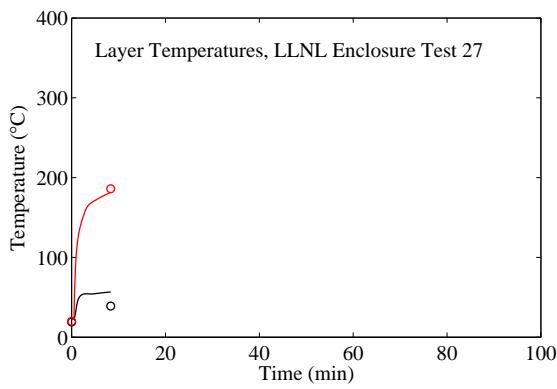
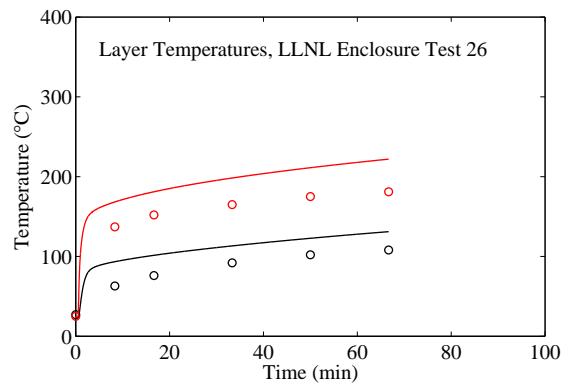
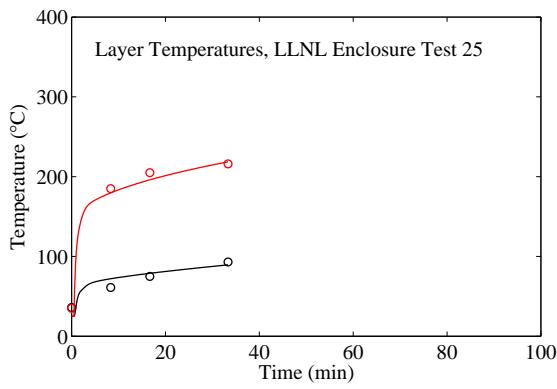


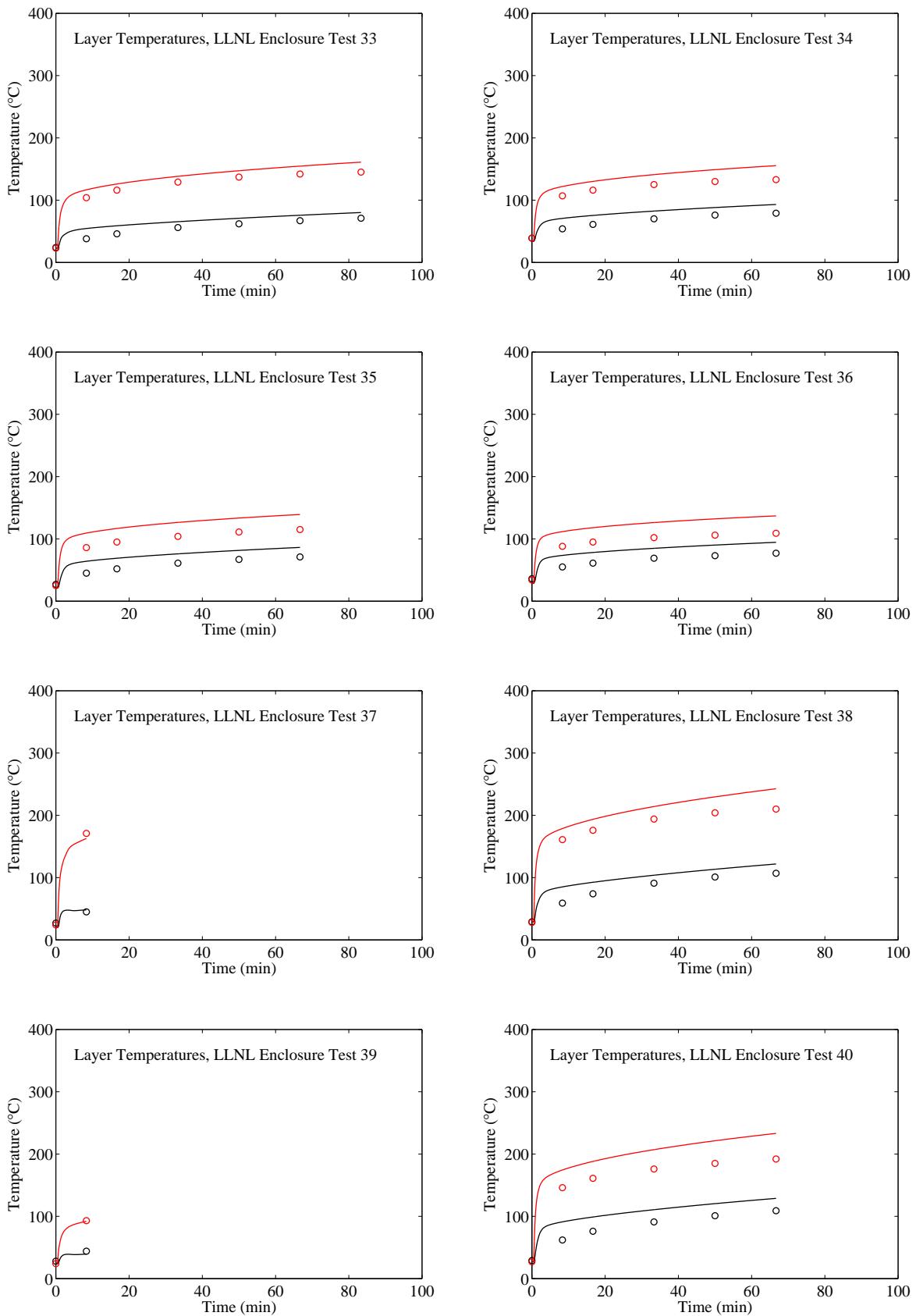
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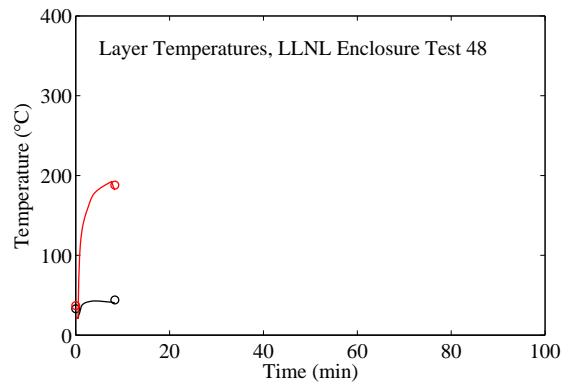
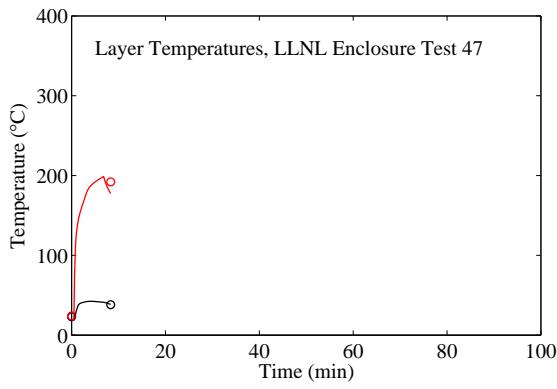
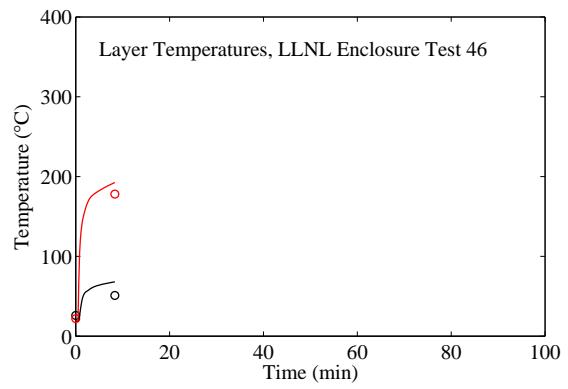
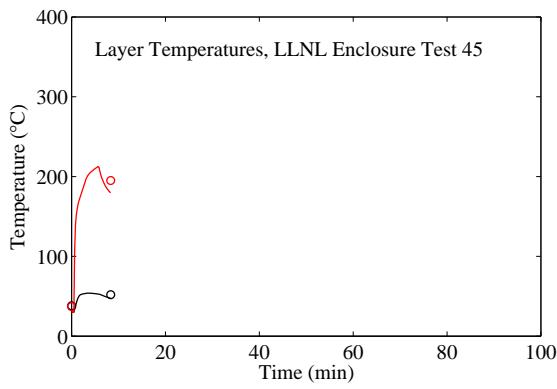
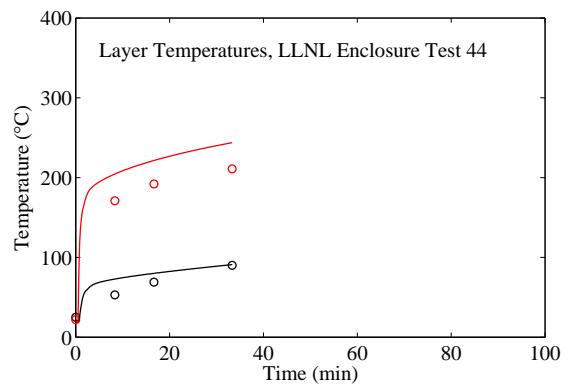
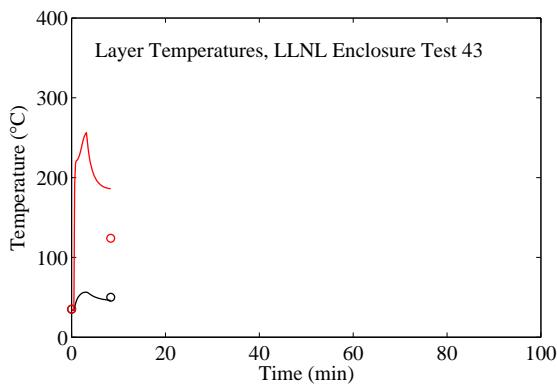
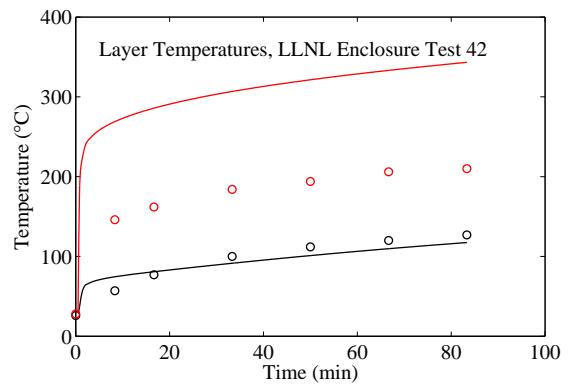
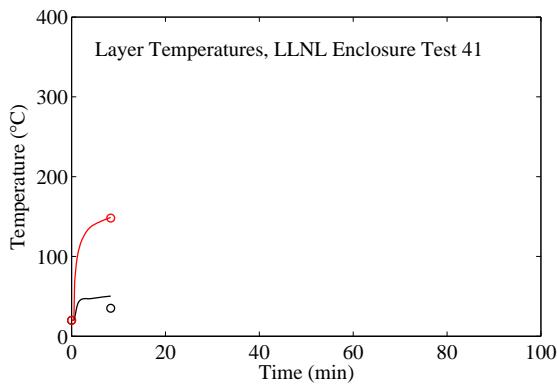
## LLNL ENCLOSURE SERIES

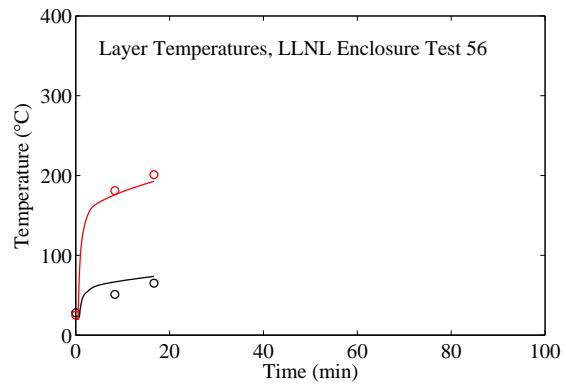
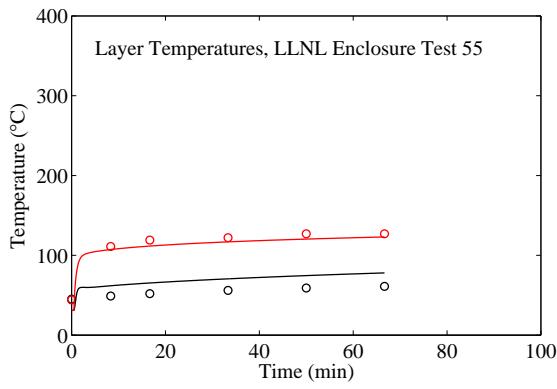
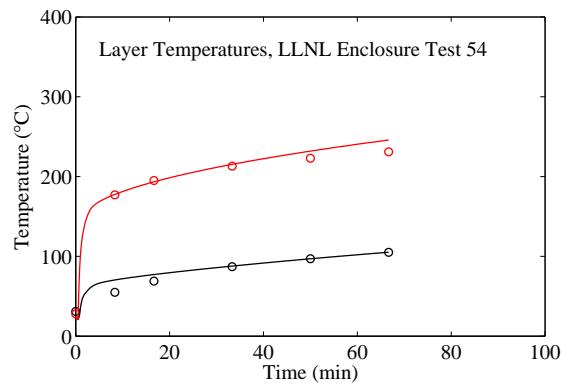
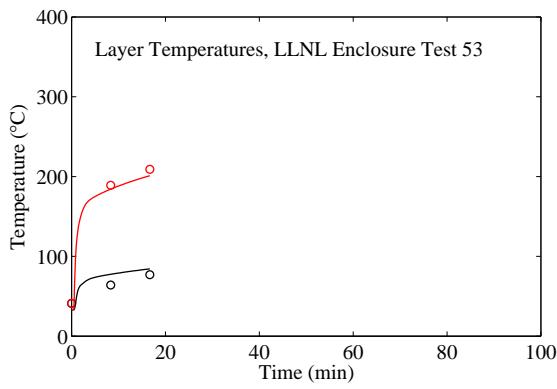
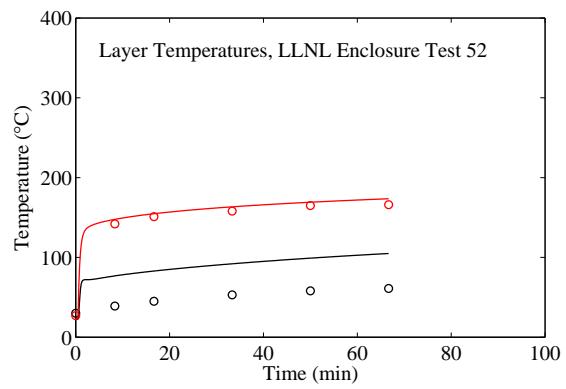
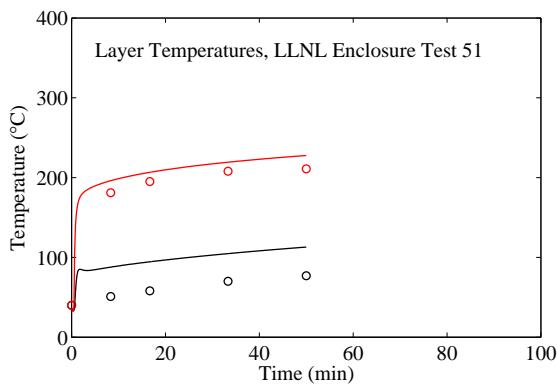
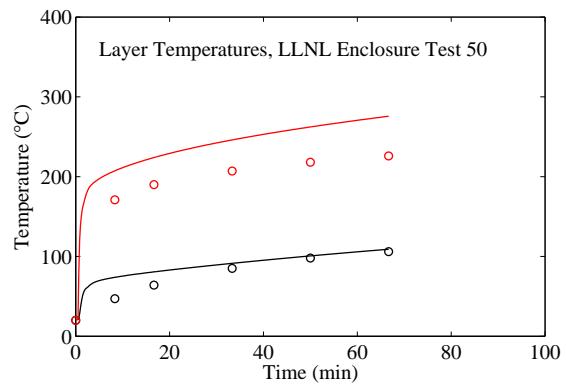
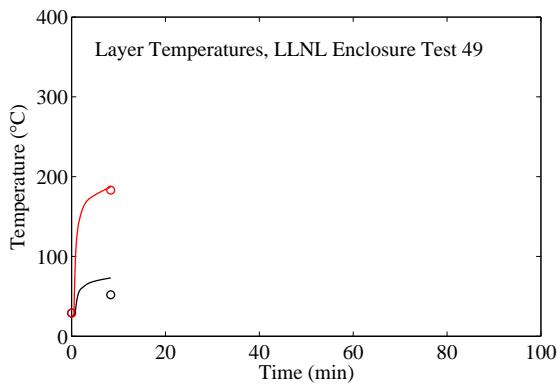


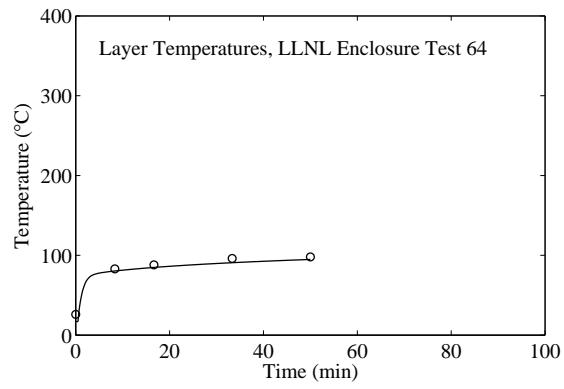
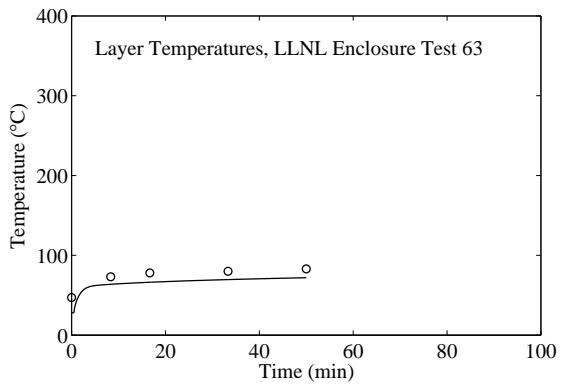
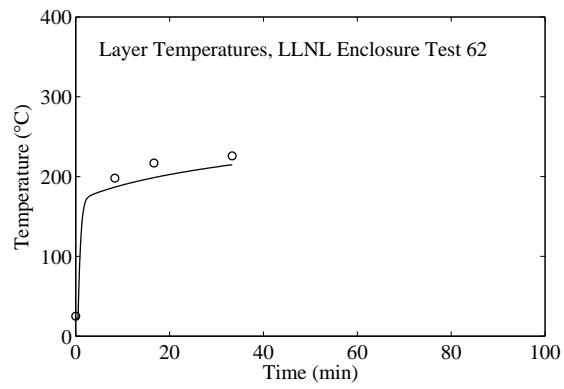
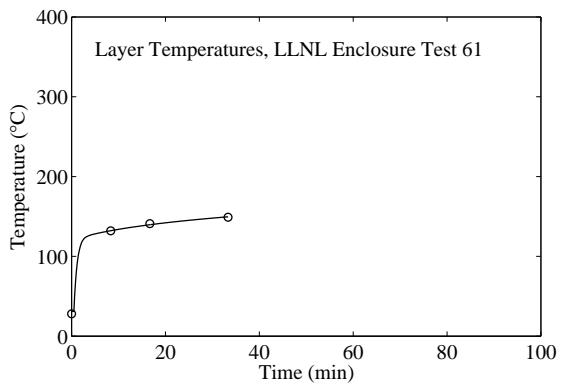
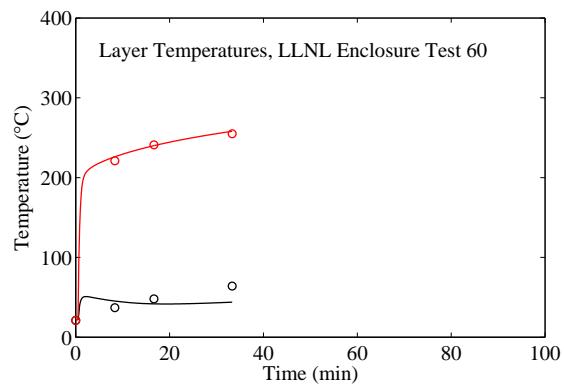
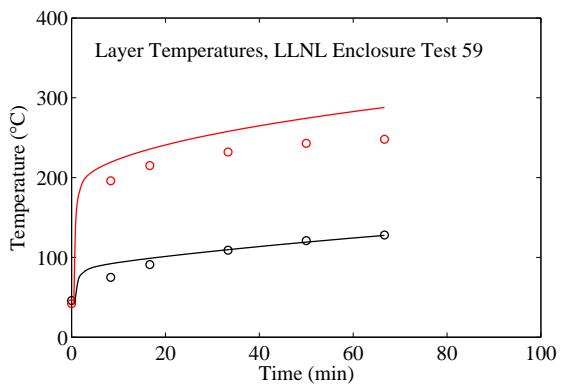
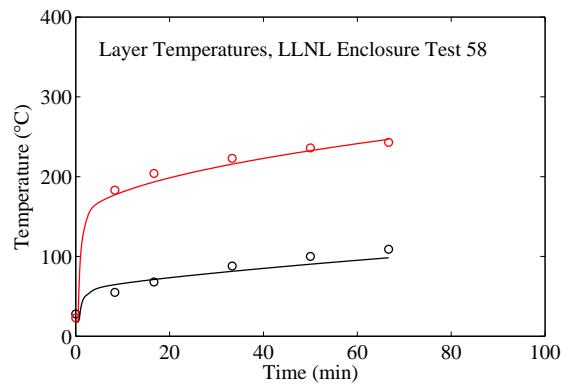
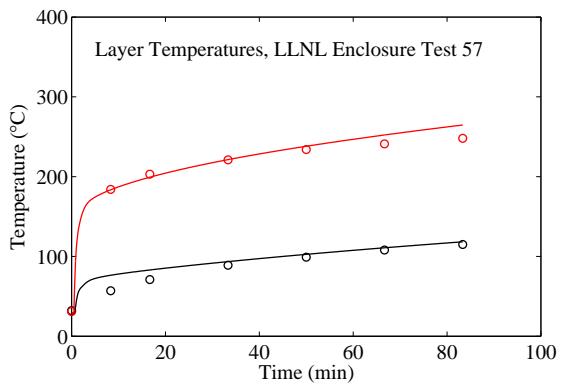




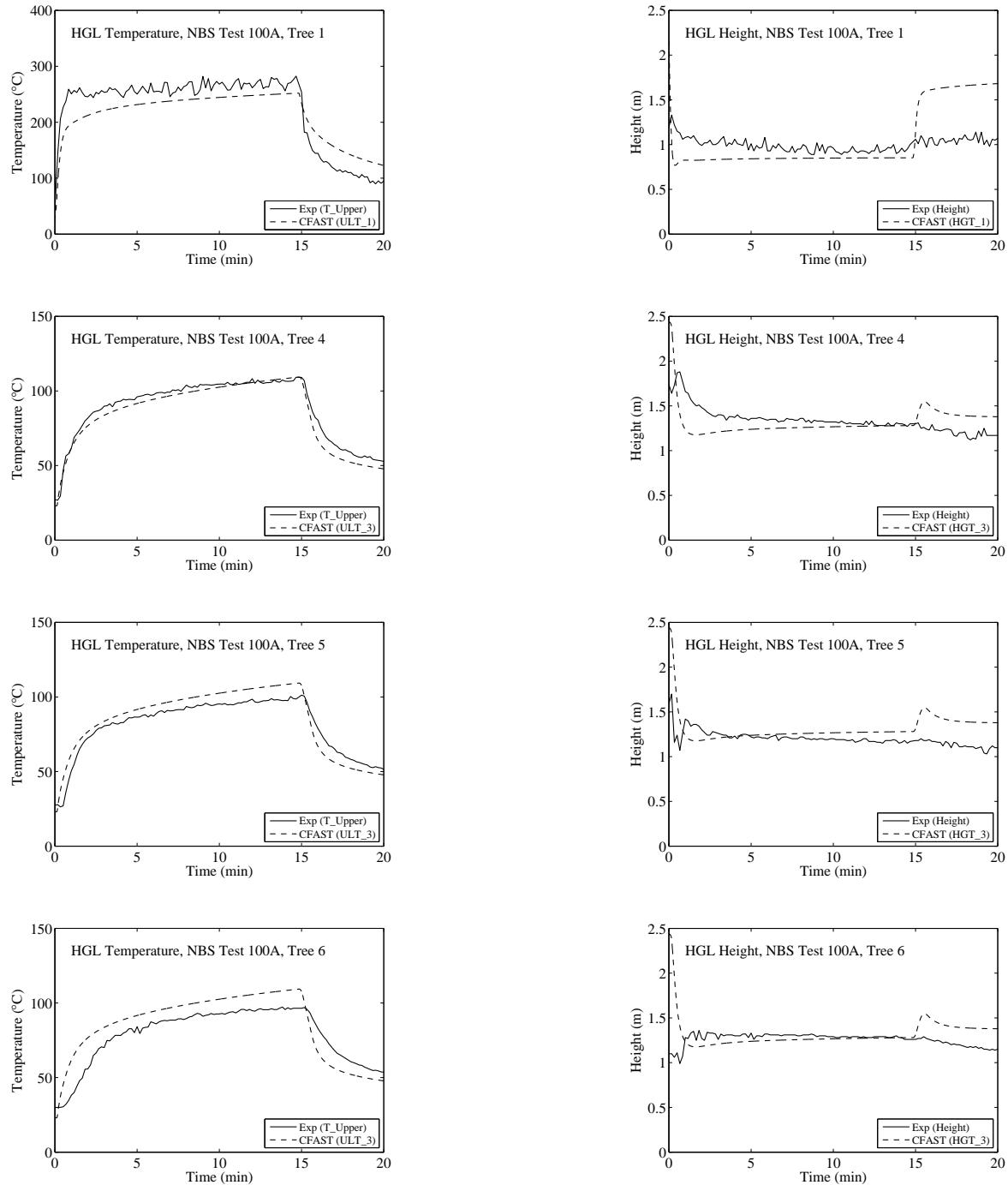






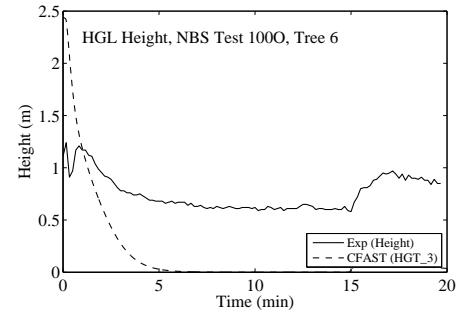
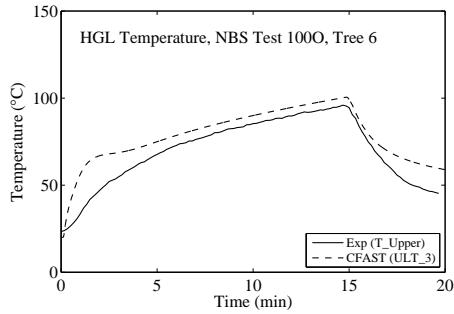
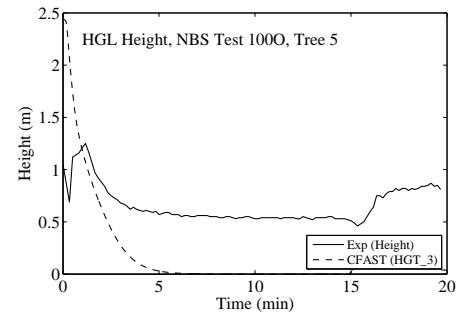
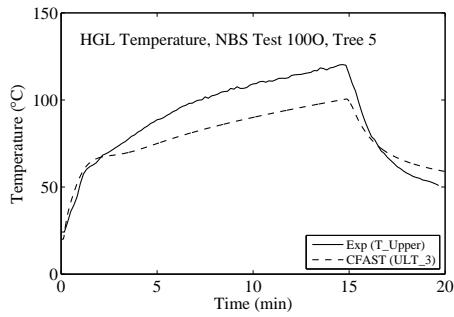
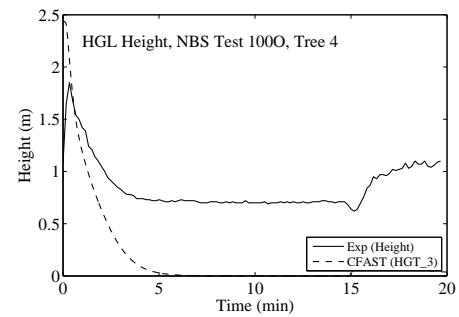
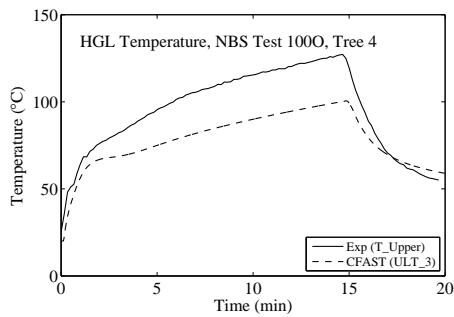
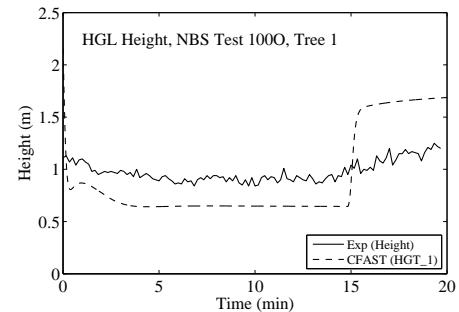
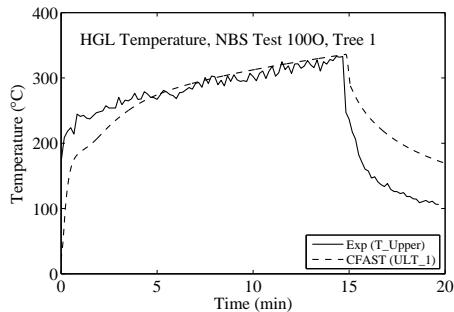


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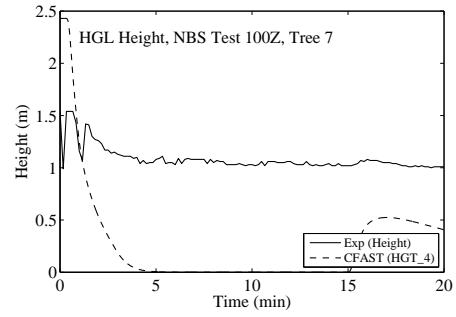
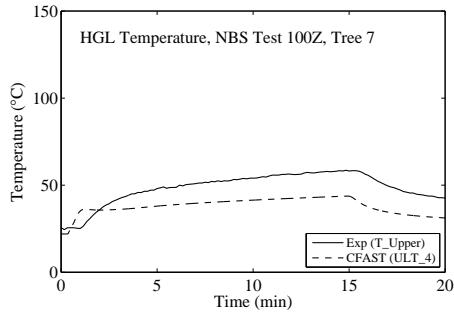
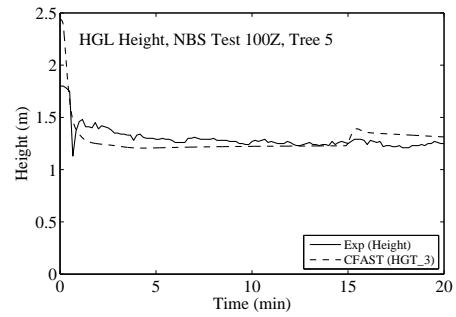
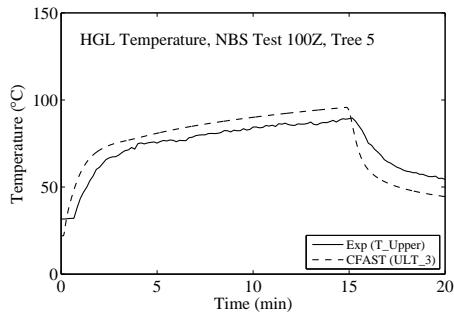
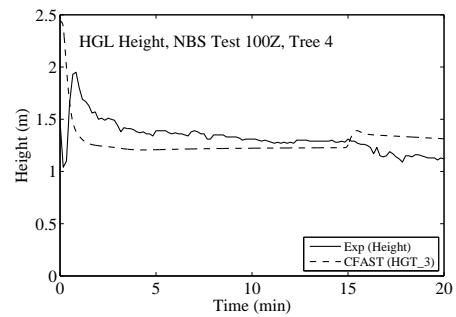
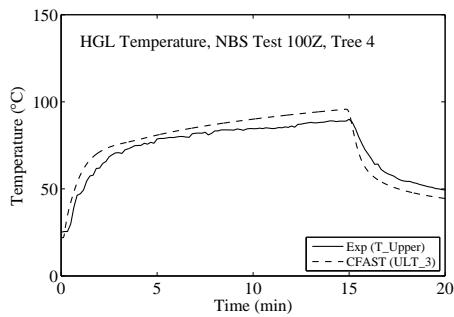
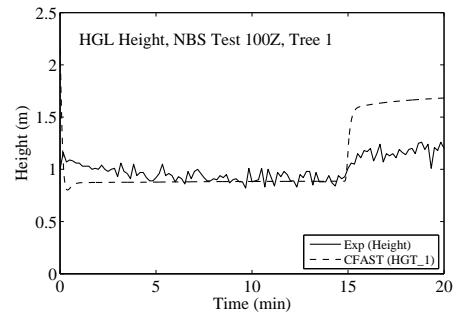
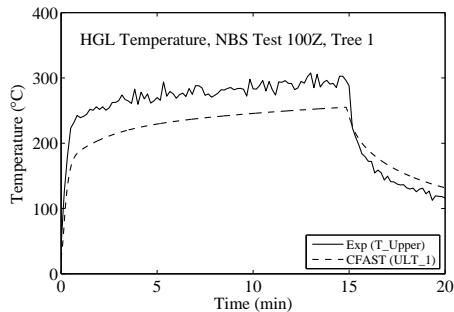
## NBS MULTI-COMPARTMENT TEST SERIES

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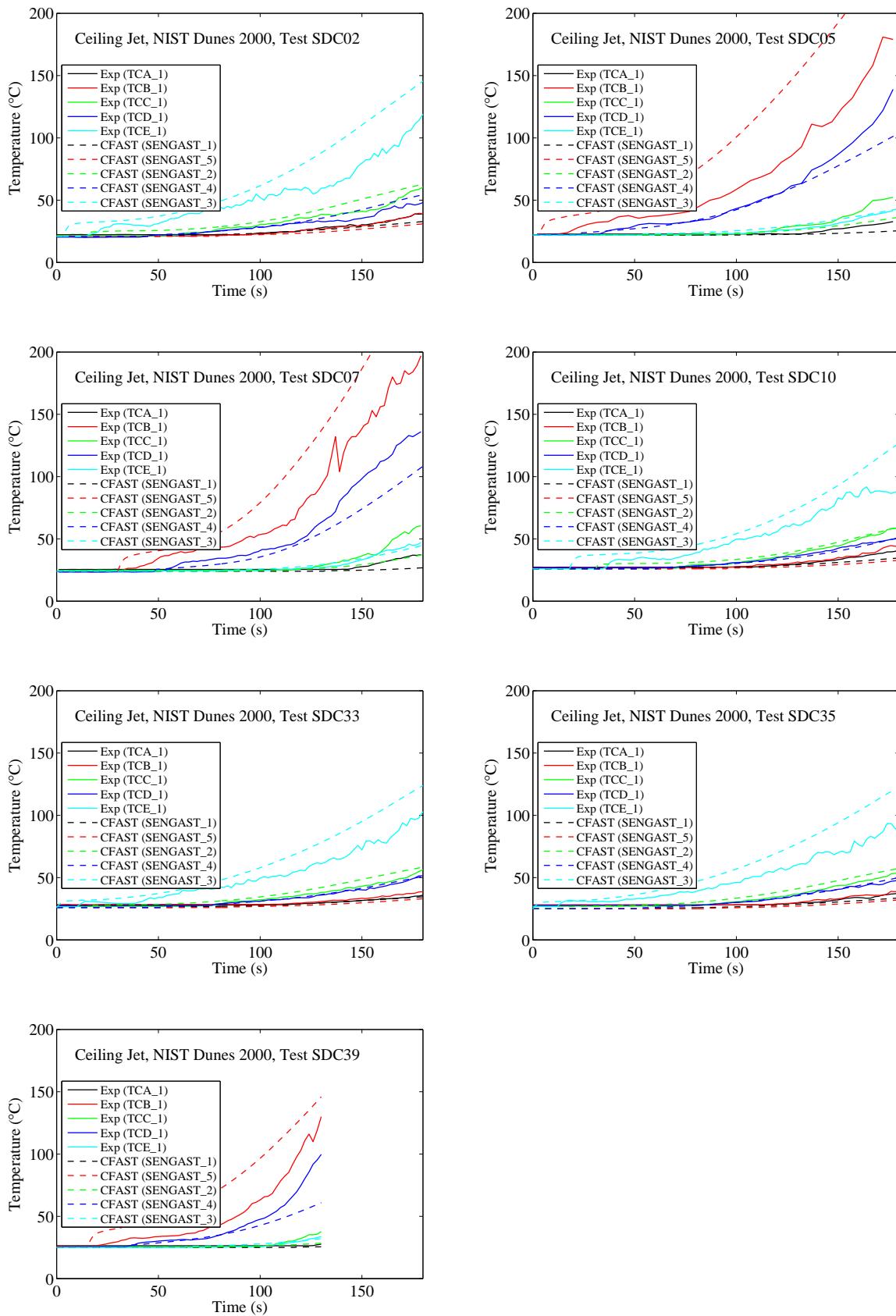
## NBS MULTI-COMPARTMENT TEST SERIES

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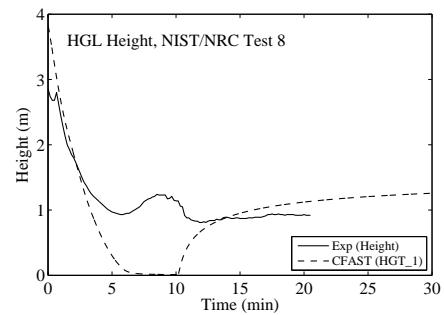
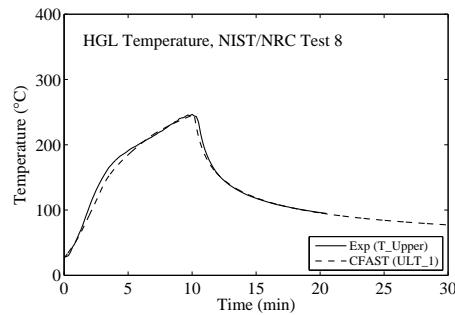
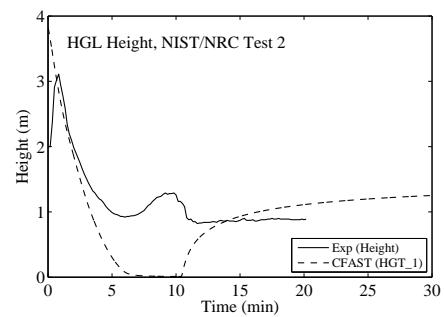
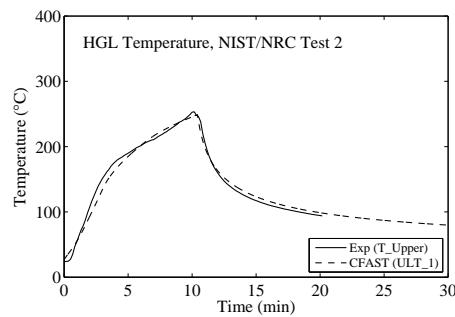
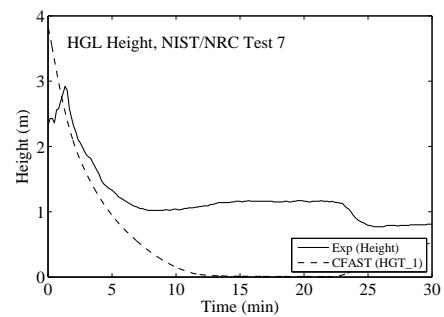
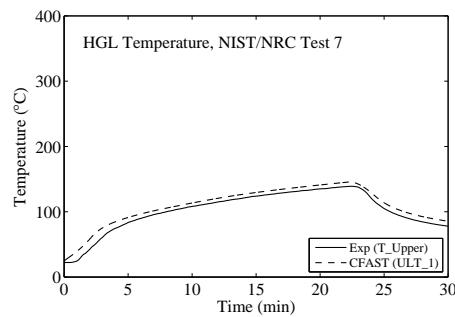
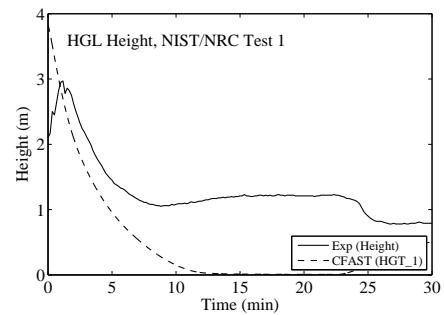
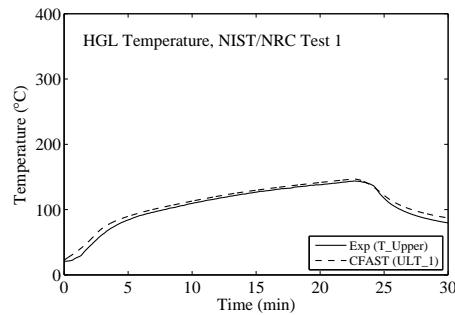


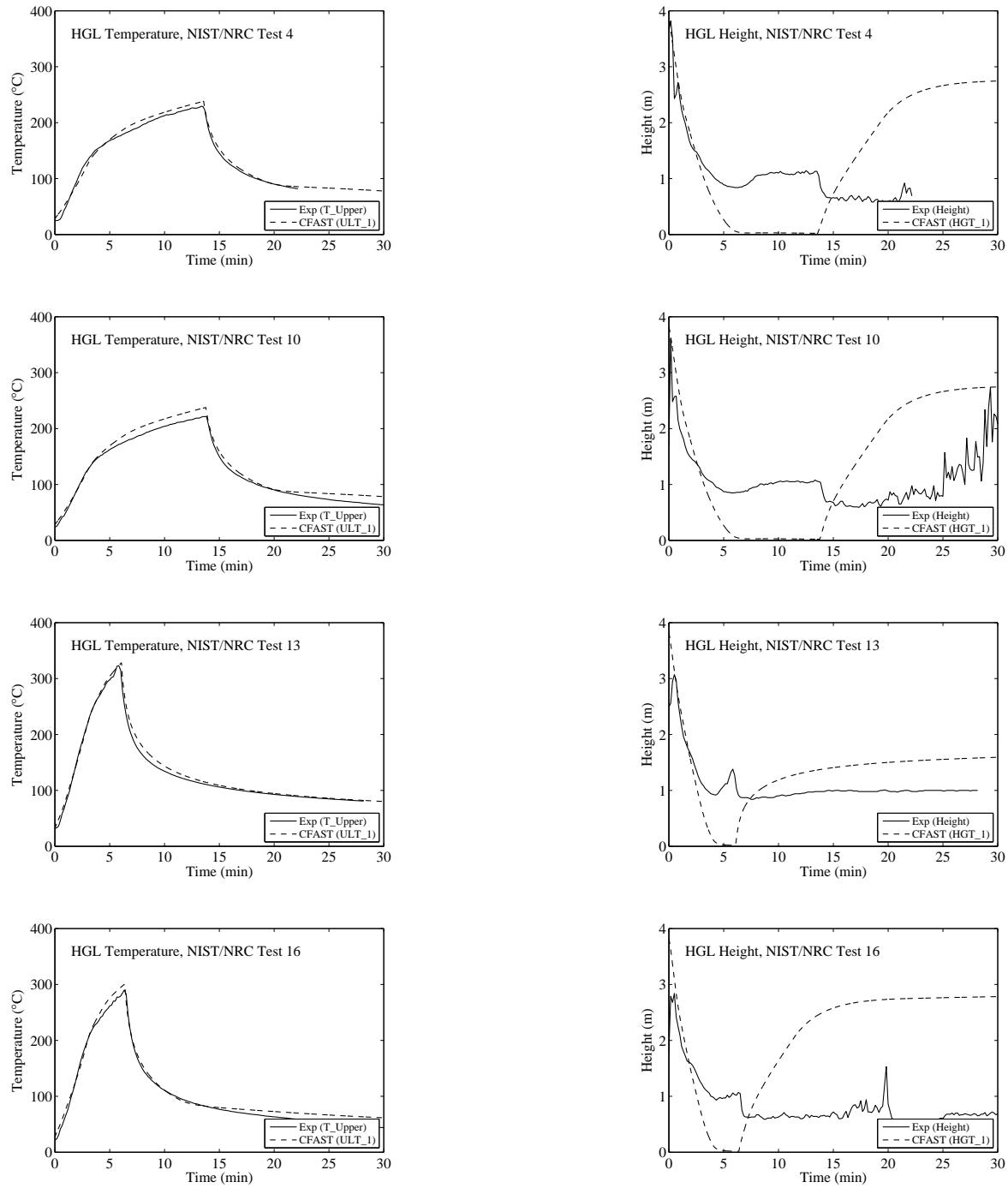
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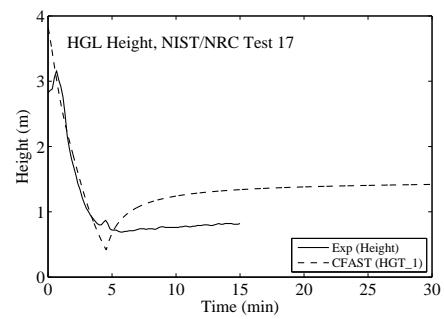
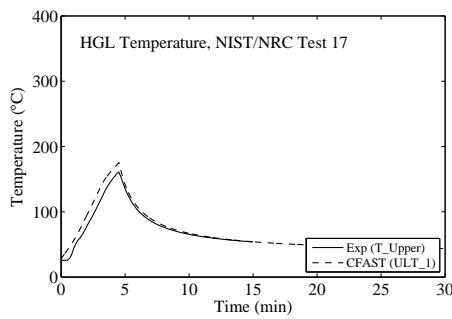
## NIST SMOKE ALARM EXPERIMENTS



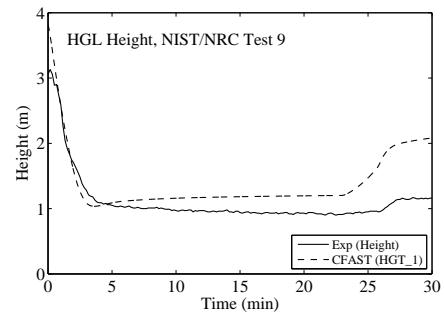
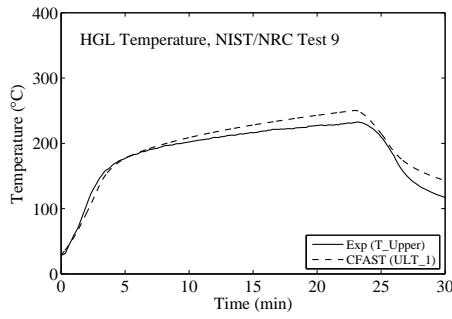
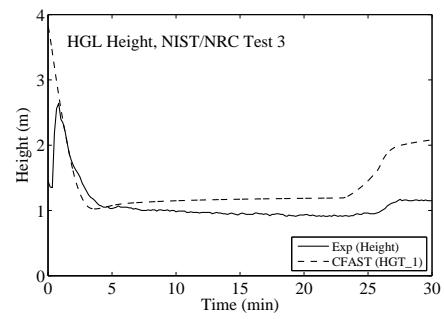
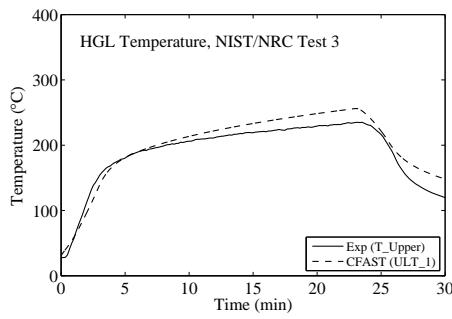
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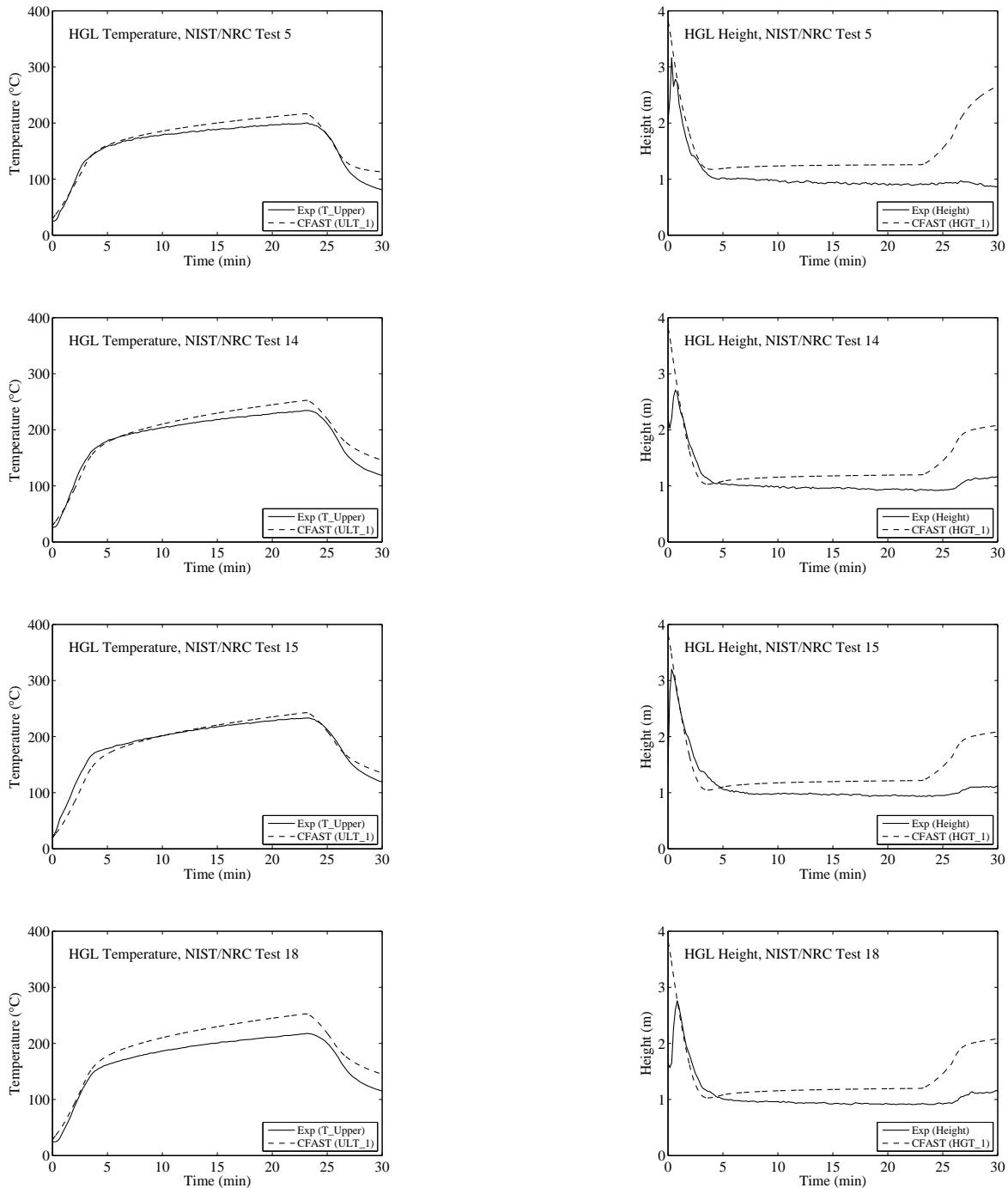


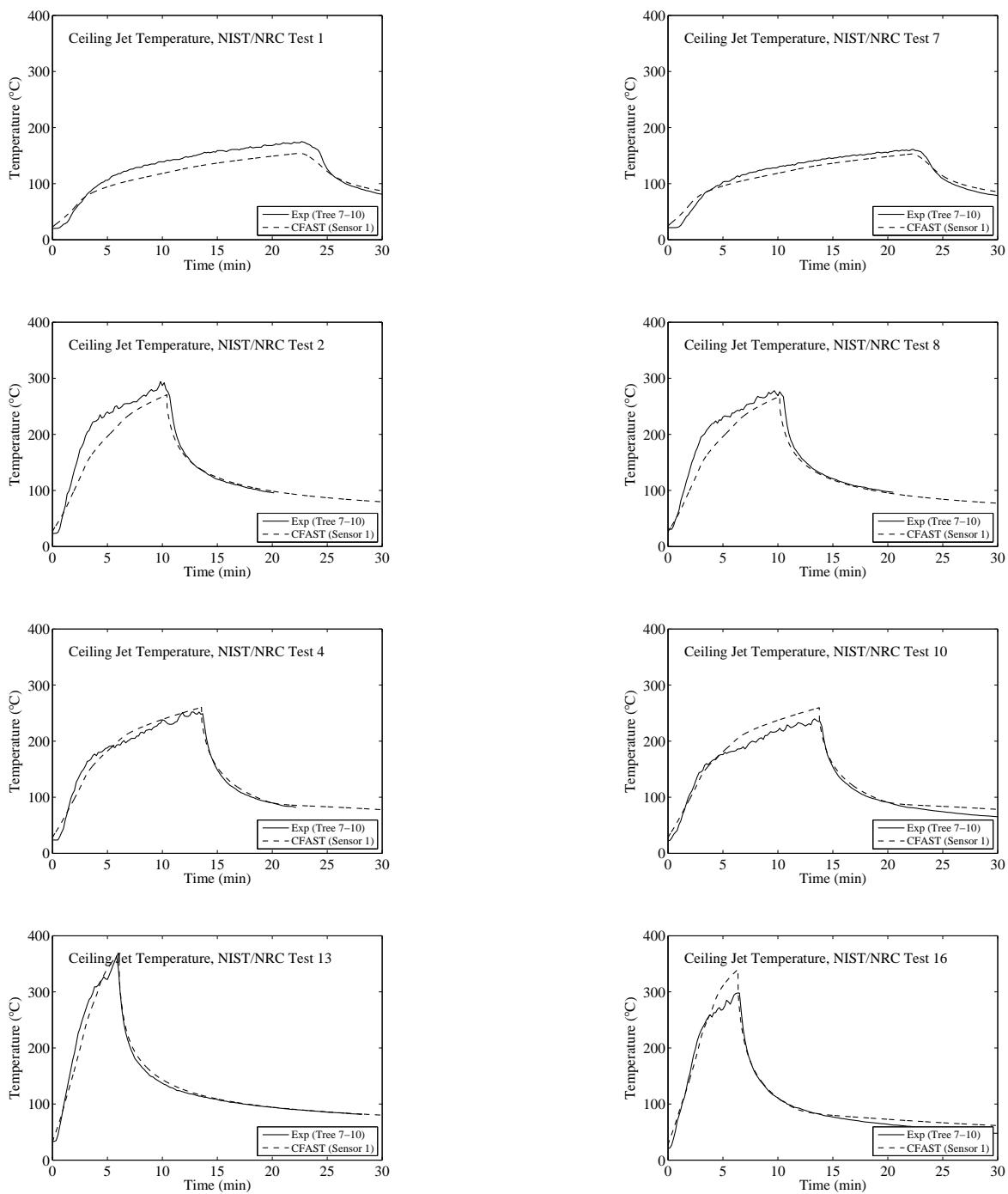


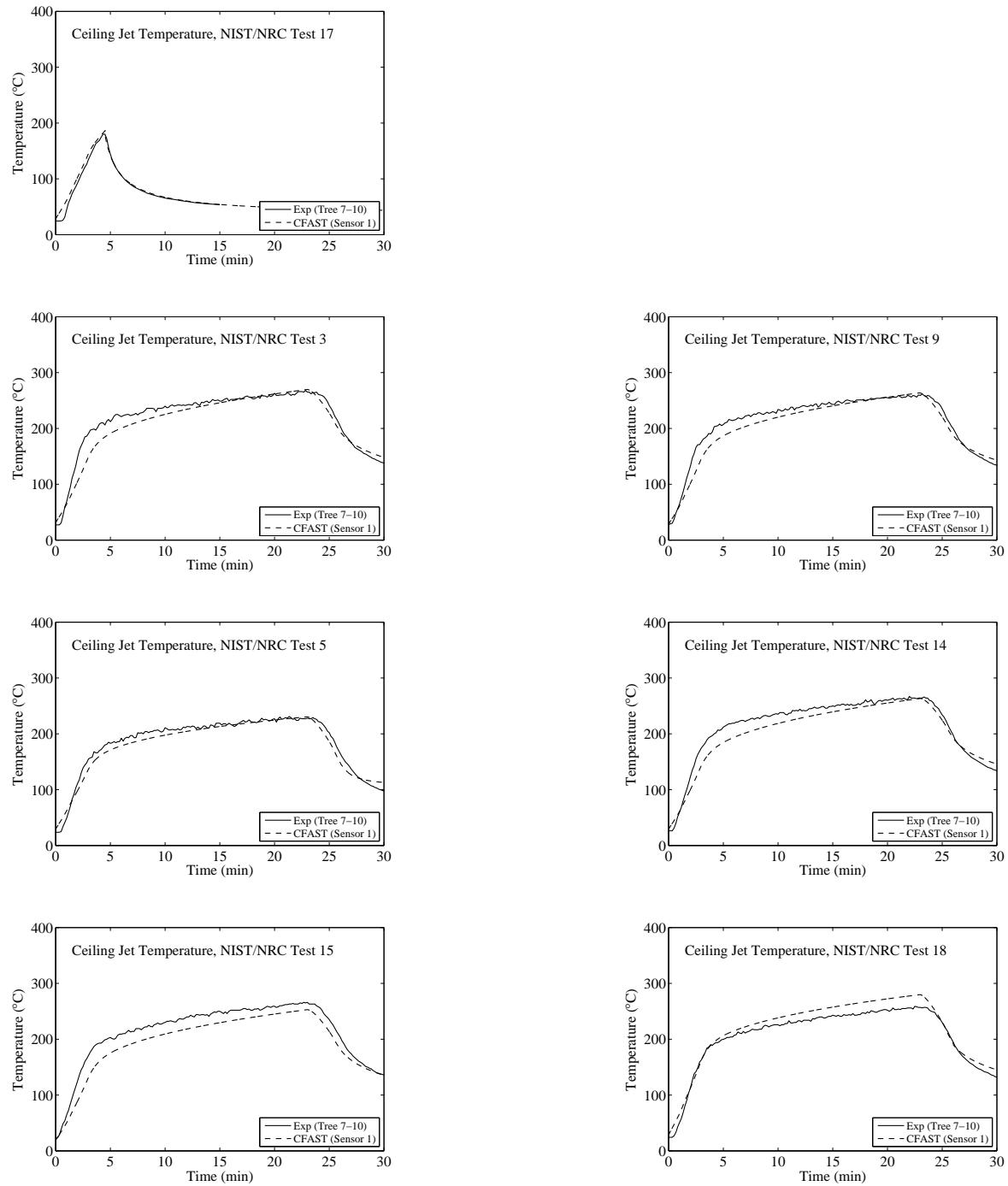


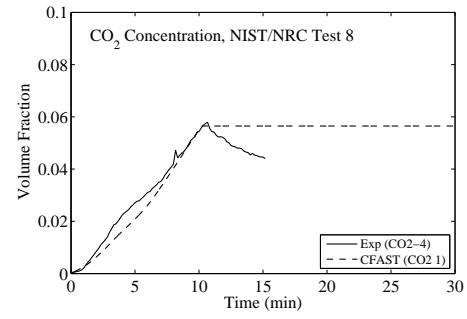
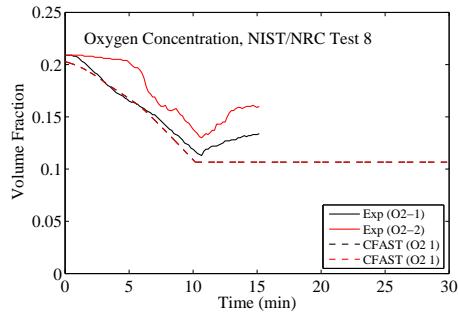
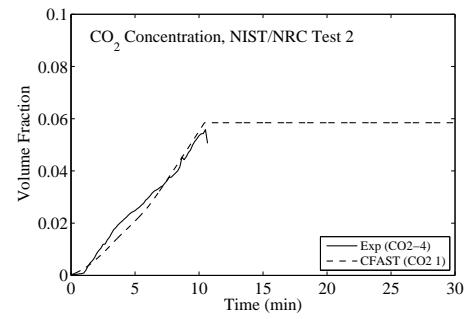
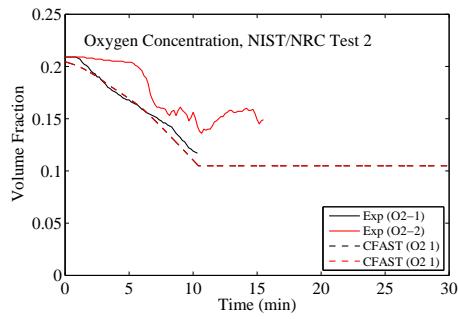
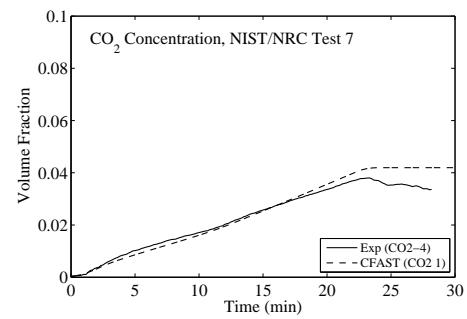
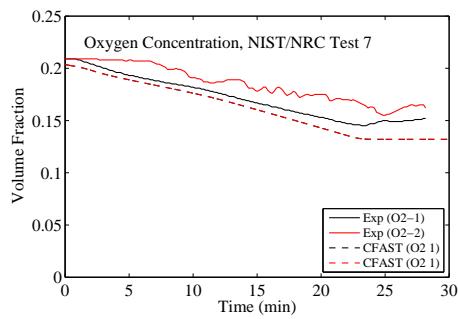
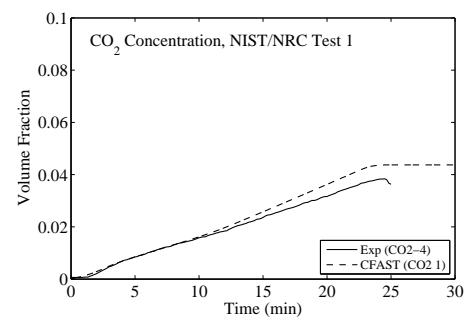
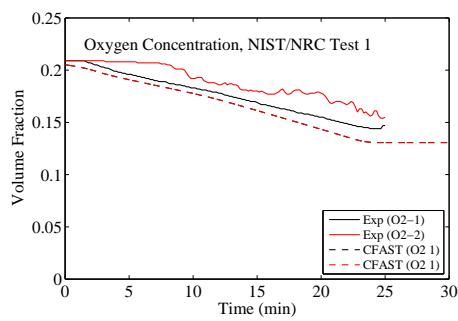
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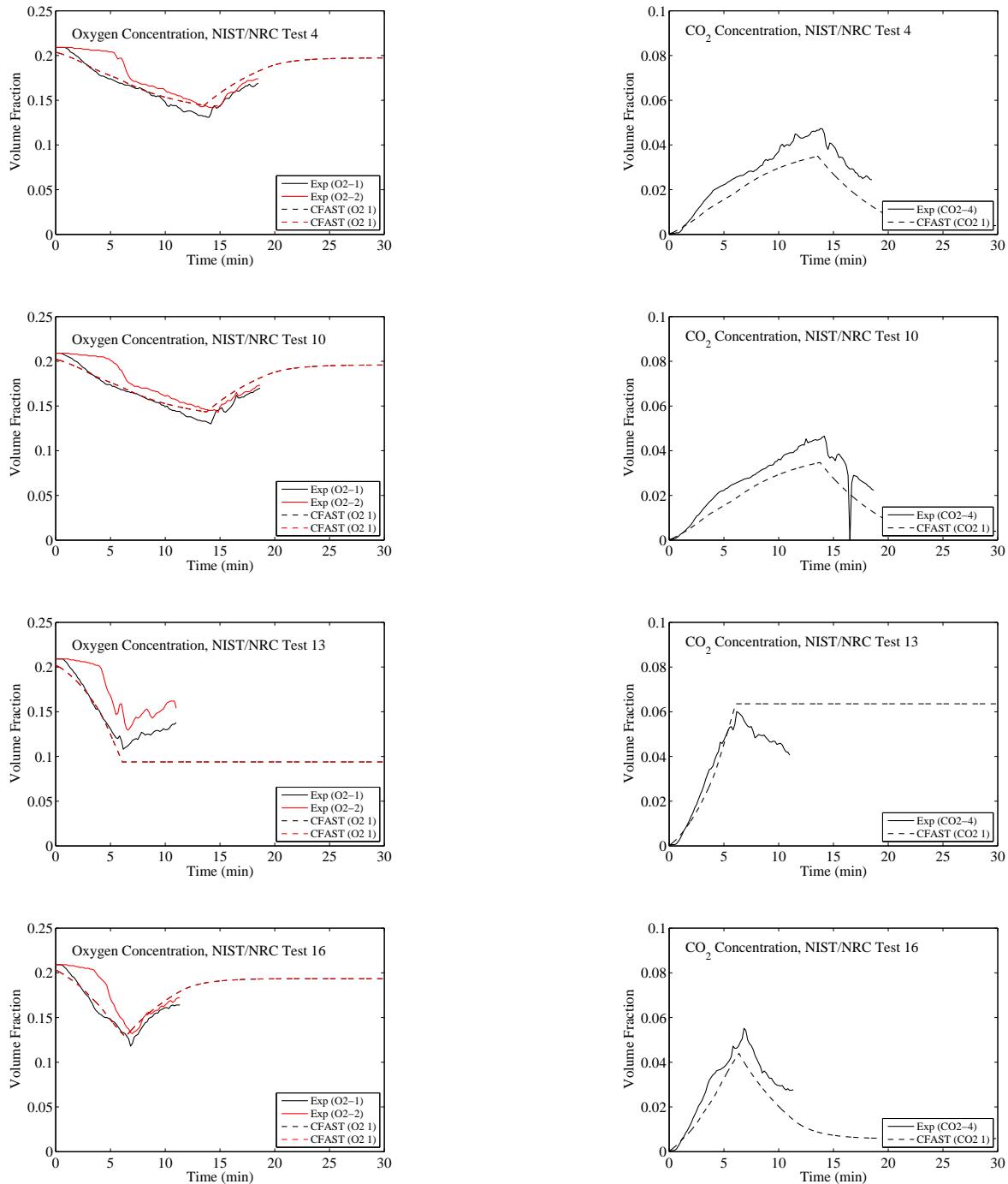


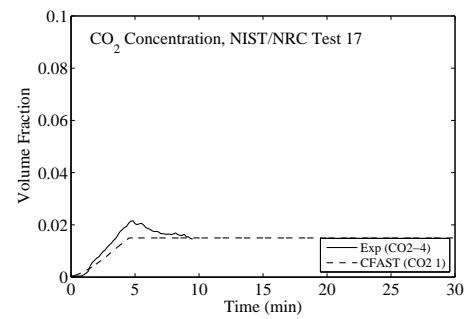
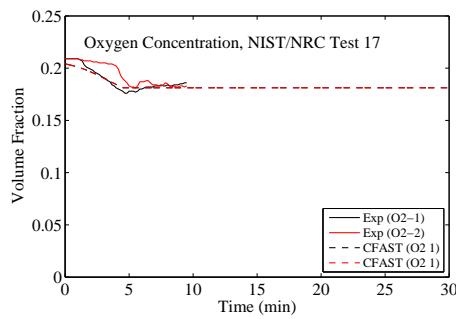




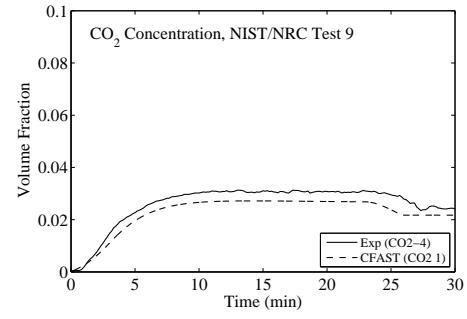
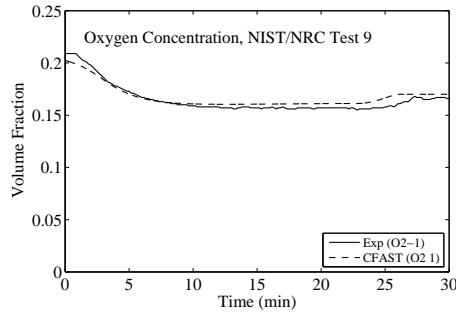
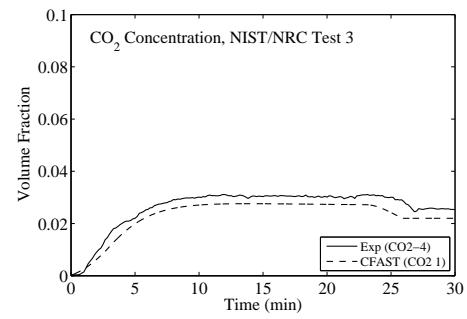
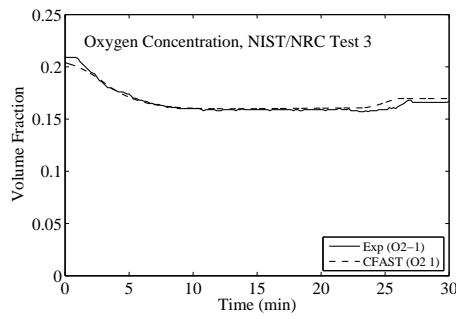


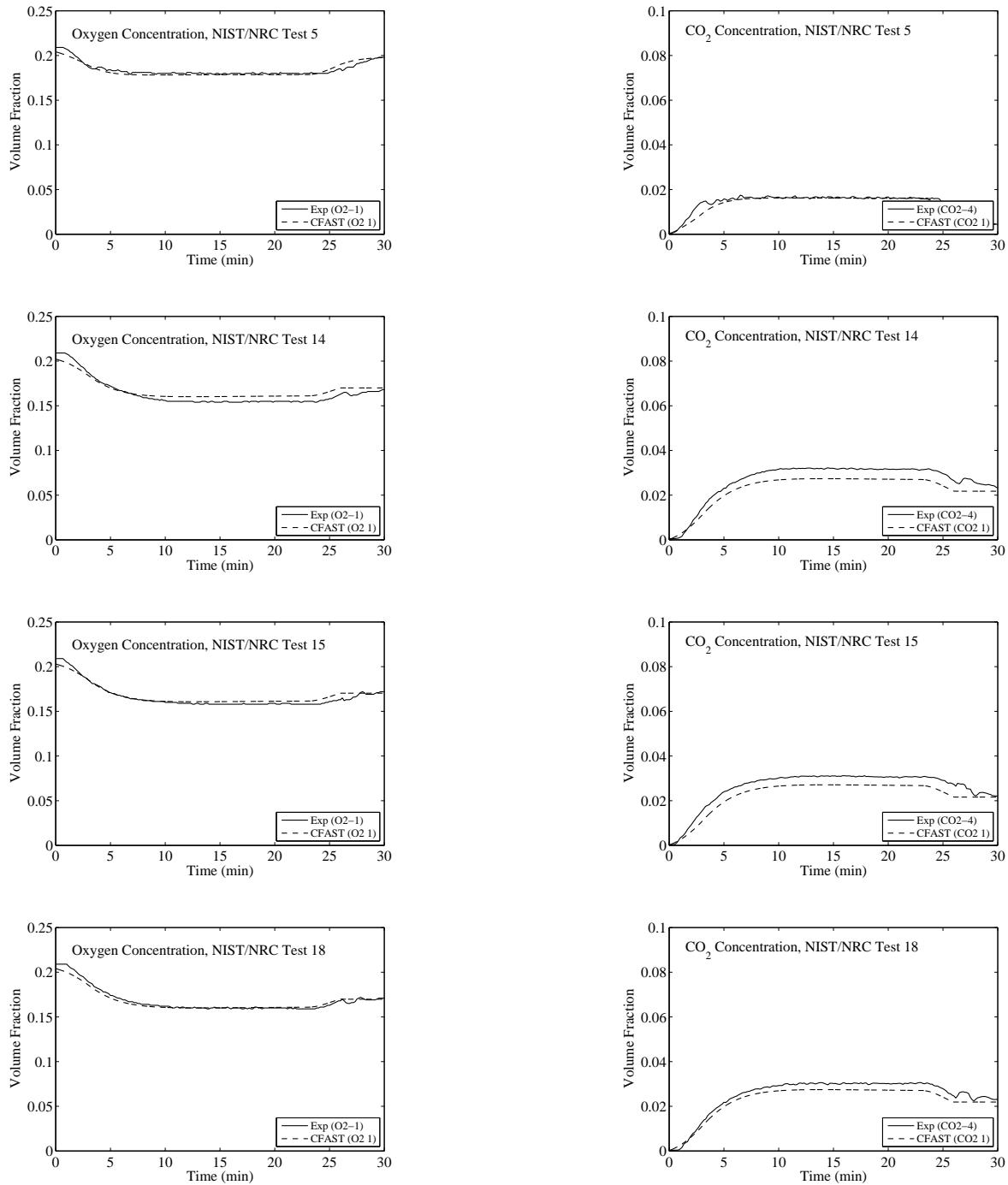




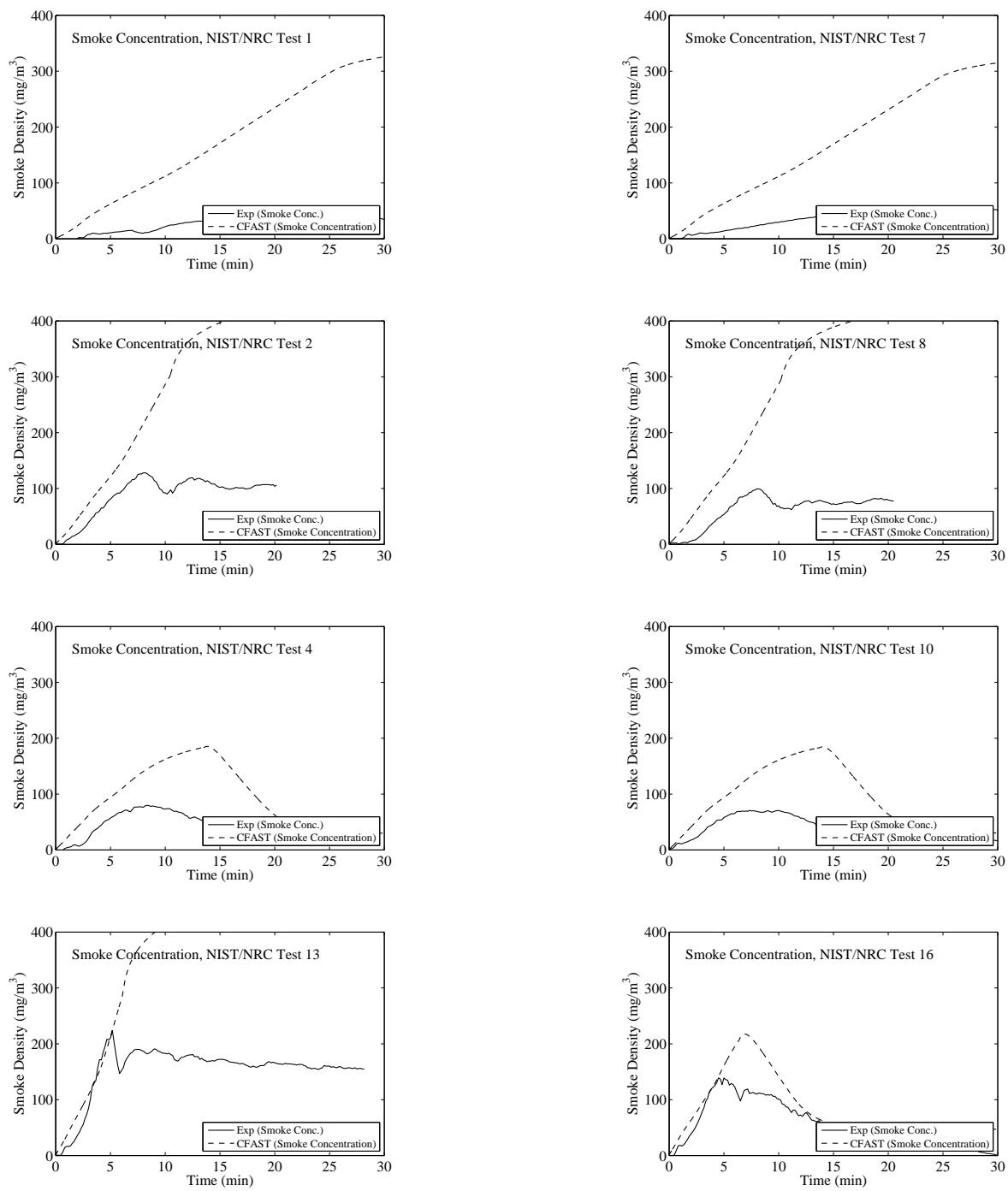


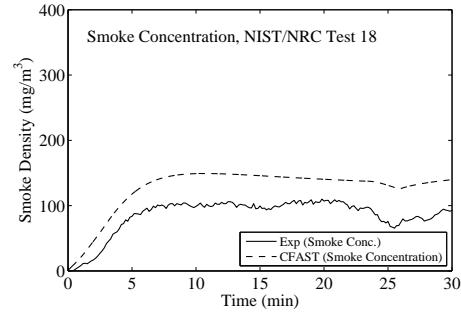
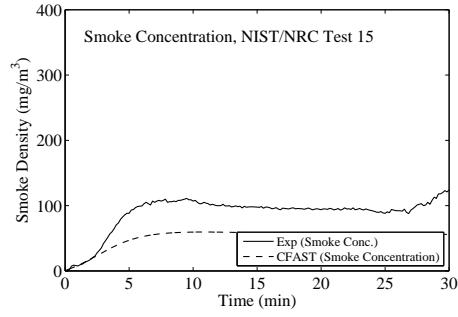
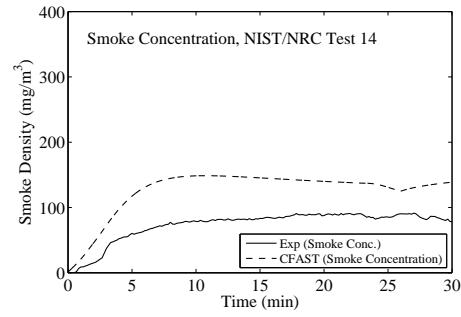
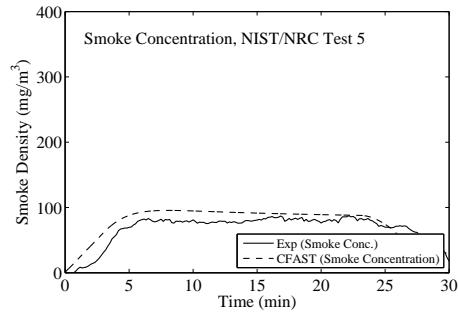
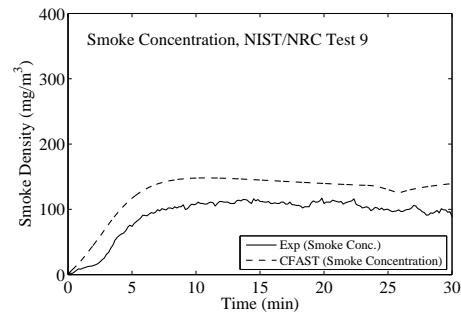
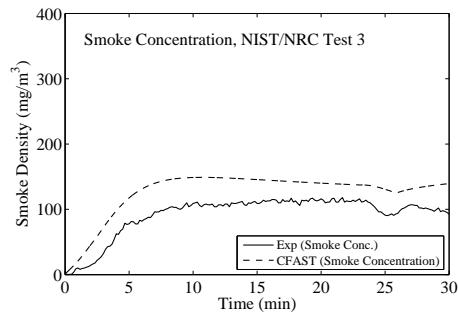
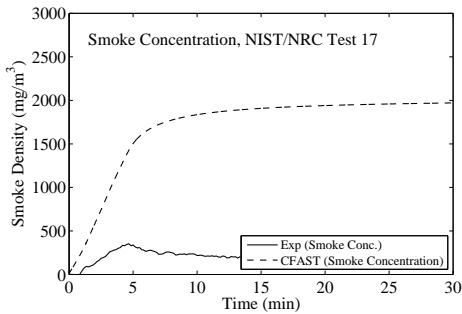
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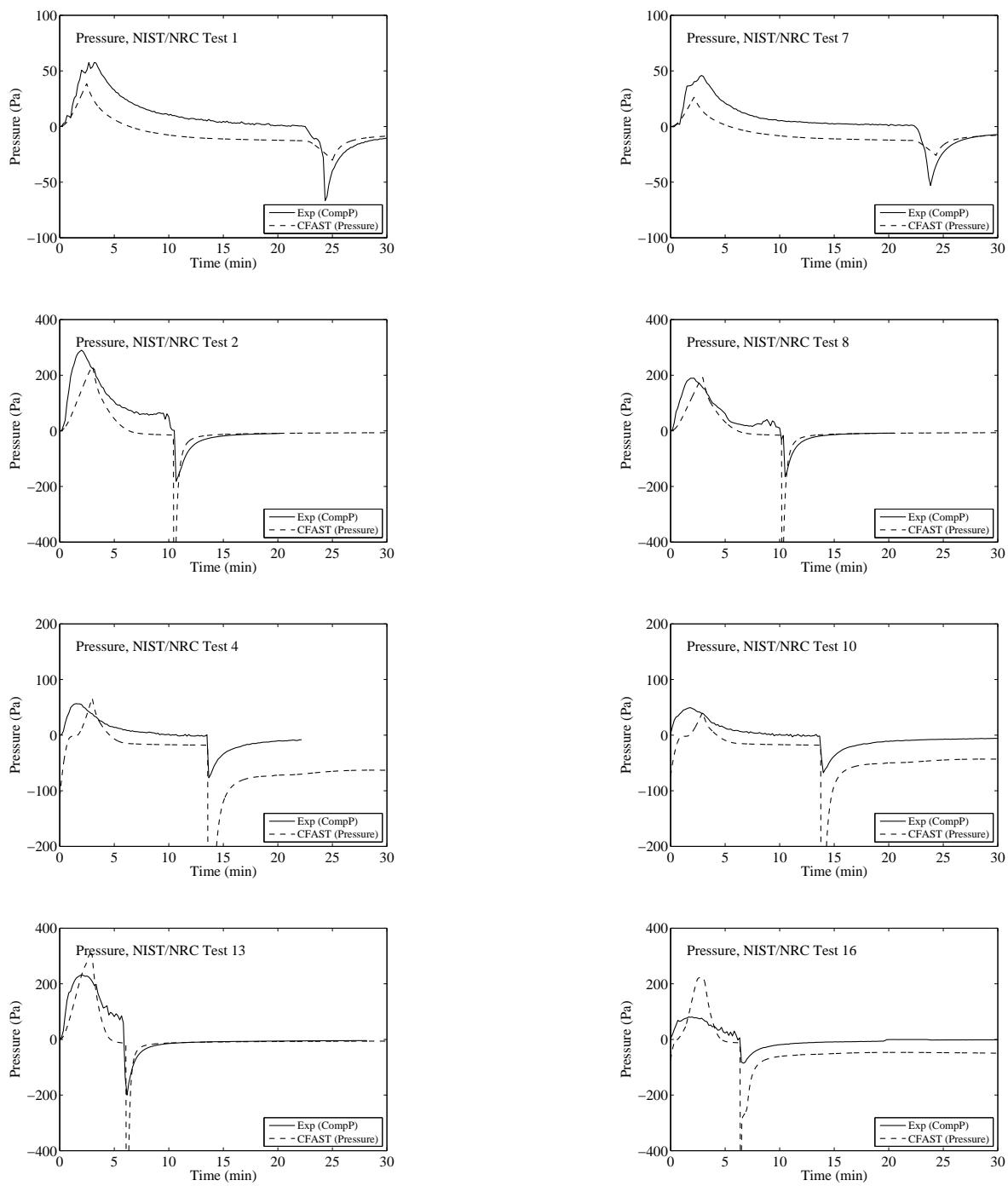


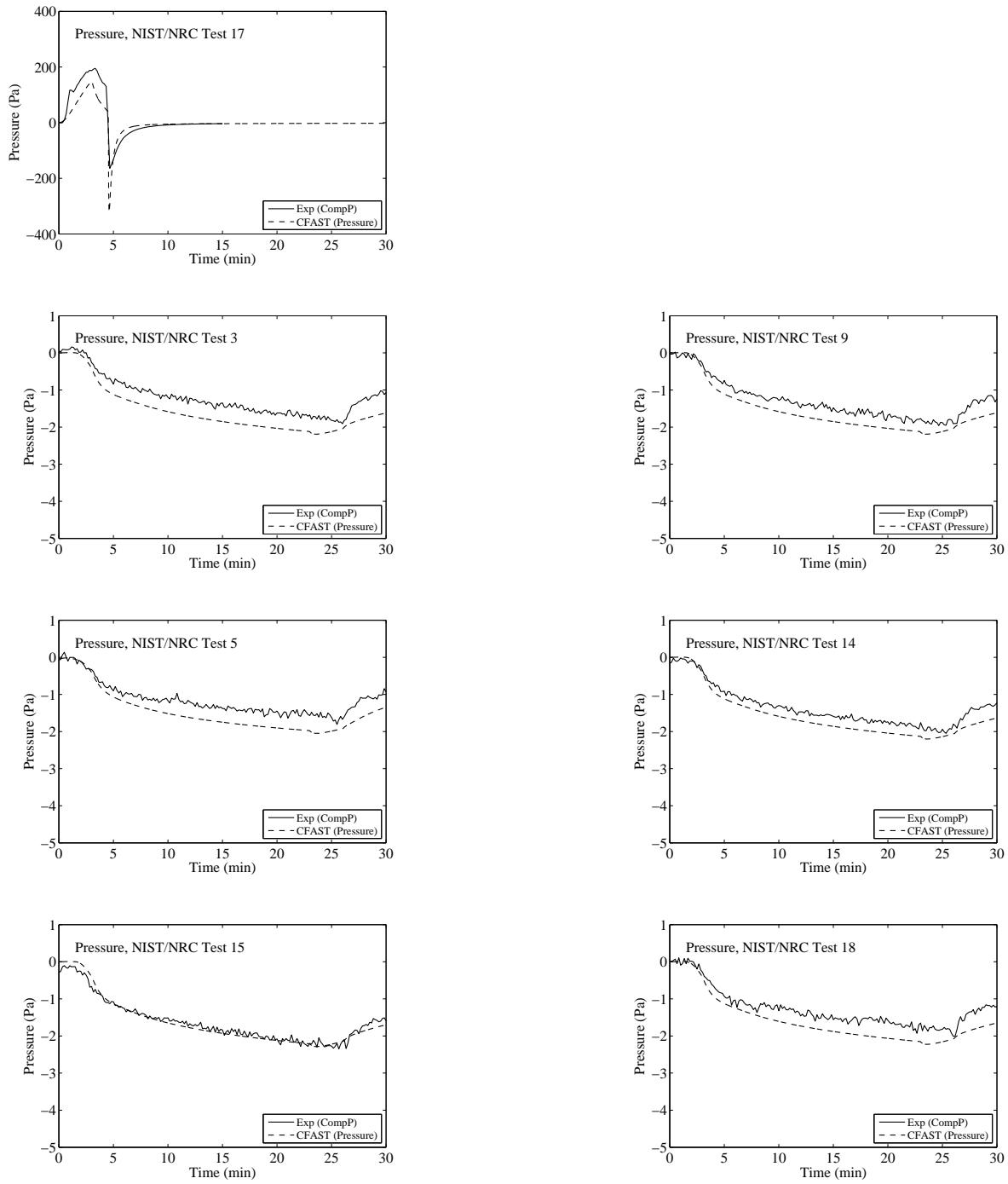


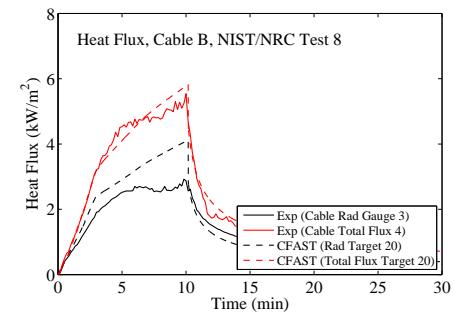
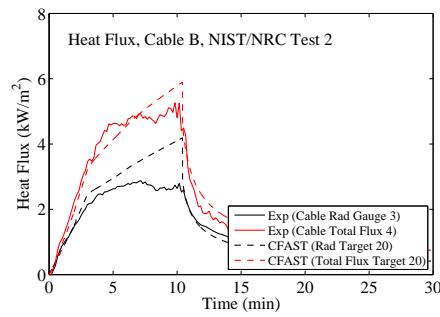
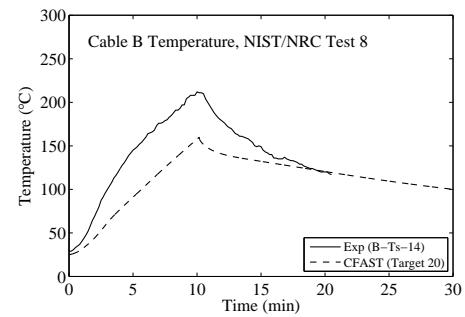
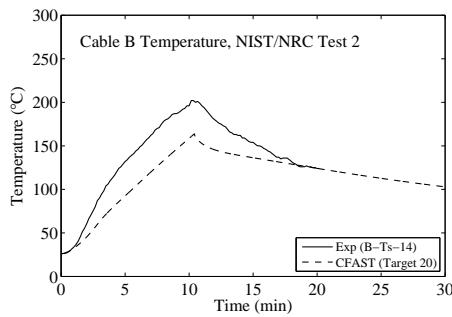
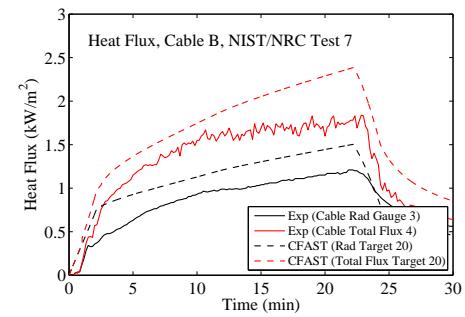
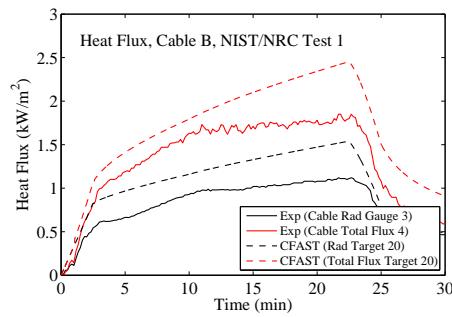
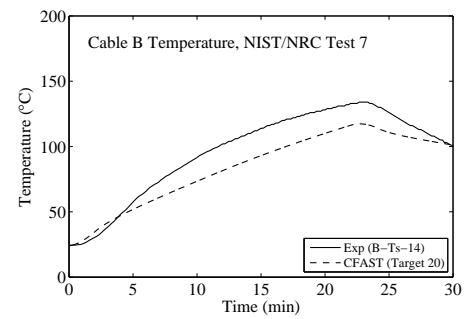
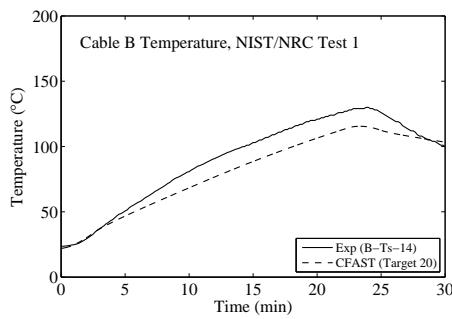
## NIST/NRC TEST SERIES

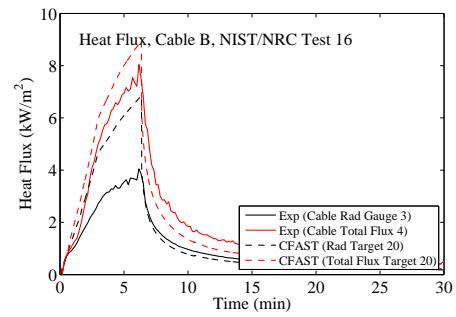
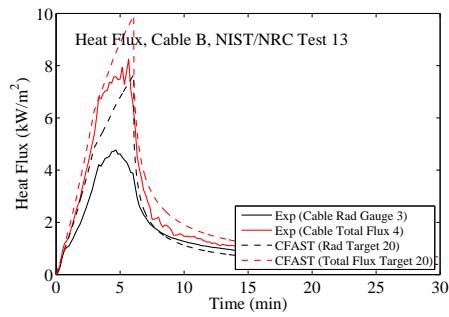
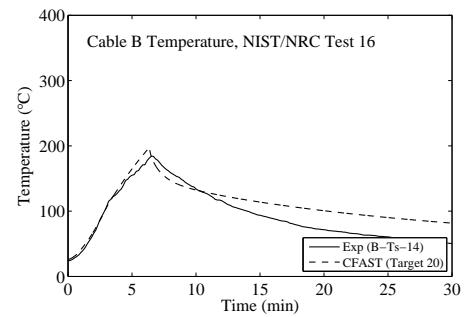
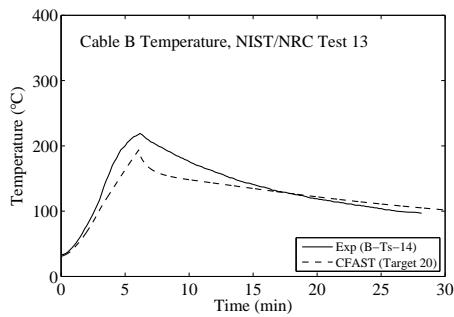
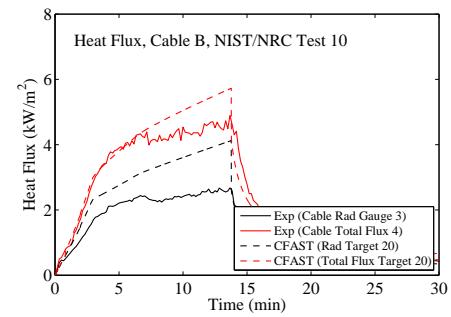
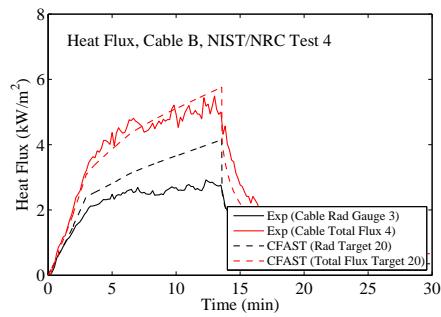
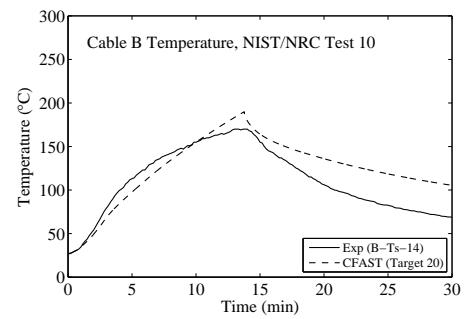
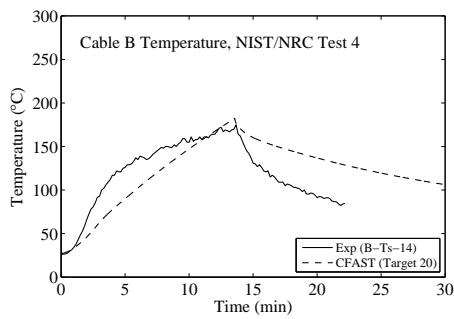


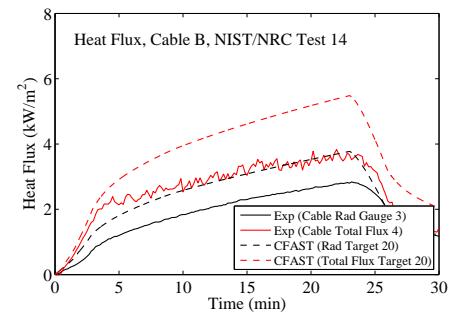
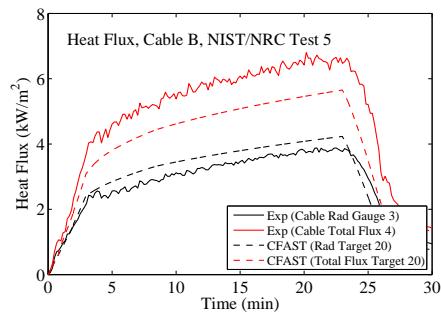
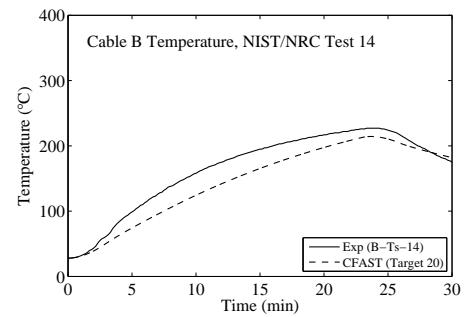
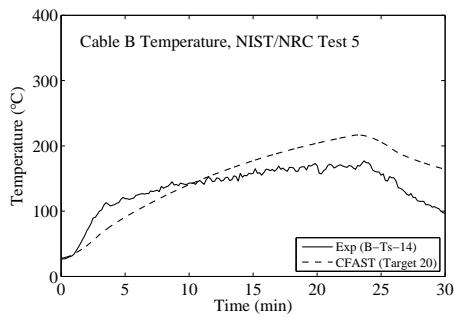
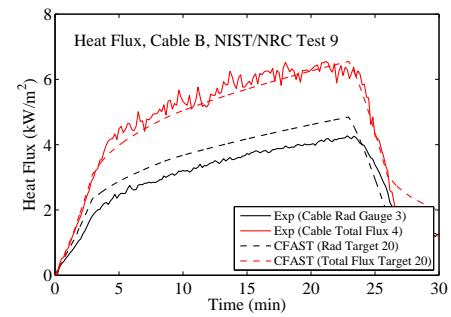
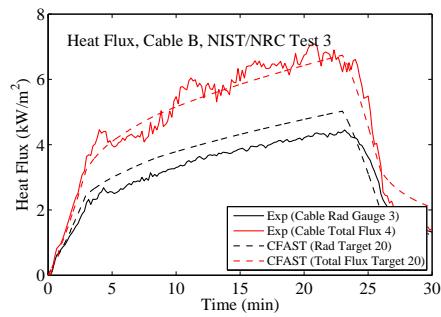
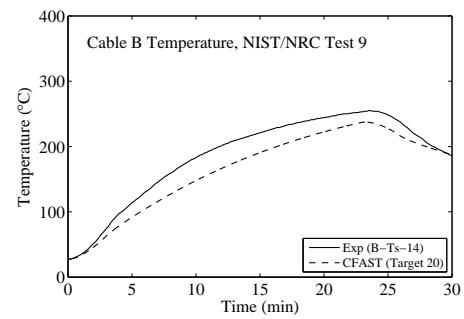
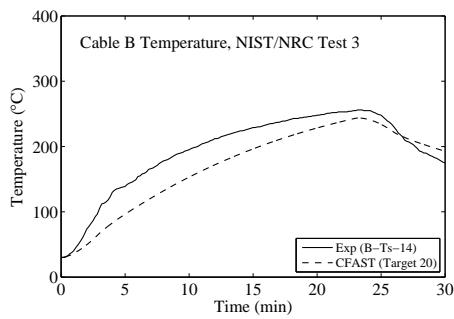


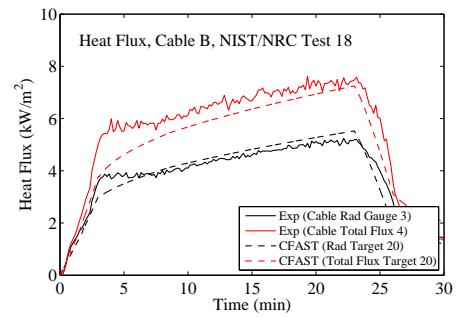
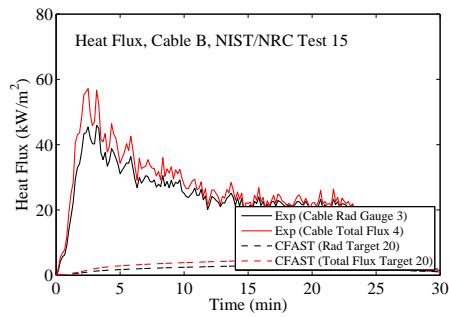
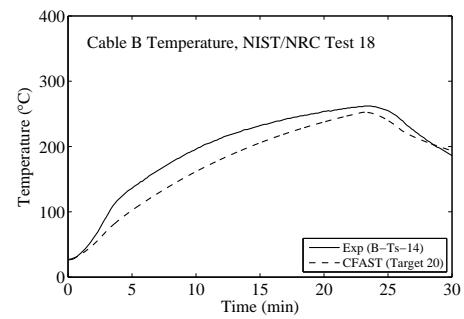
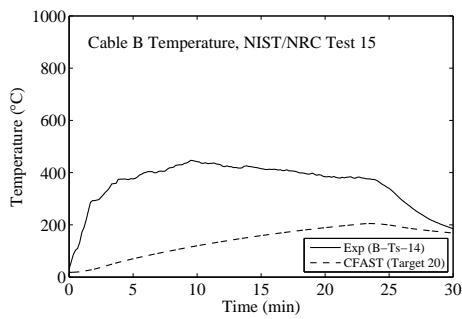


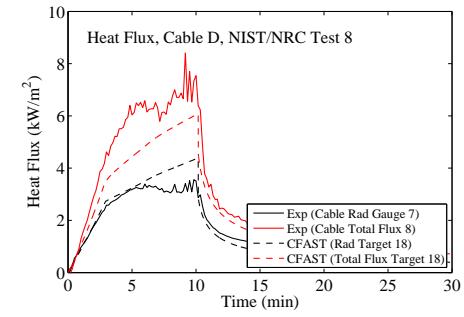
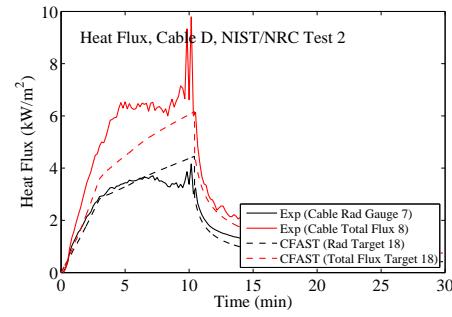
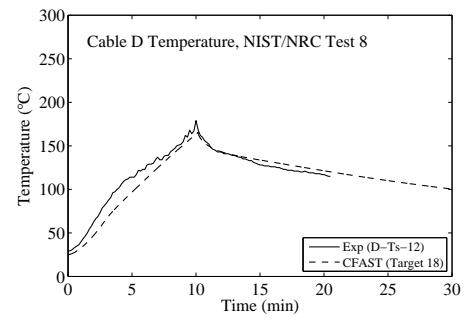
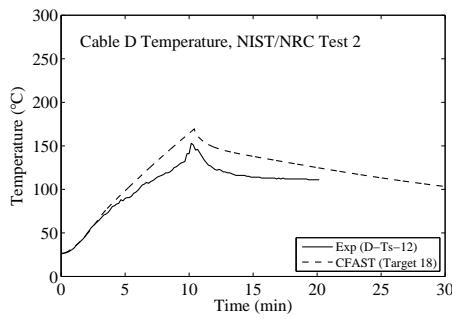
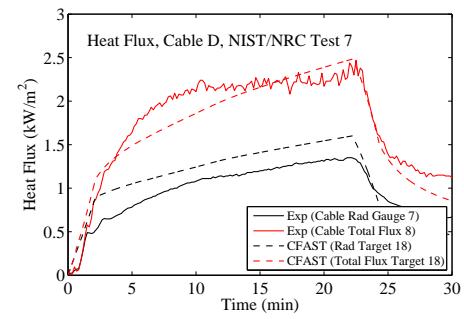
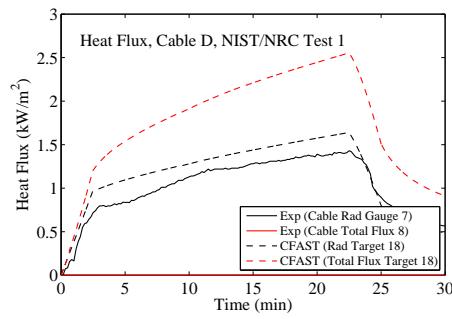
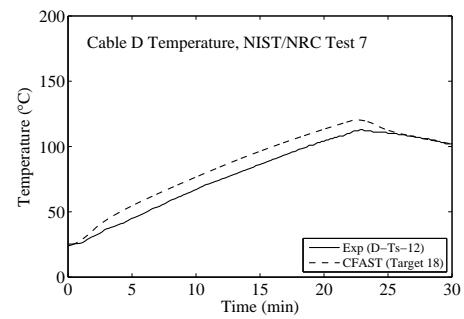
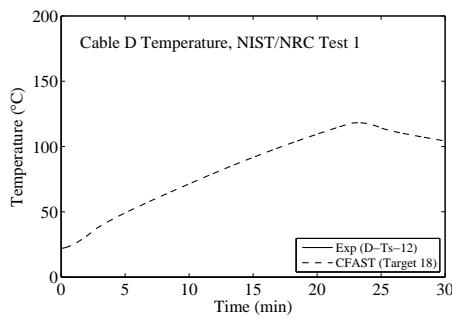


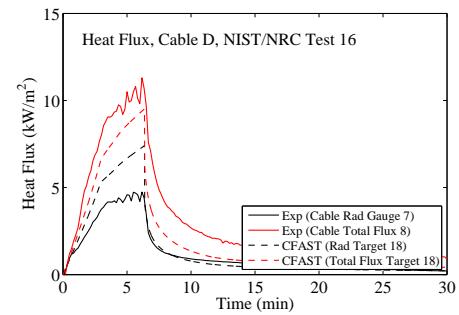
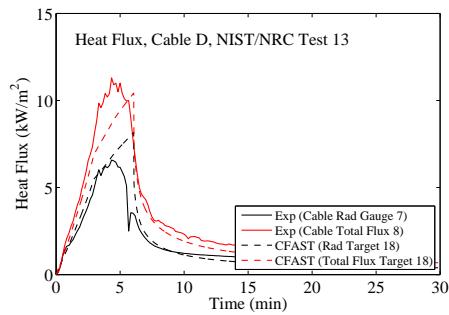
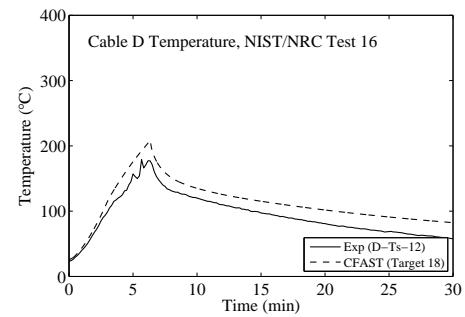
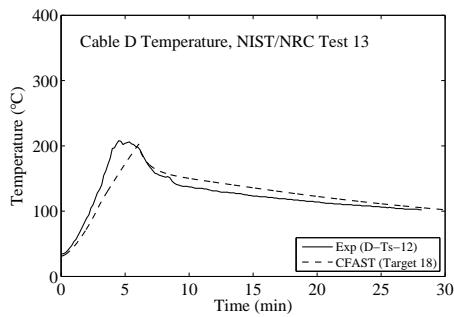
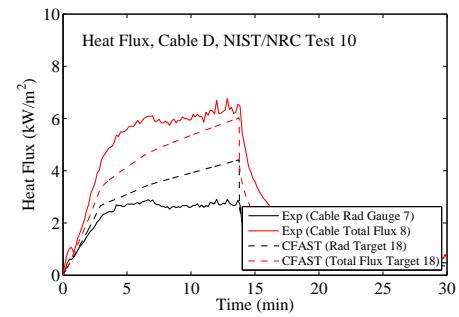
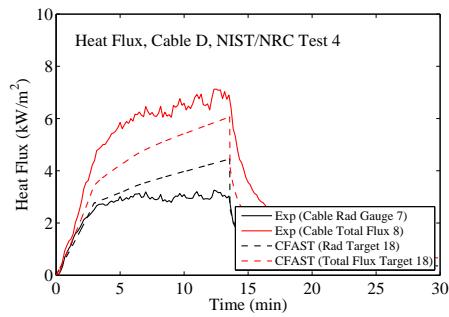
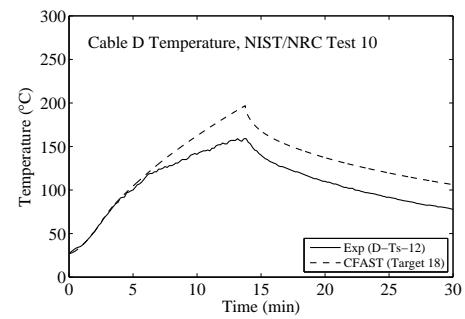
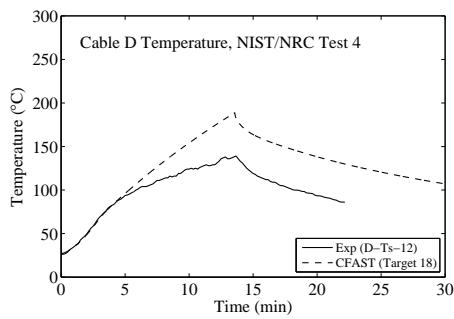


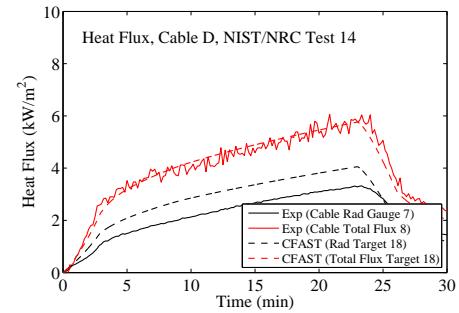
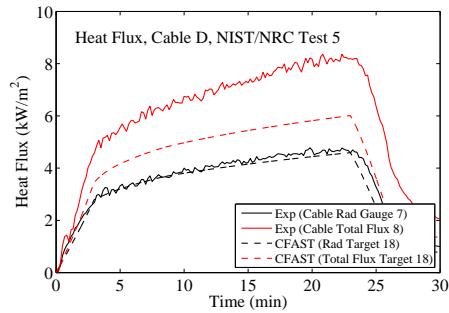
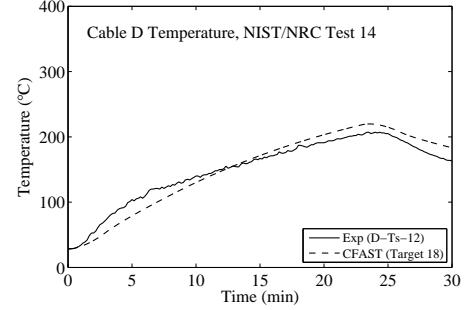
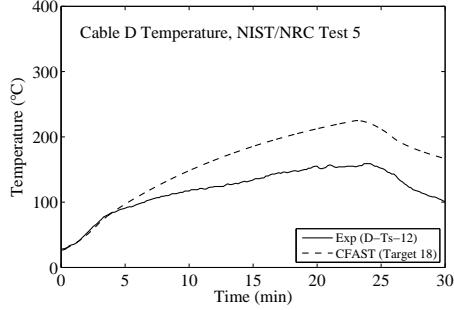
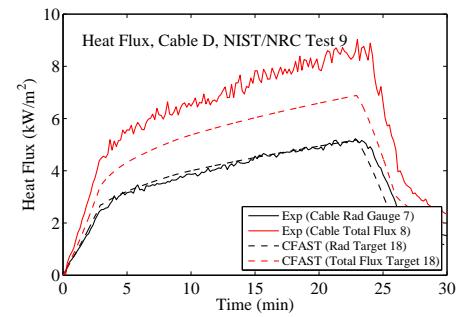
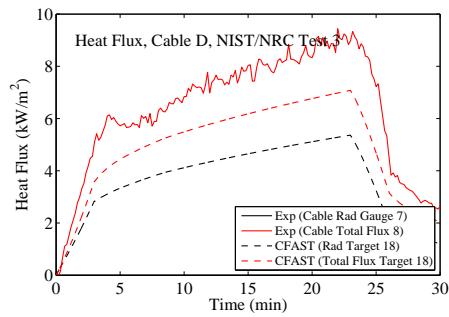
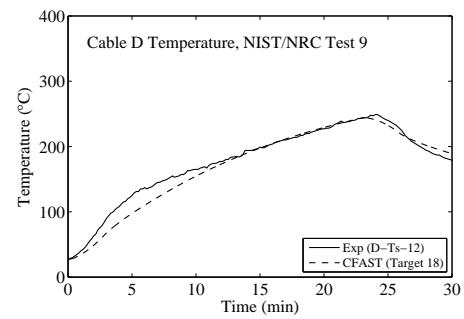
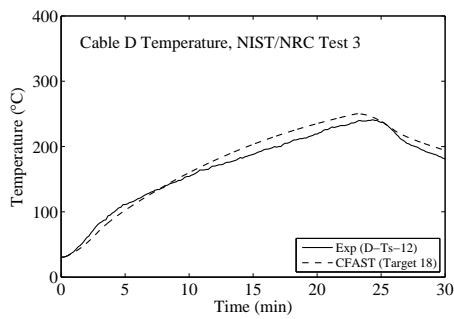


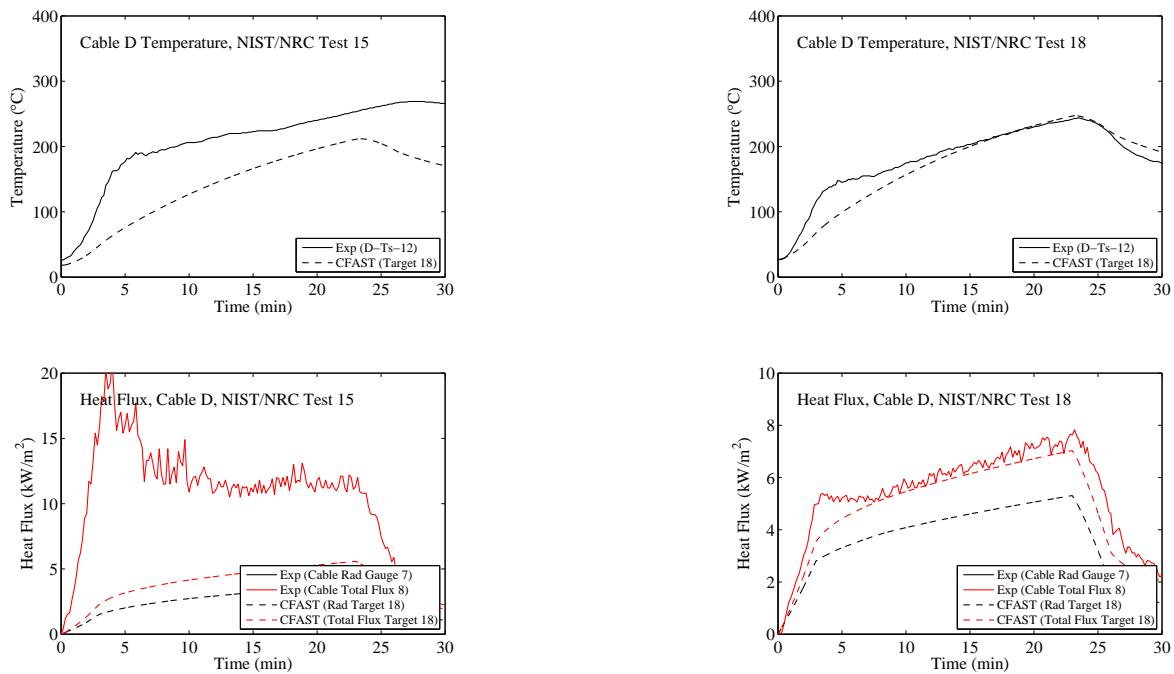


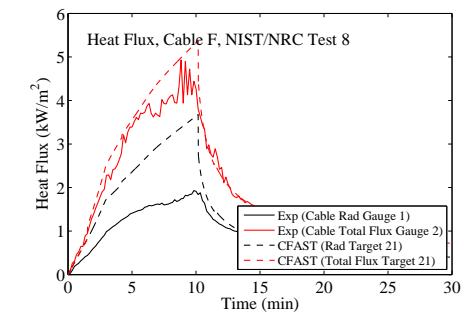
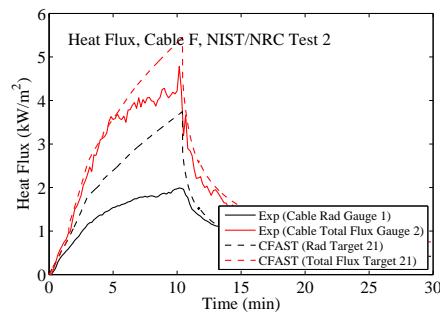
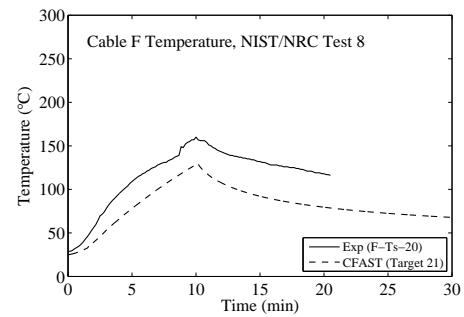
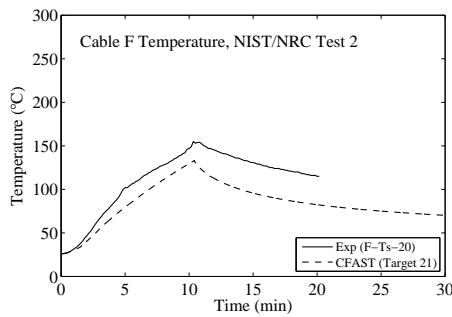
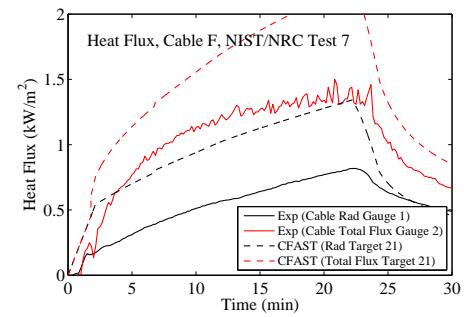
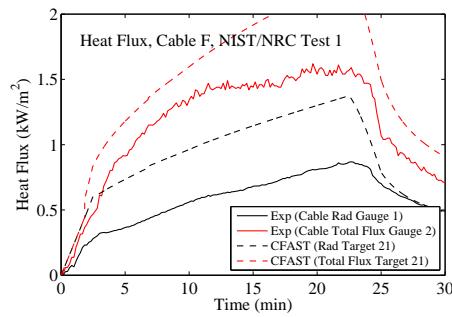
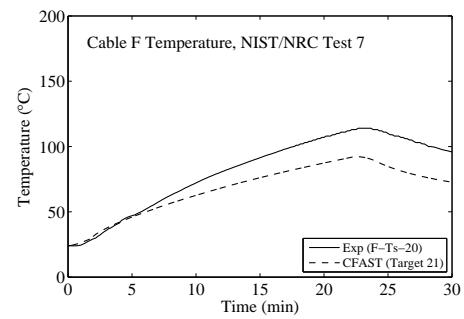
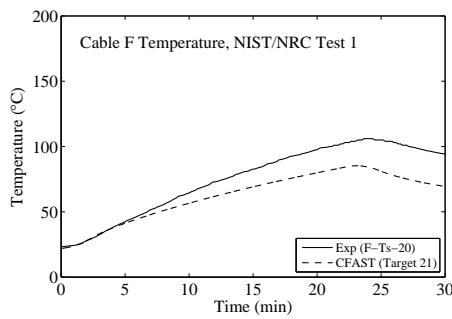


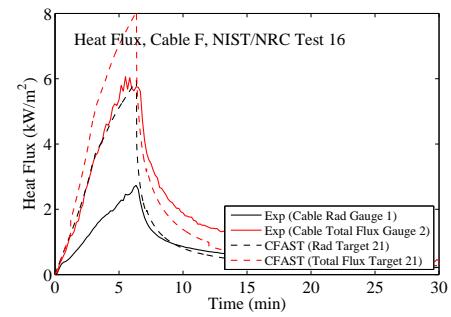
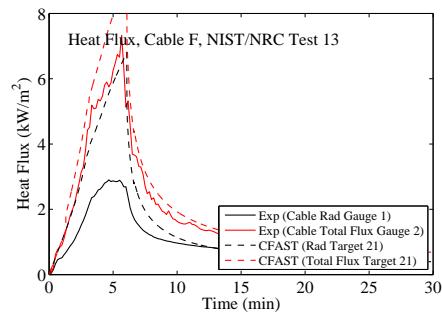
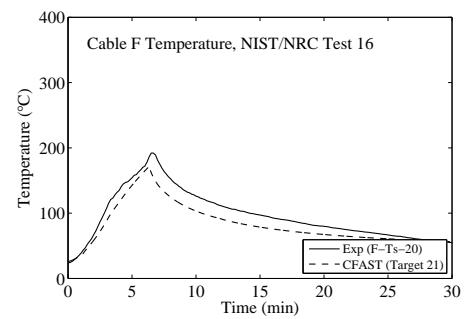
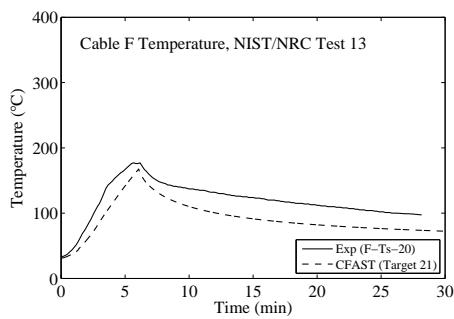
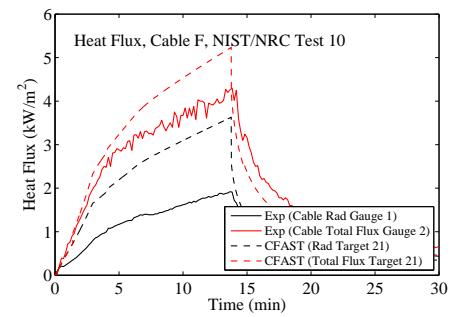
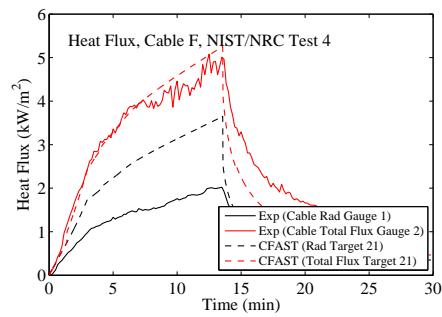
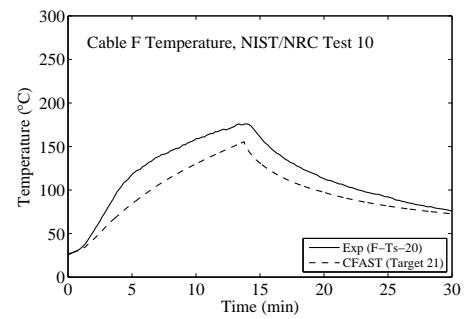
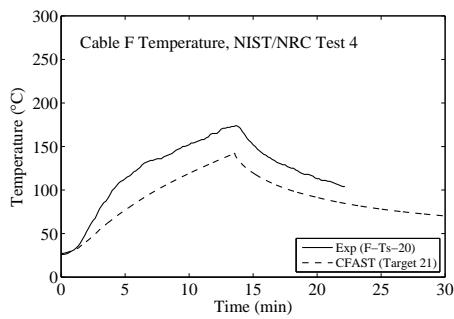


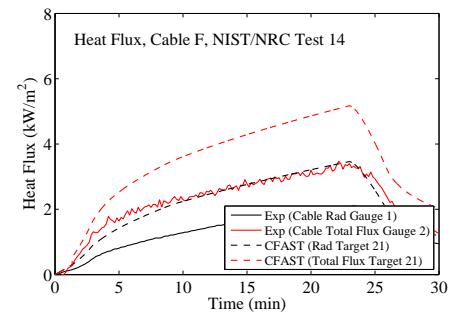
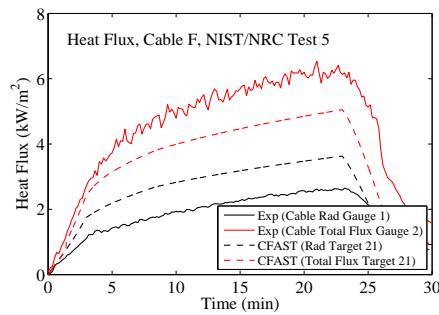
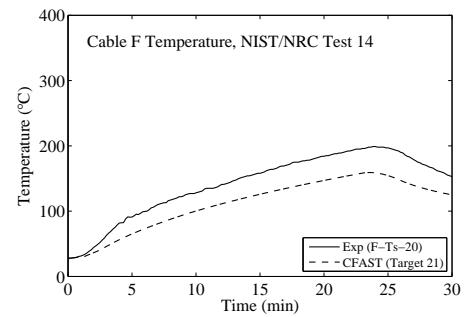
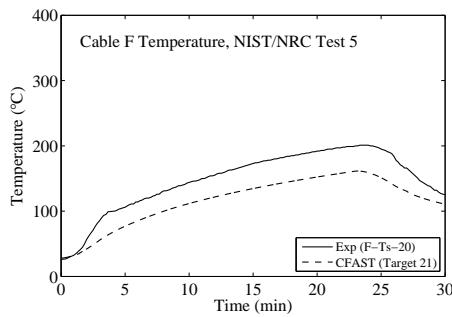
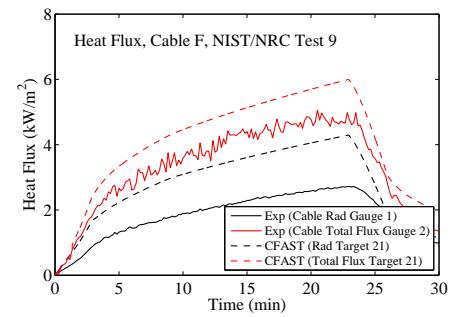
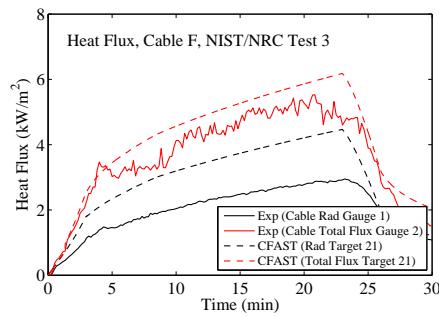
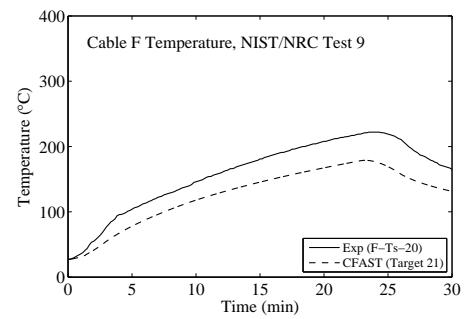
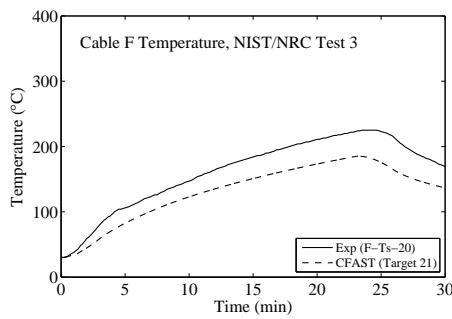


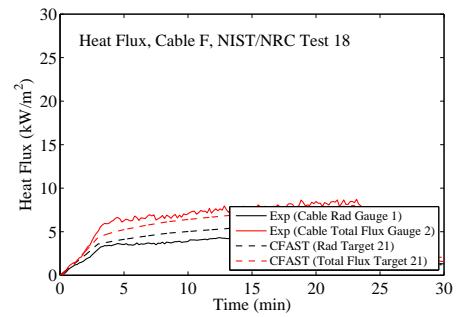
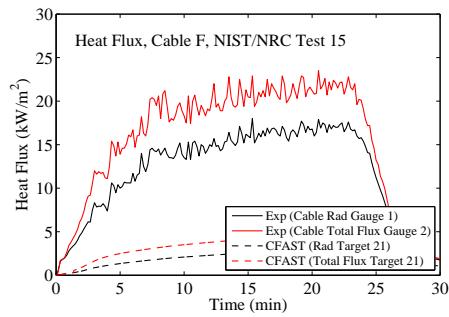
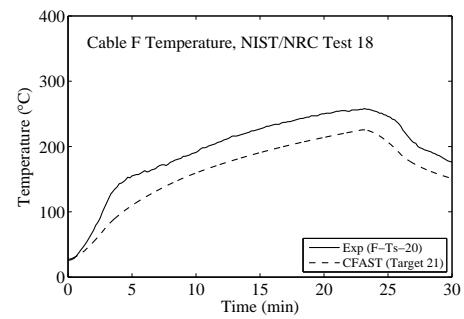
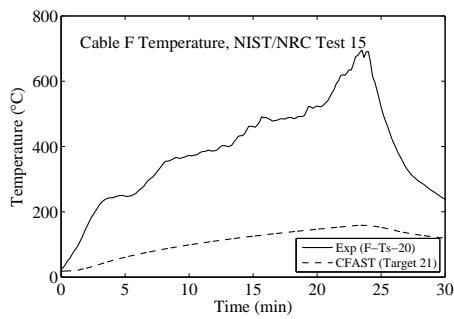


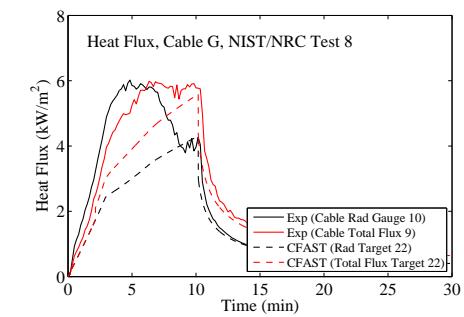
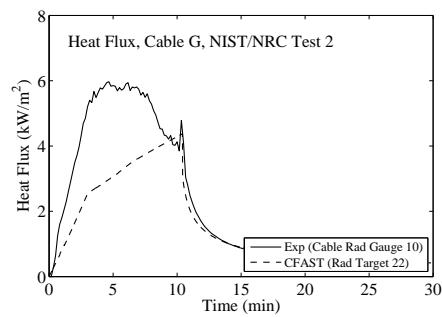
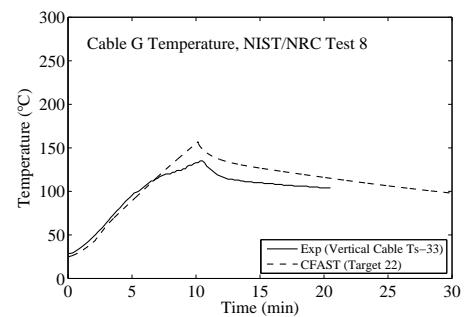
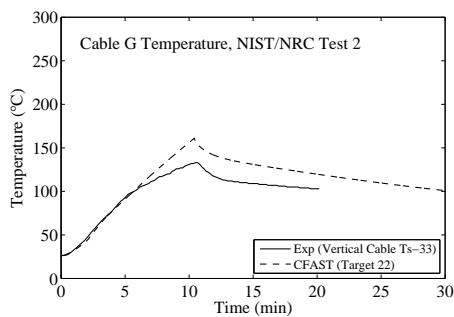
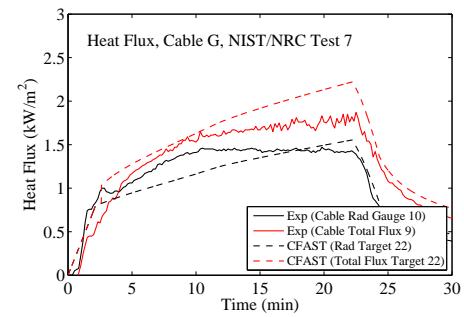
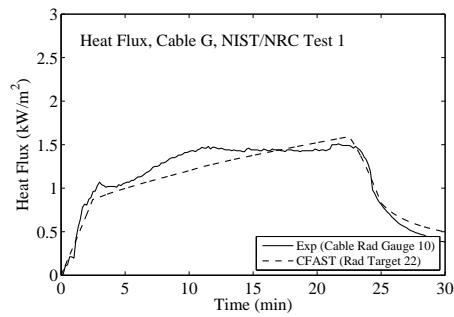
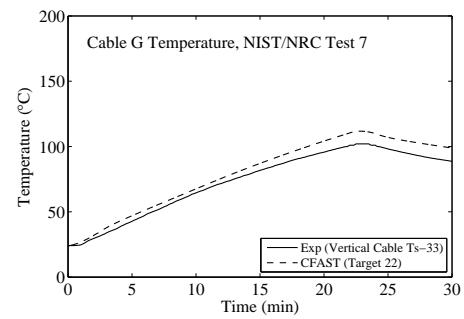
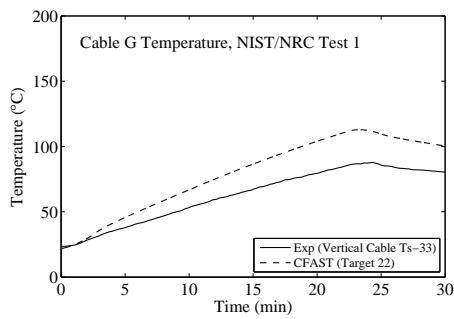


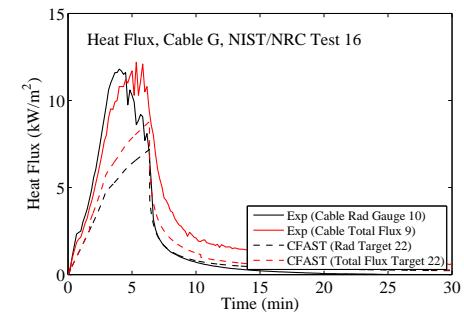
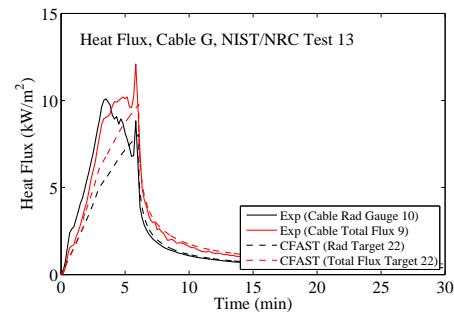
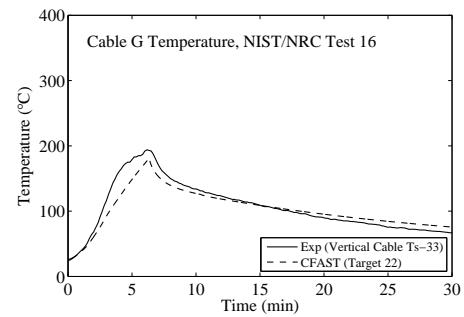
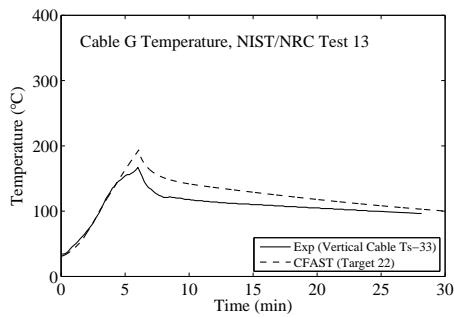
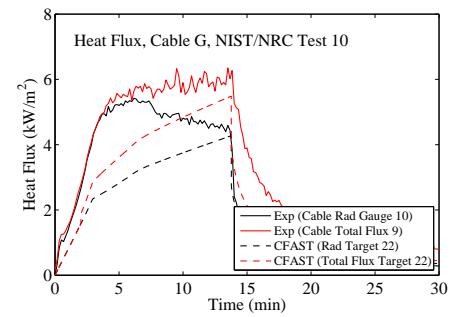
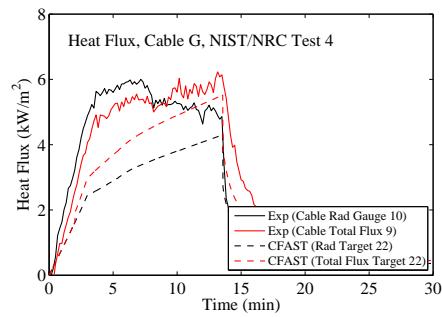
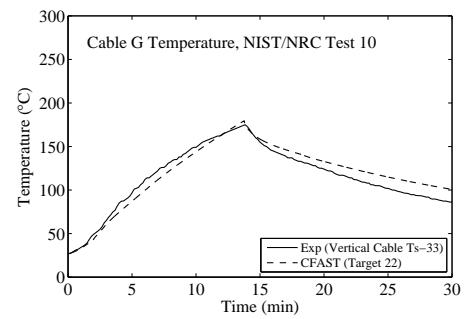
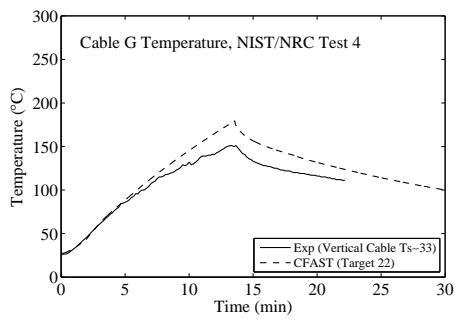


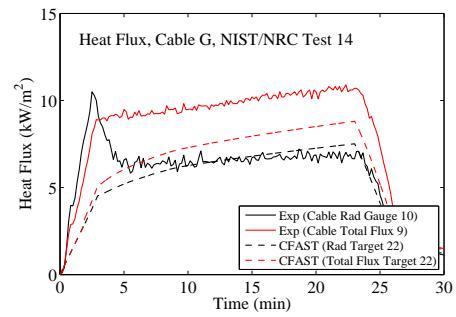
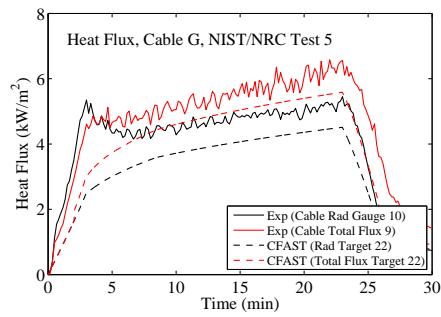
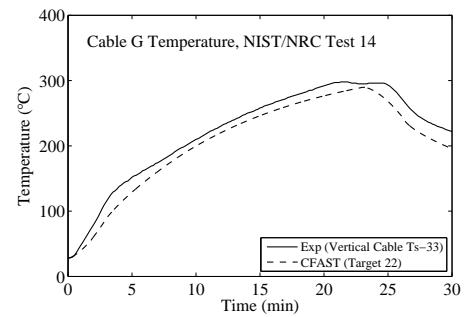
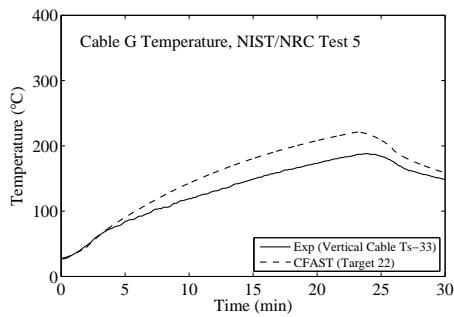
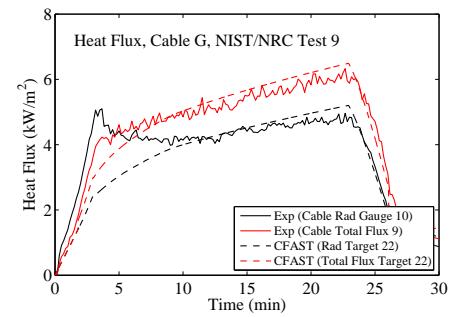
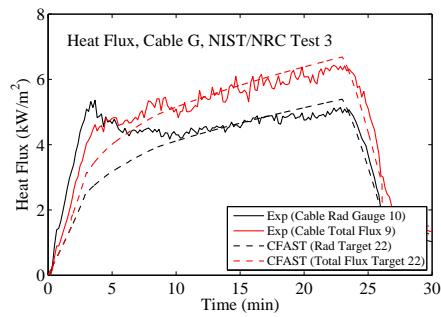
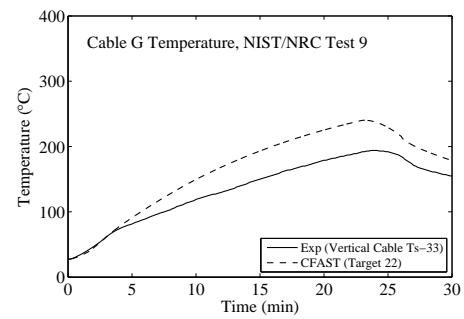
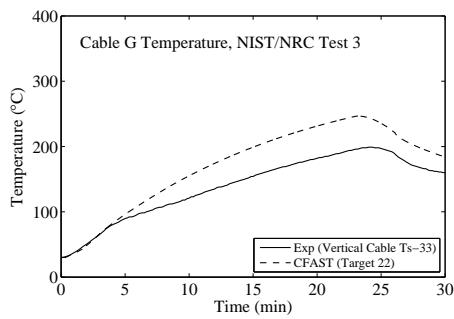


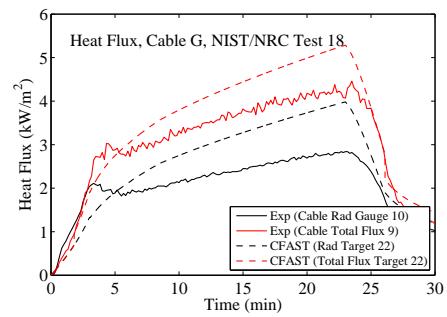
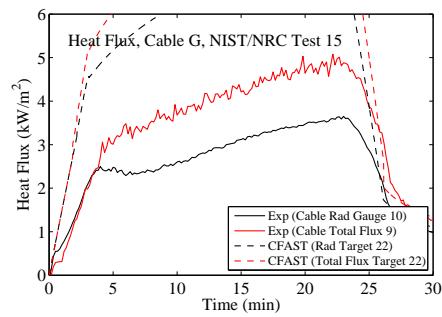
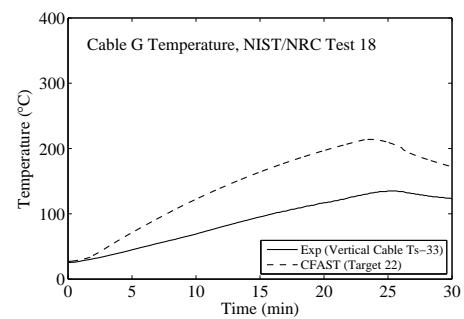
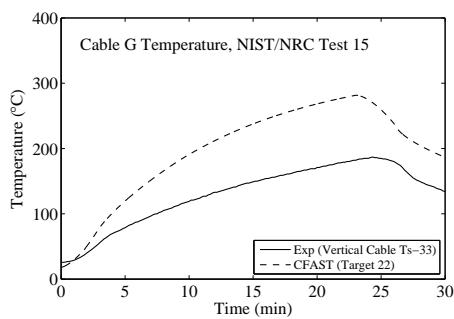


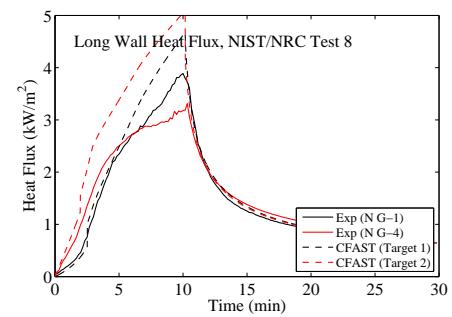
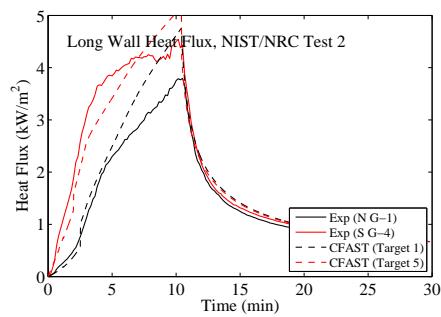
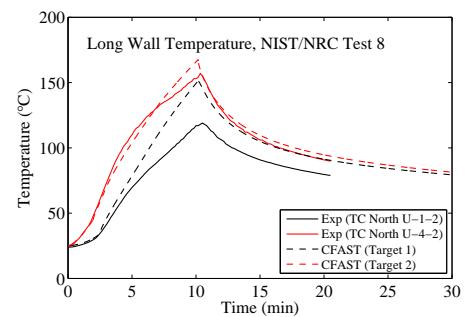
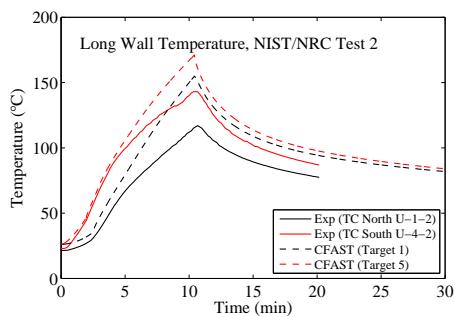
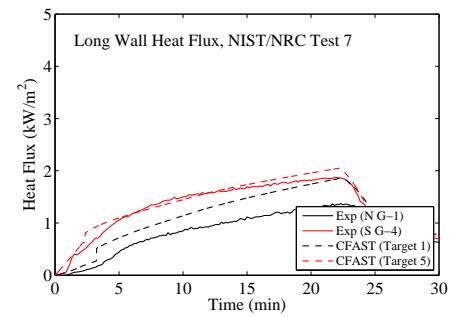
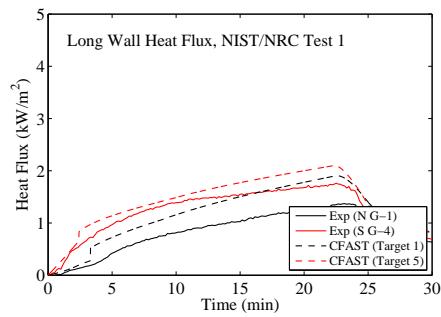
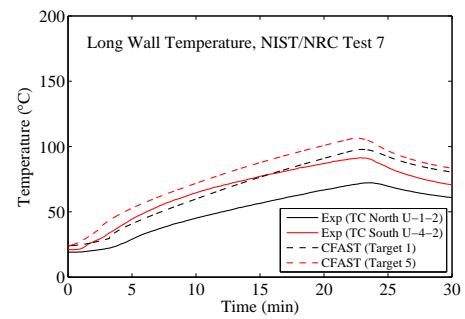
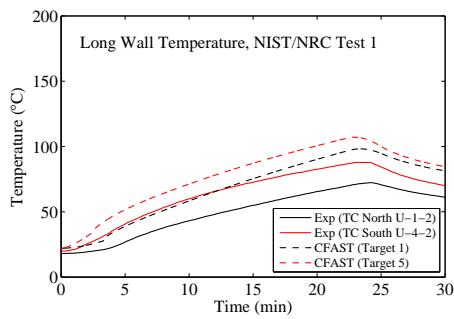


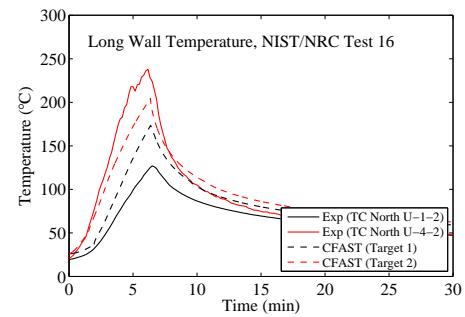
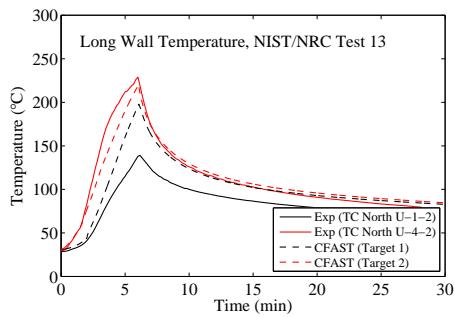
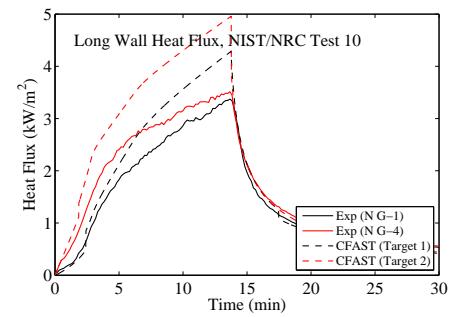
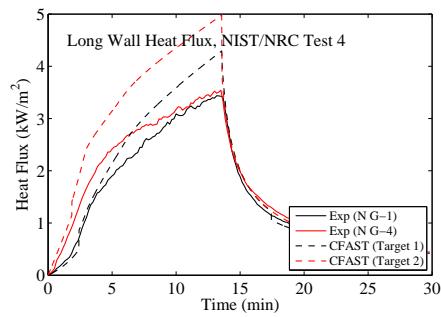
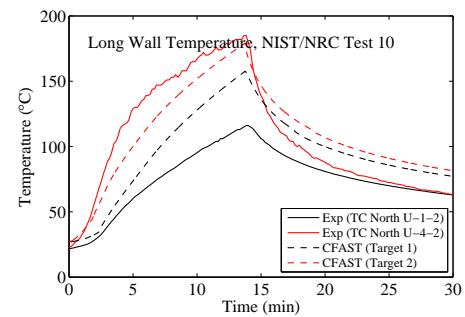
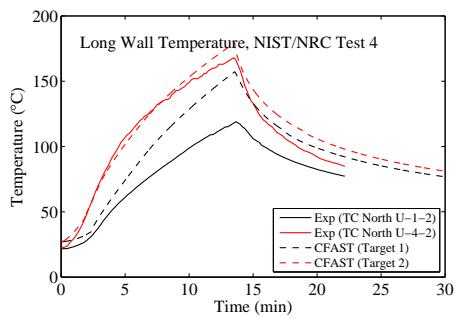




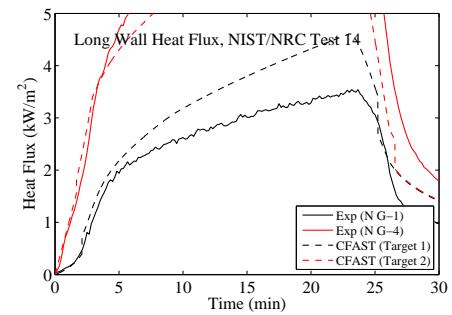
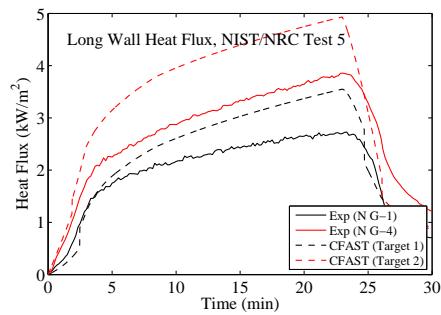
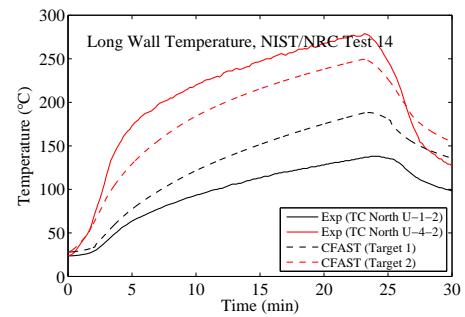
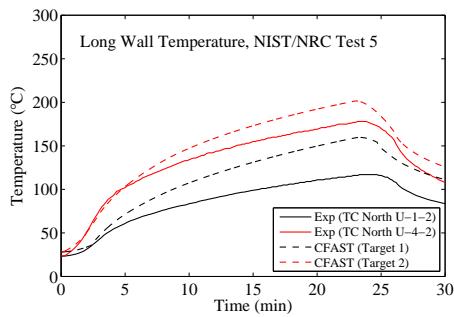
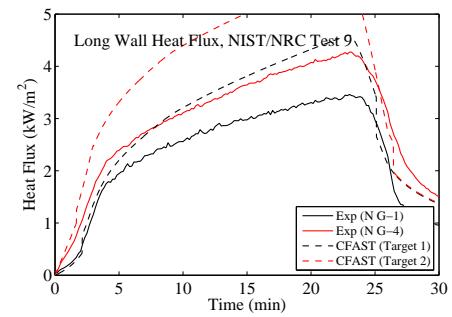
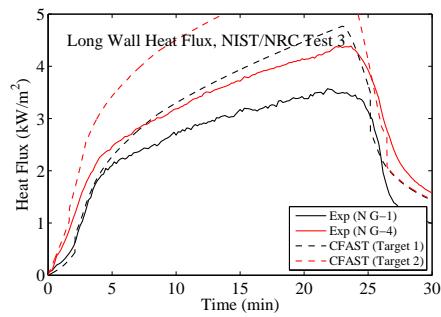
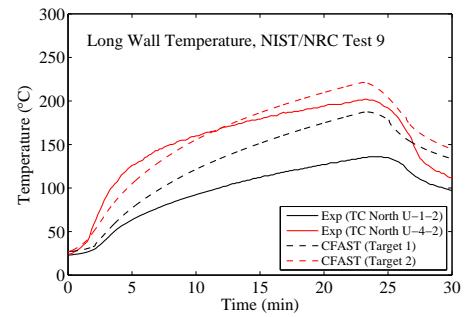
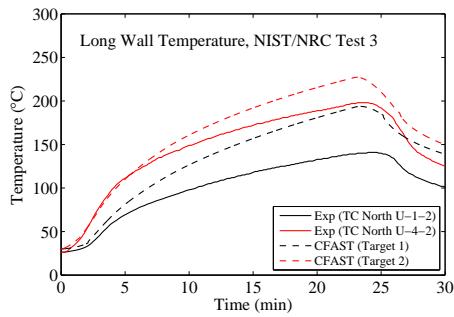


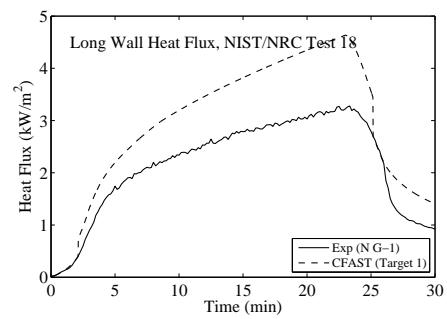
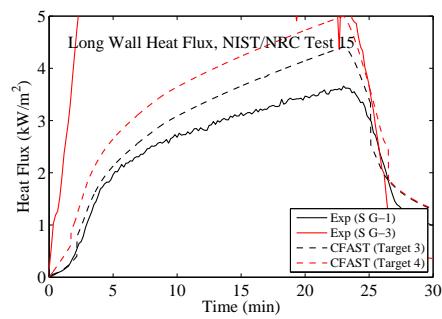
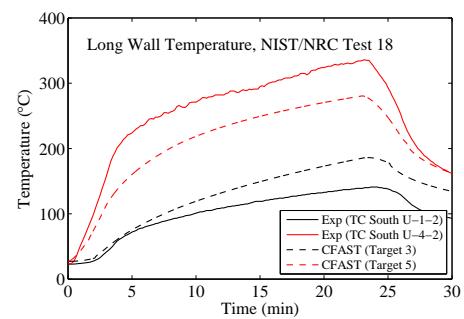
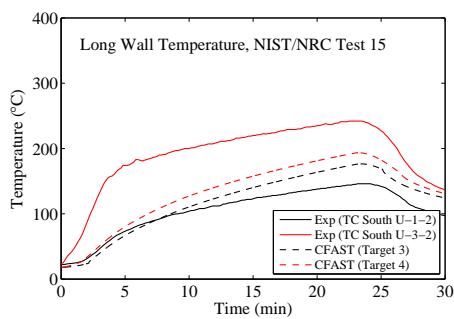


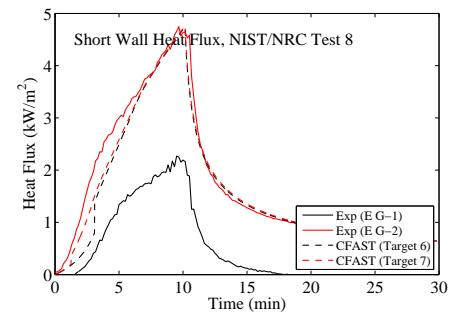
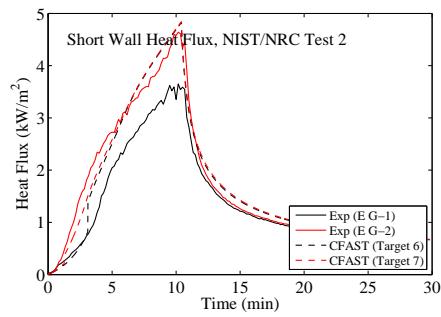
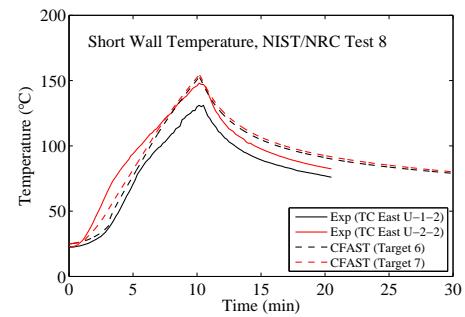
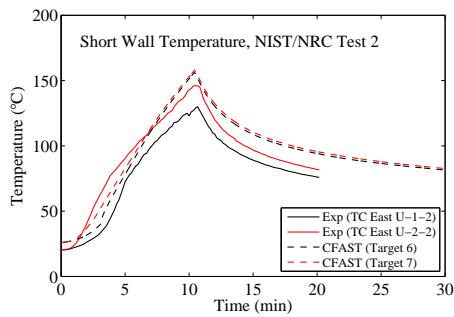
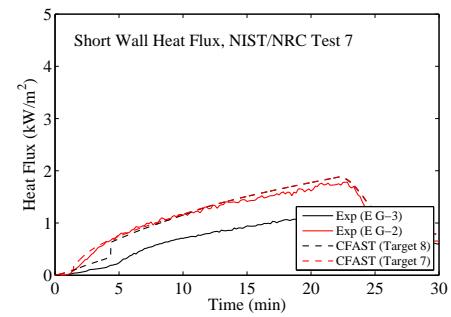
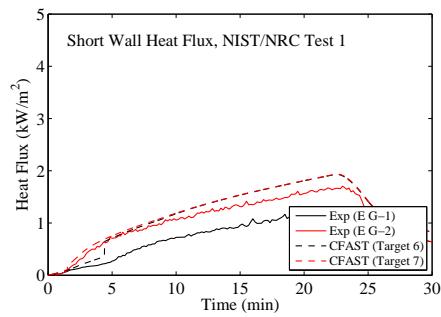
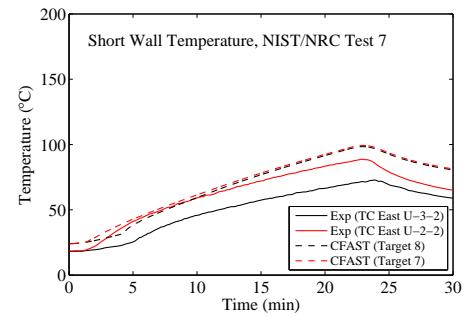
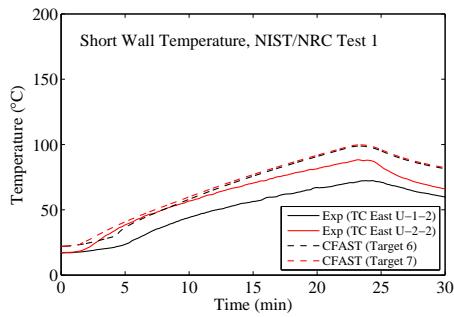


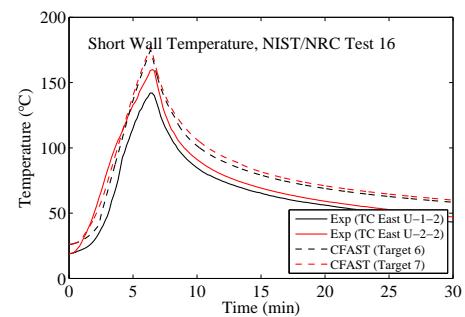
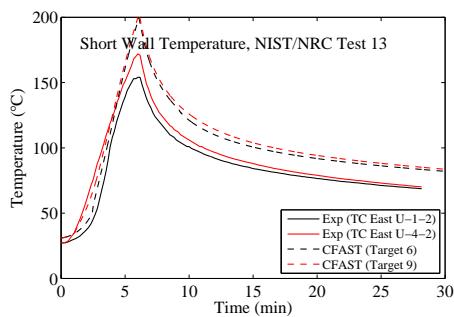
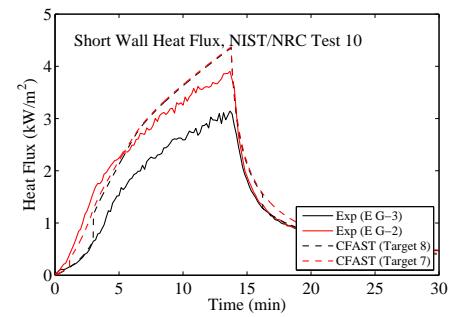
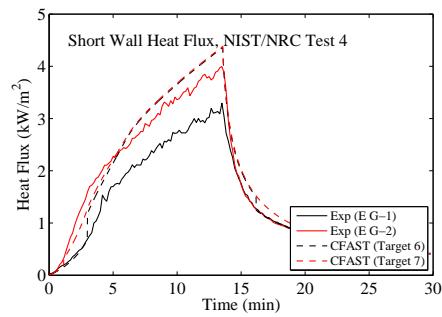
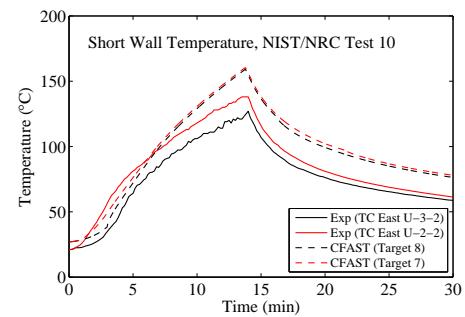
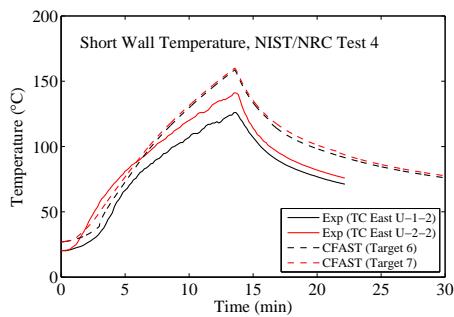


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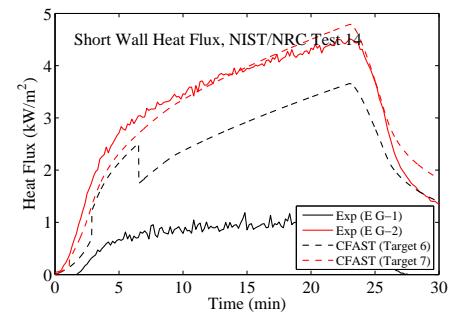
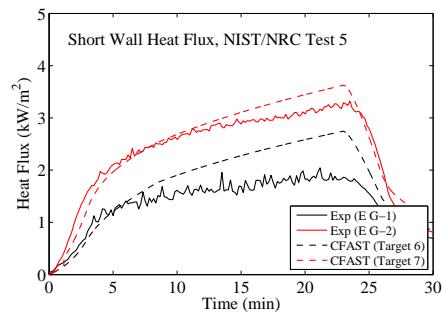
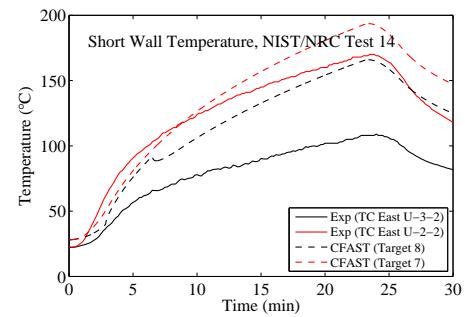
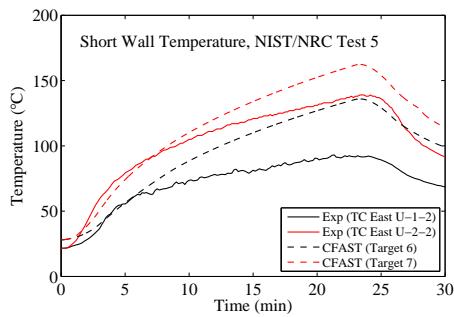
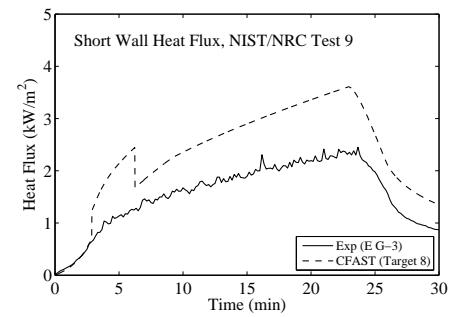
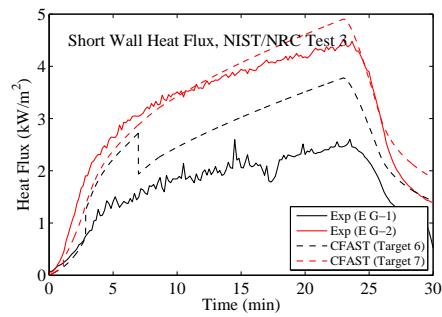
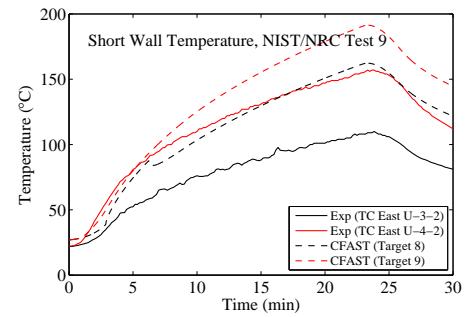
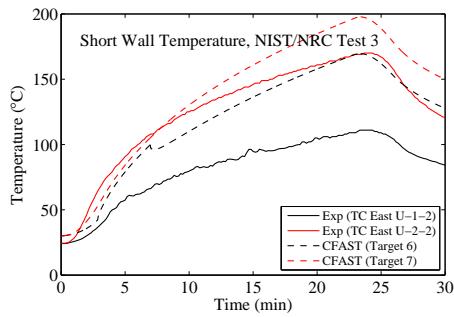


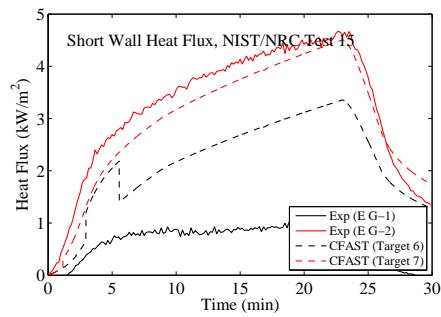
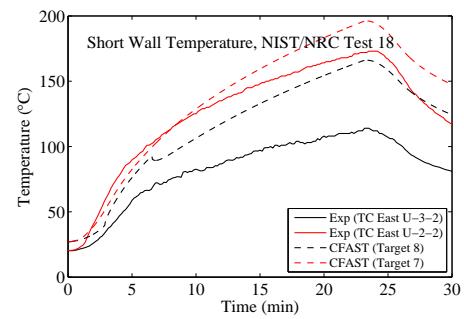
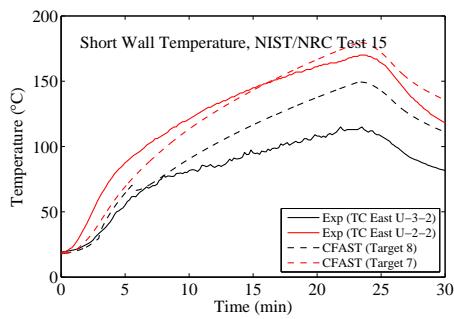




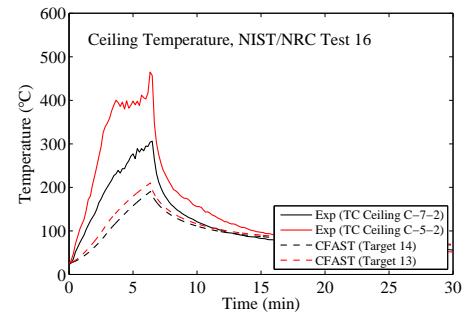
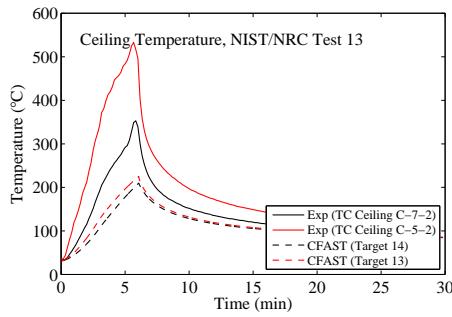
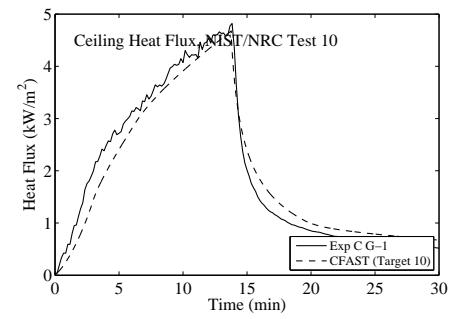
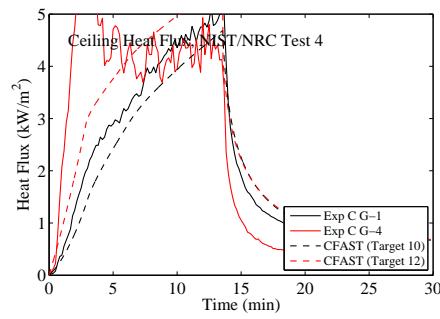
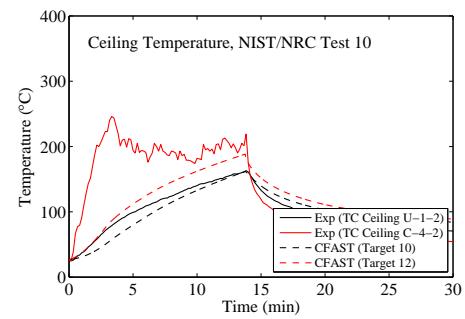
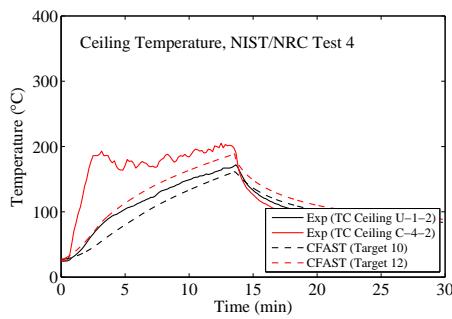


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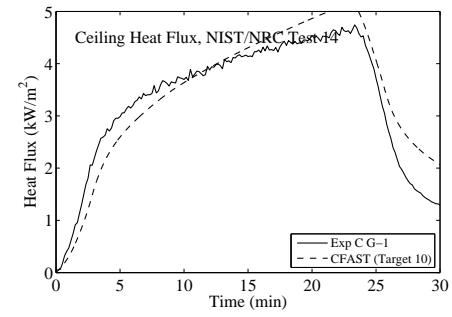
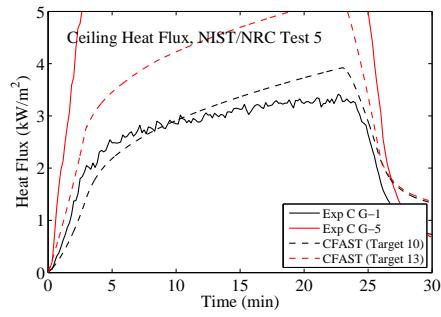
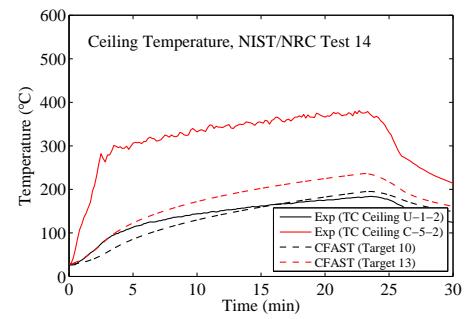
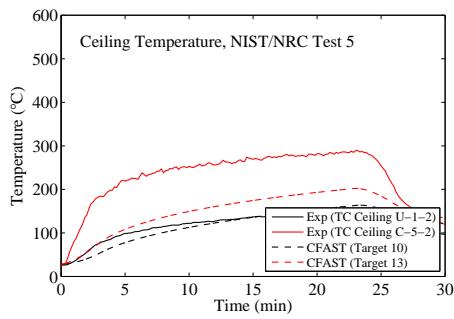
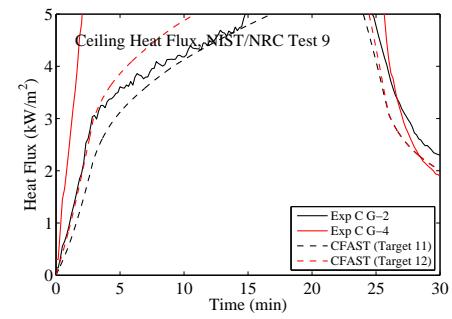
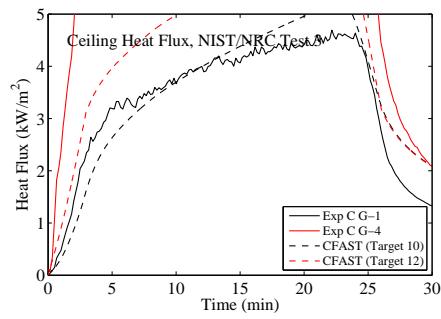
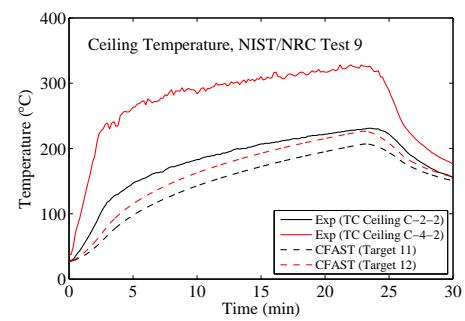
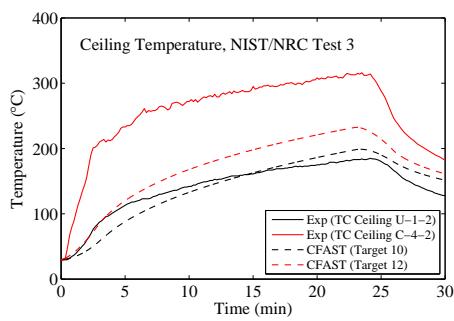


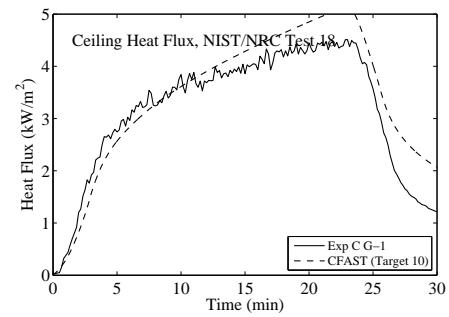
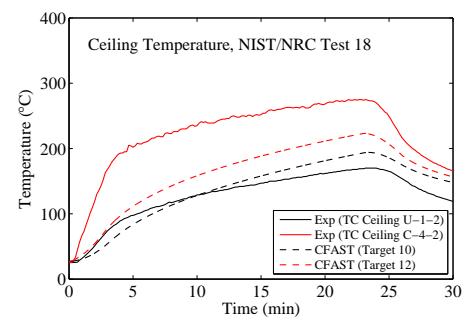
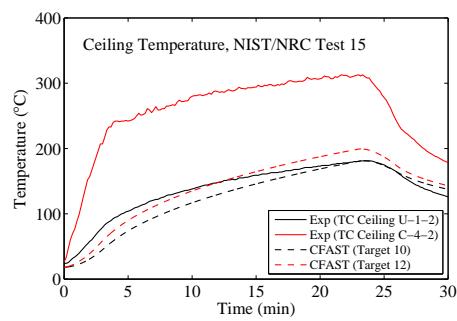


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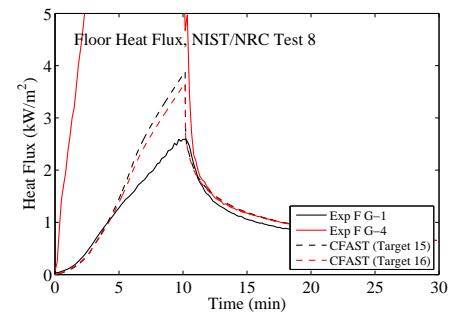
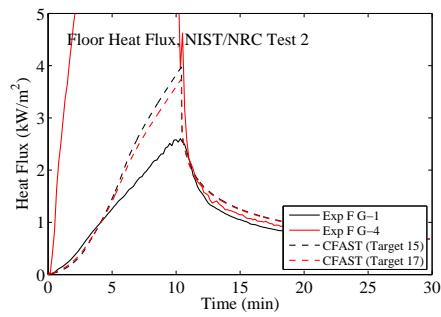
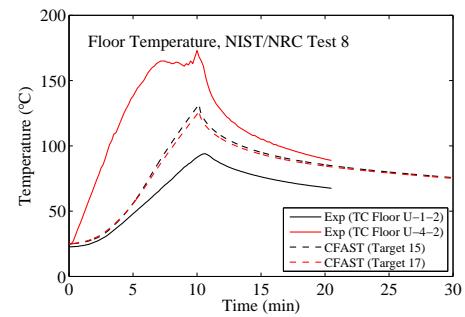
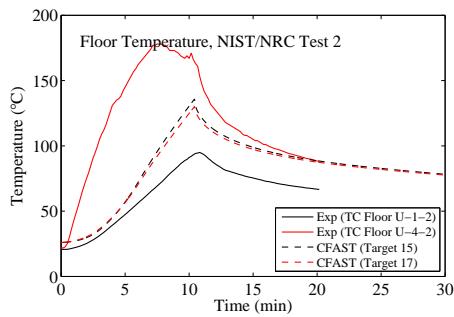
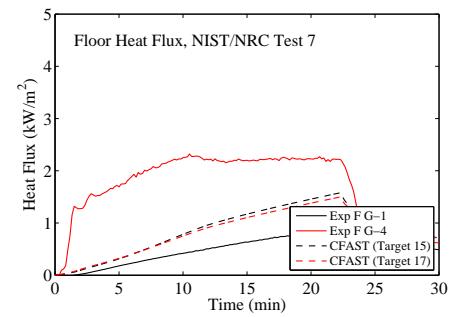
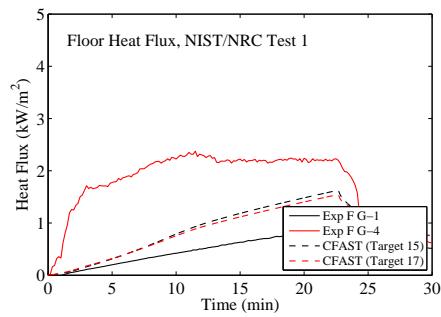
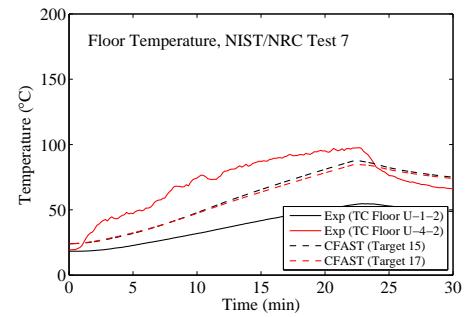
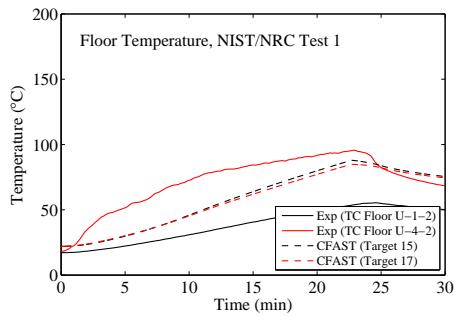


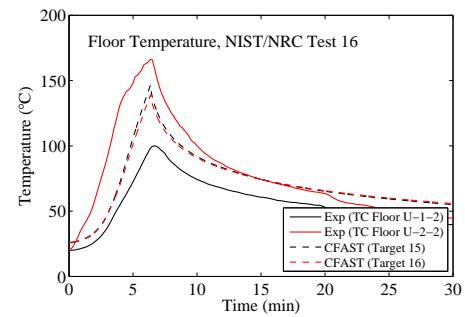
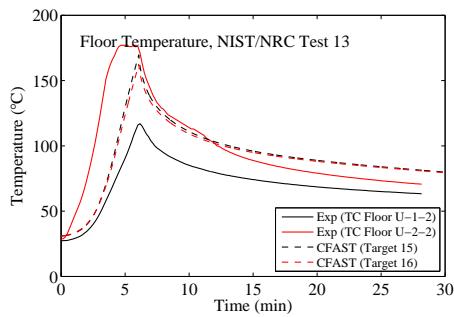
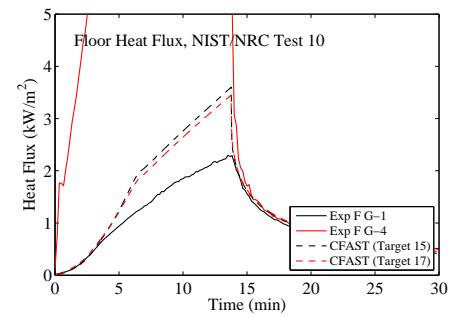
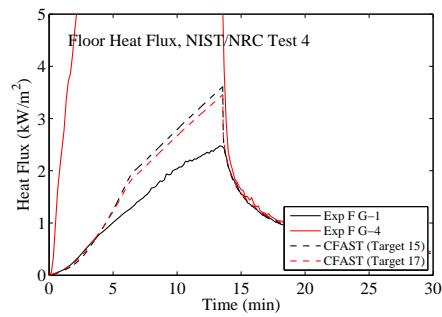
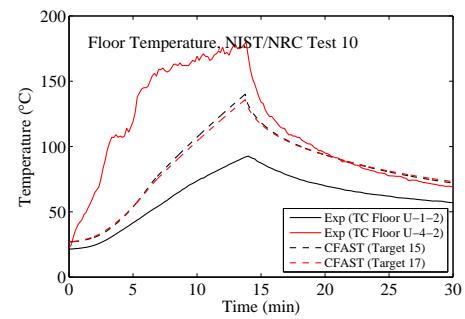
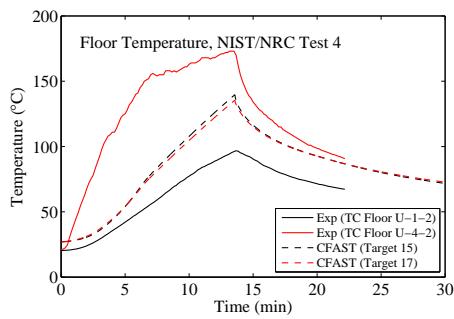
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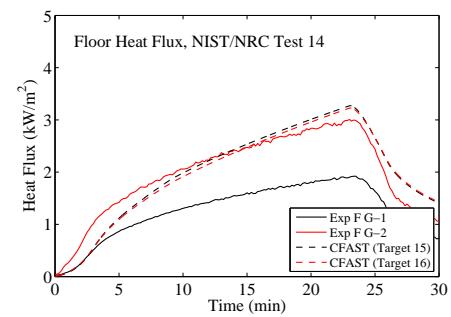
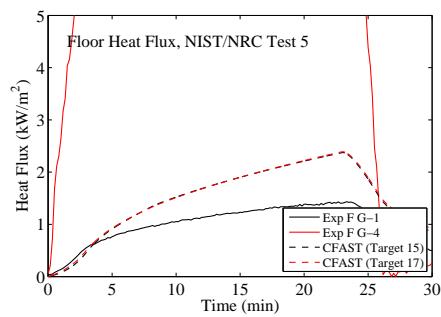
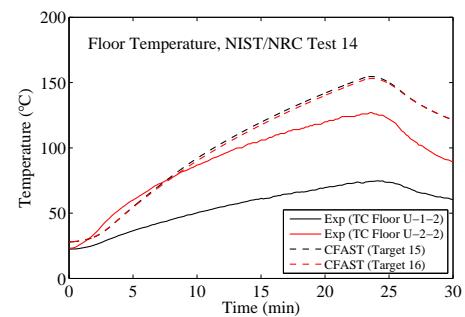
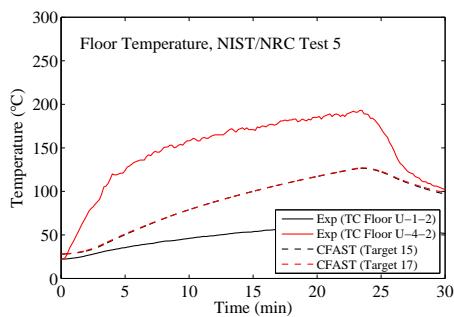
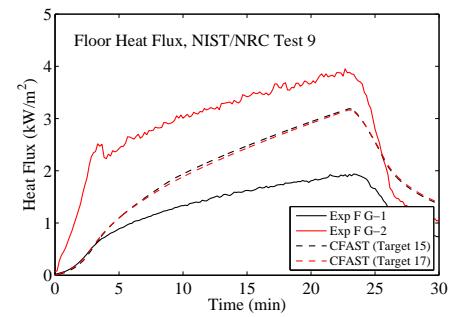
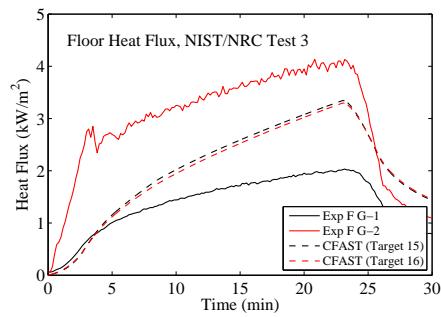
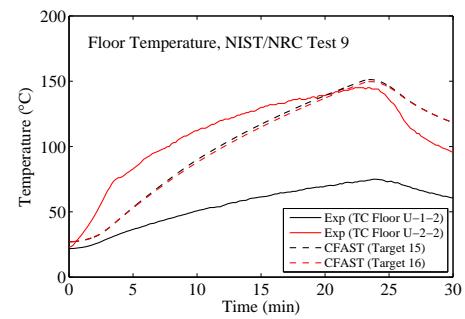
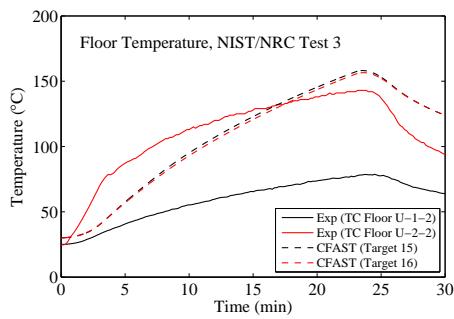


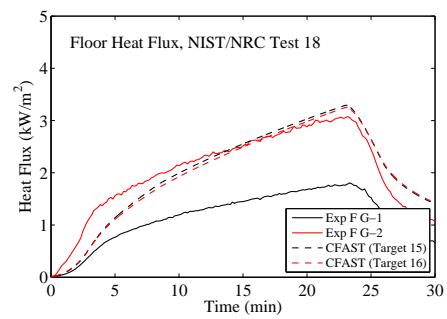
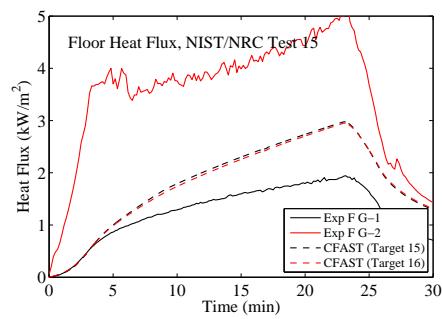
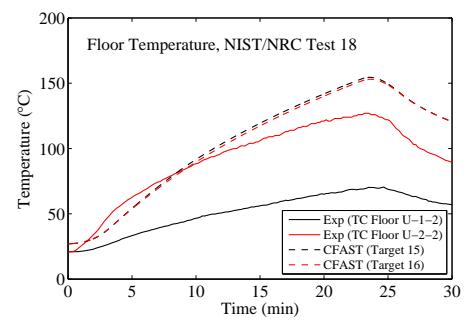
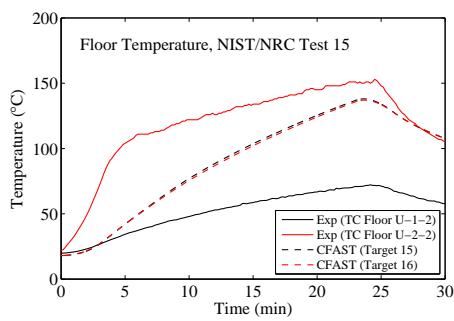
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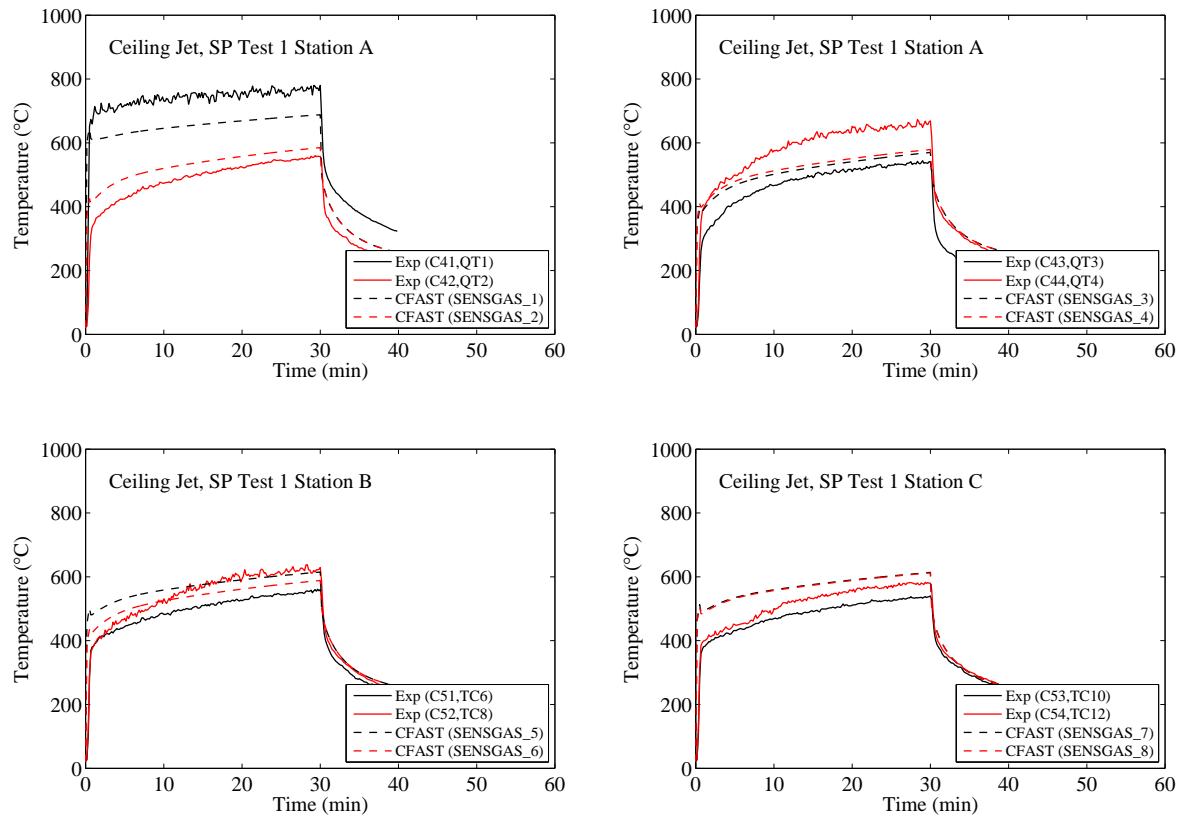


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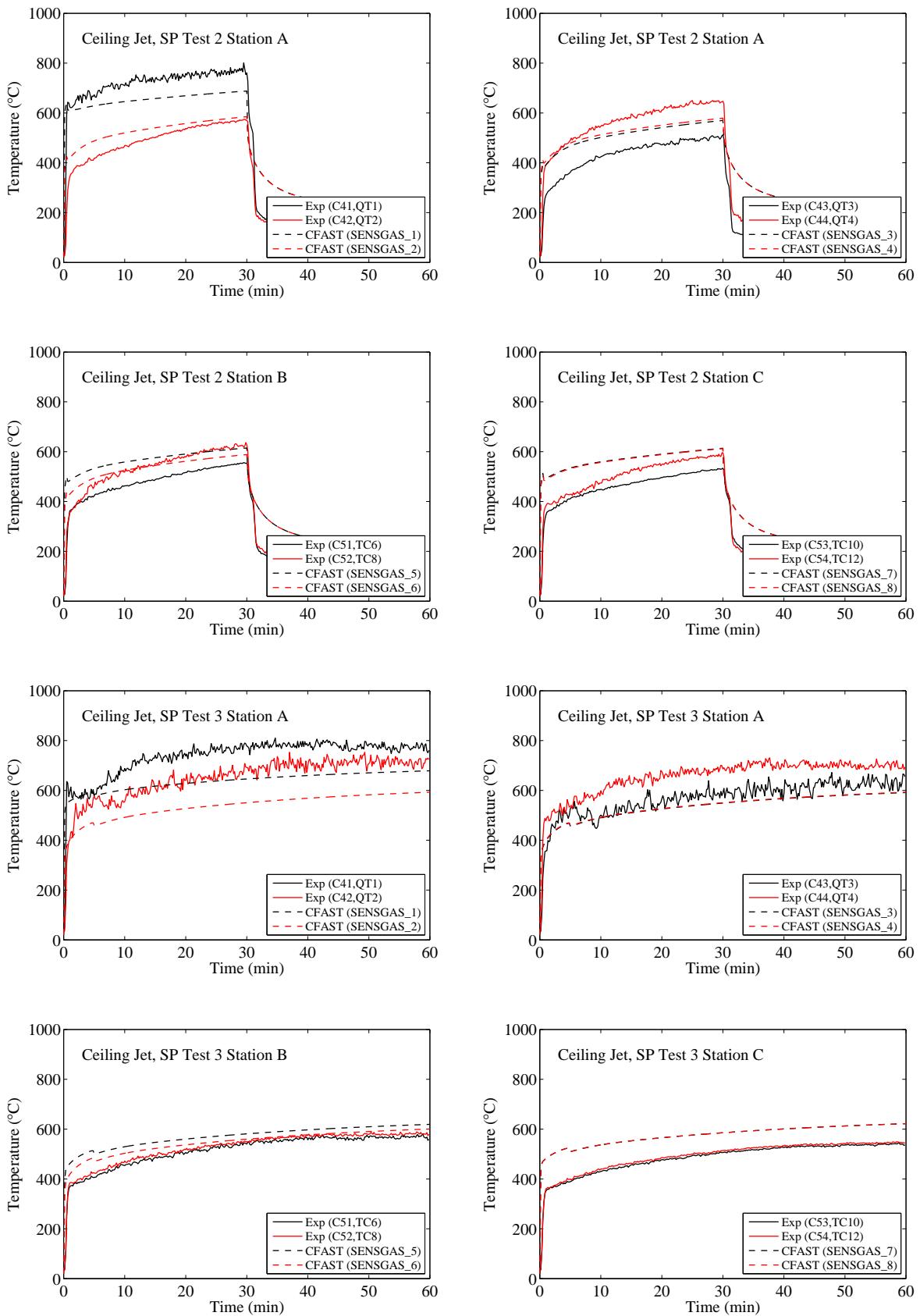




## B.8 SP Adiabatic Surface Temperature Experiments

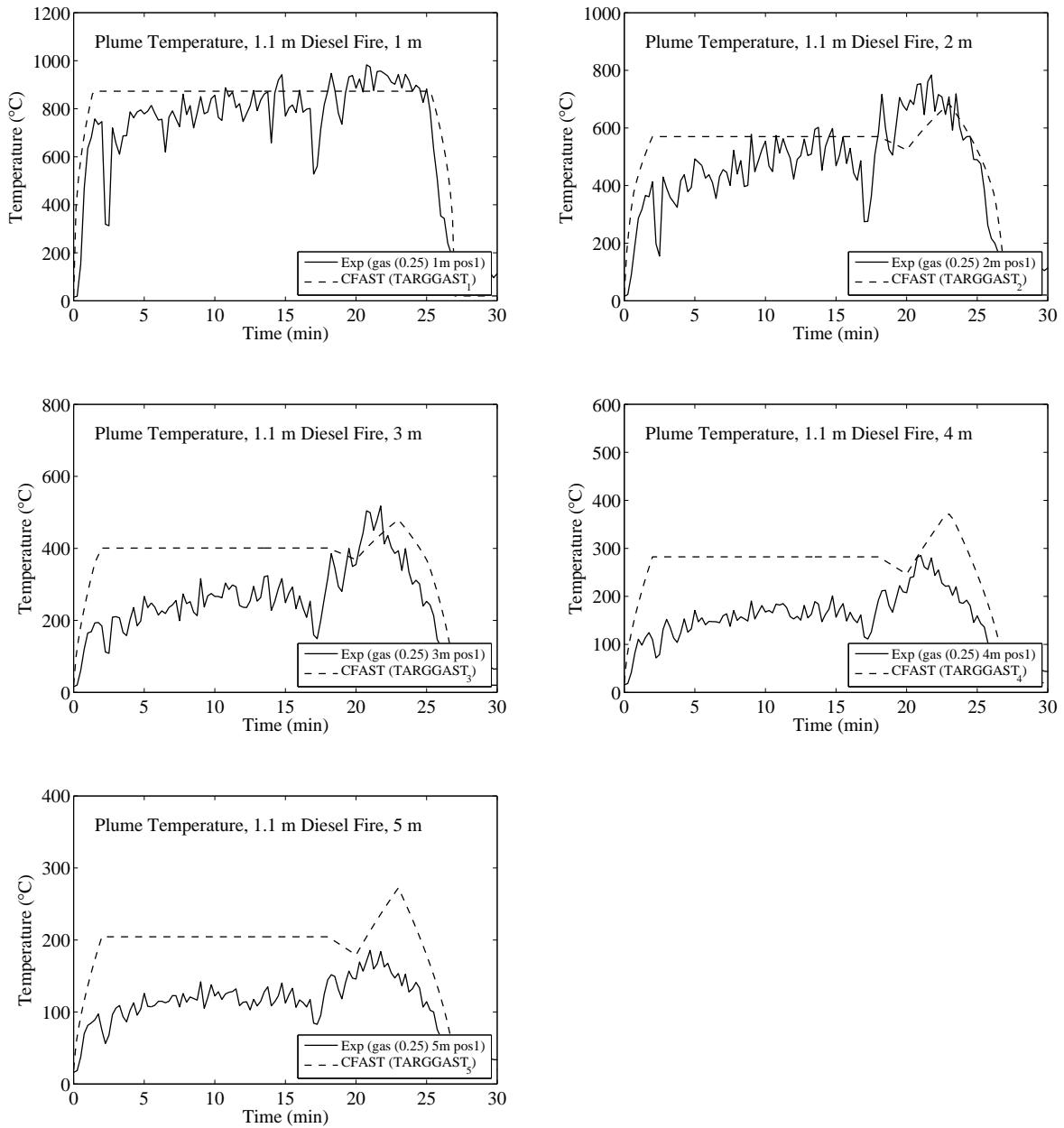


## SP ADIABATIC SURFACE TEMPERATURE EXPERIMENTS



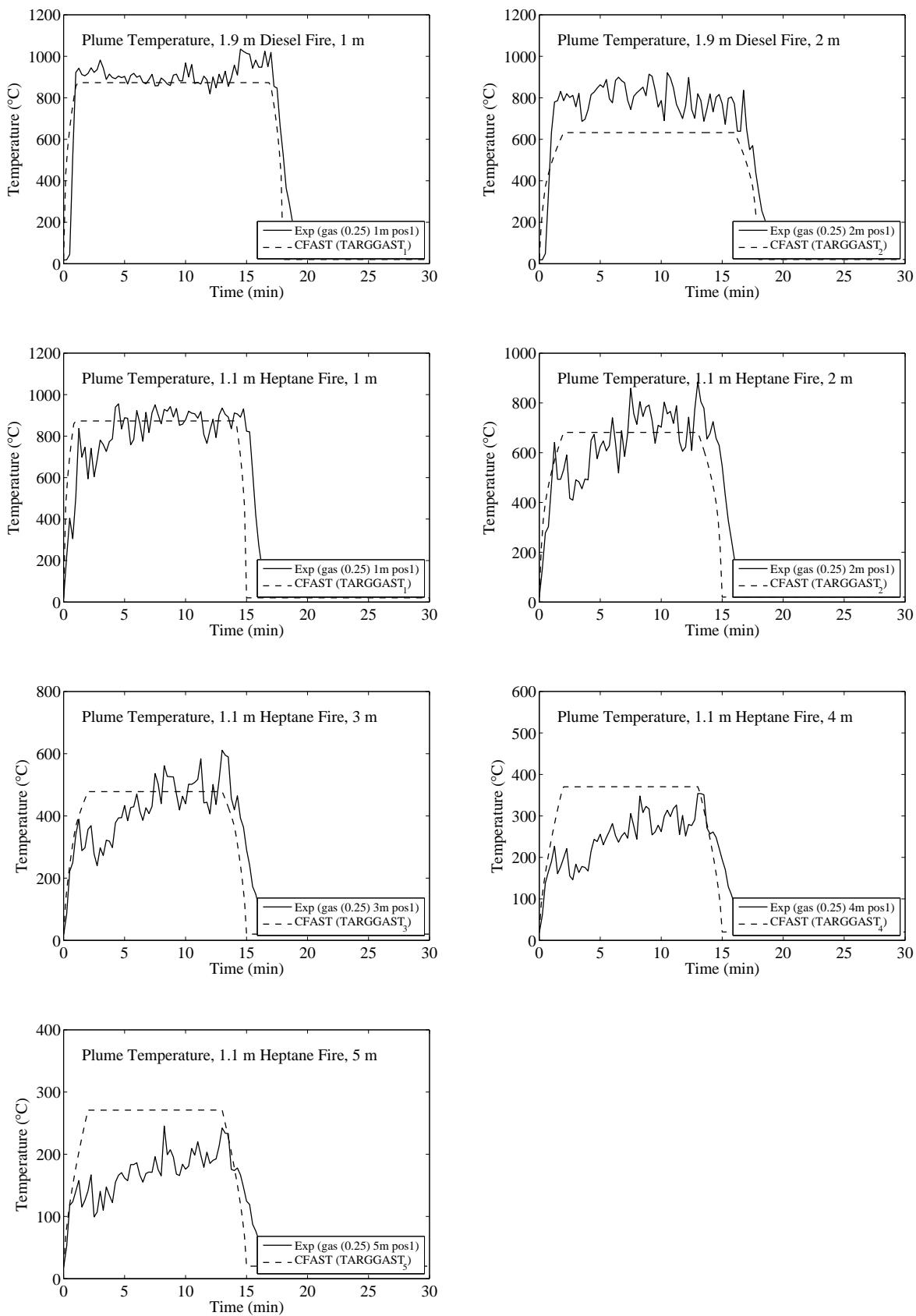
## SP ADIABATIC SURFACE TEMPERATURE EXPERIMENTS

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## SP ADIABATIC SURFACE TEMPERATURE EXPERIMENTS

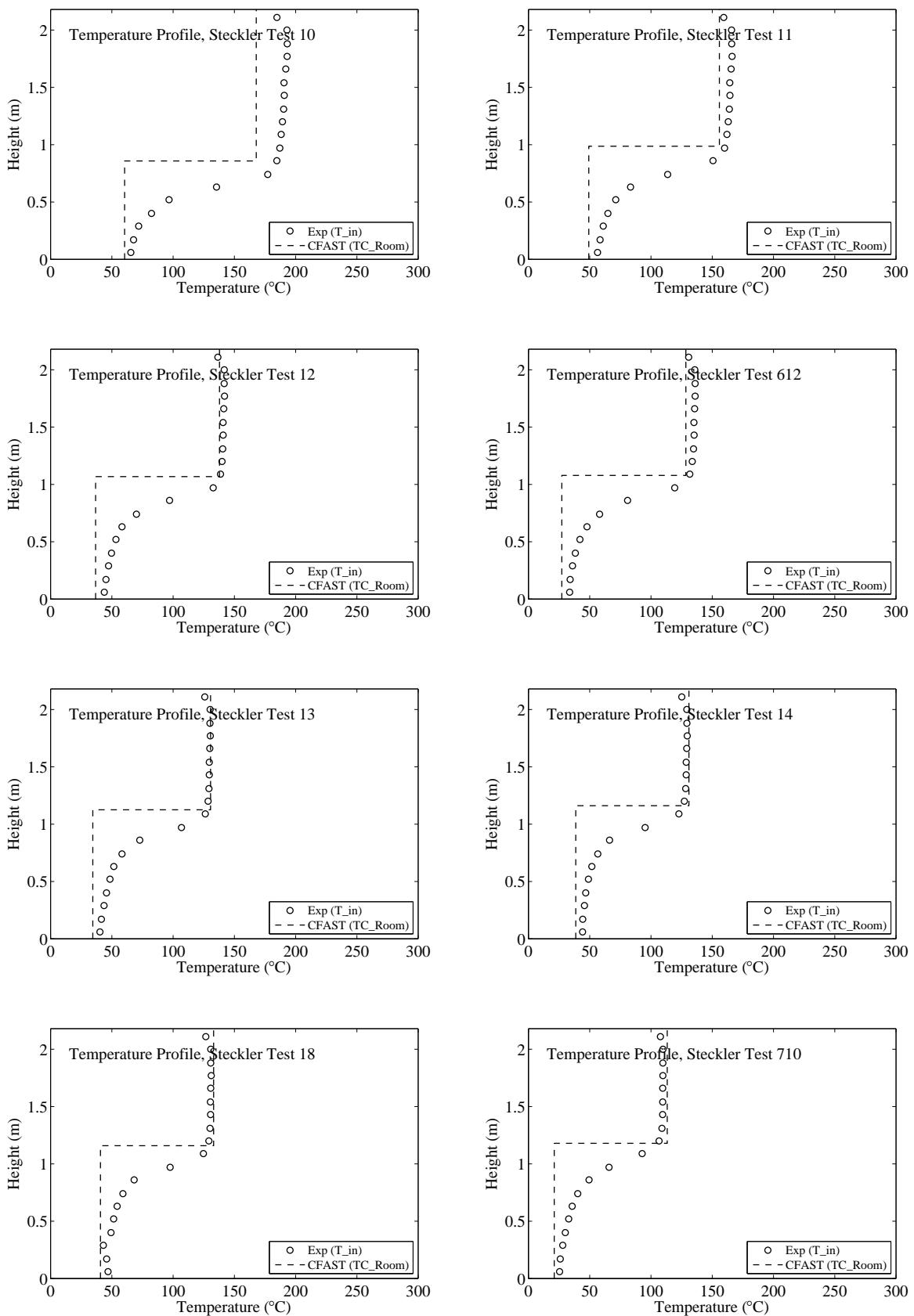
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## B.9 Steckler Compartment Experiments

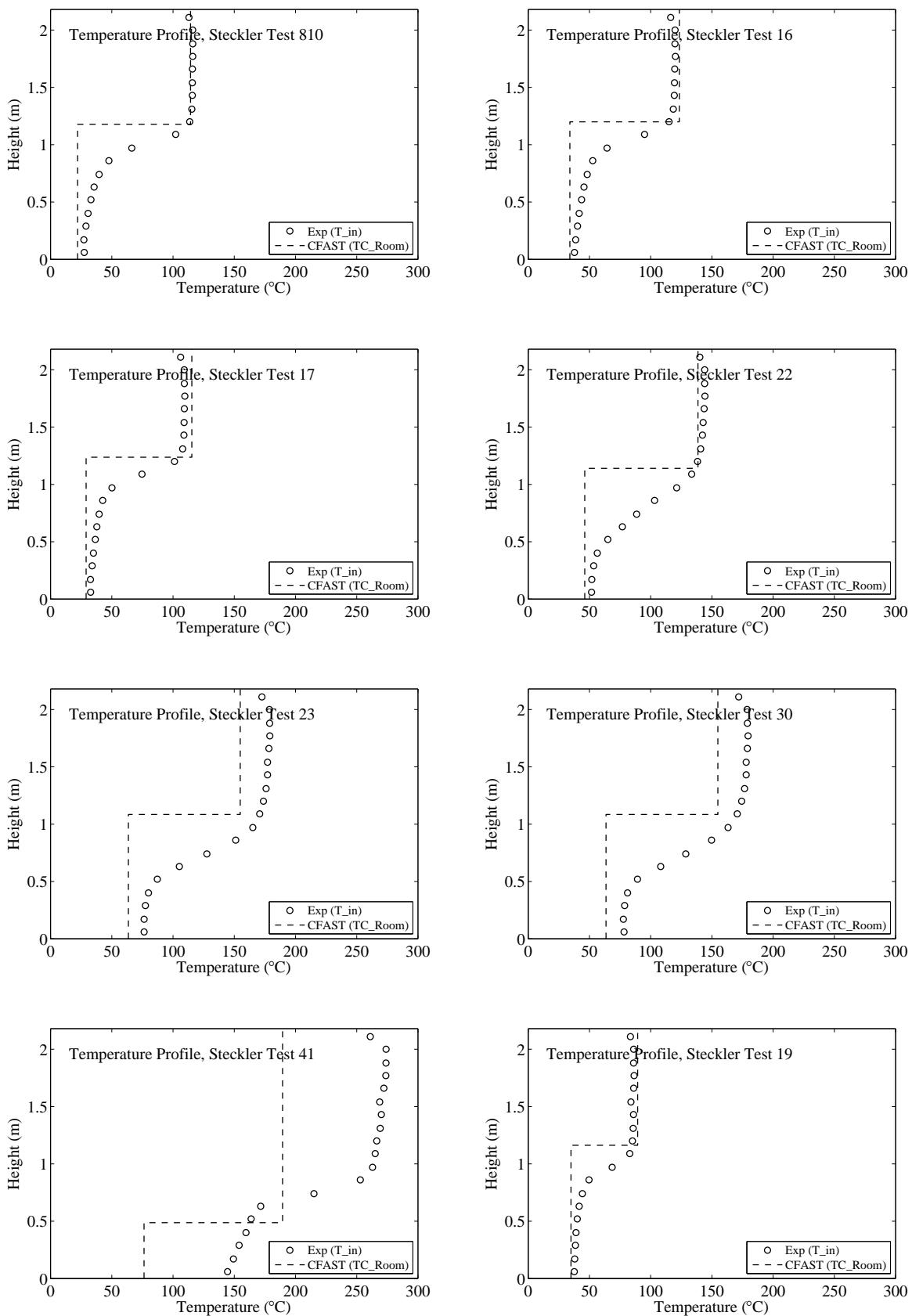
## STECKLER COMPARTMENT EXPERIMENTS

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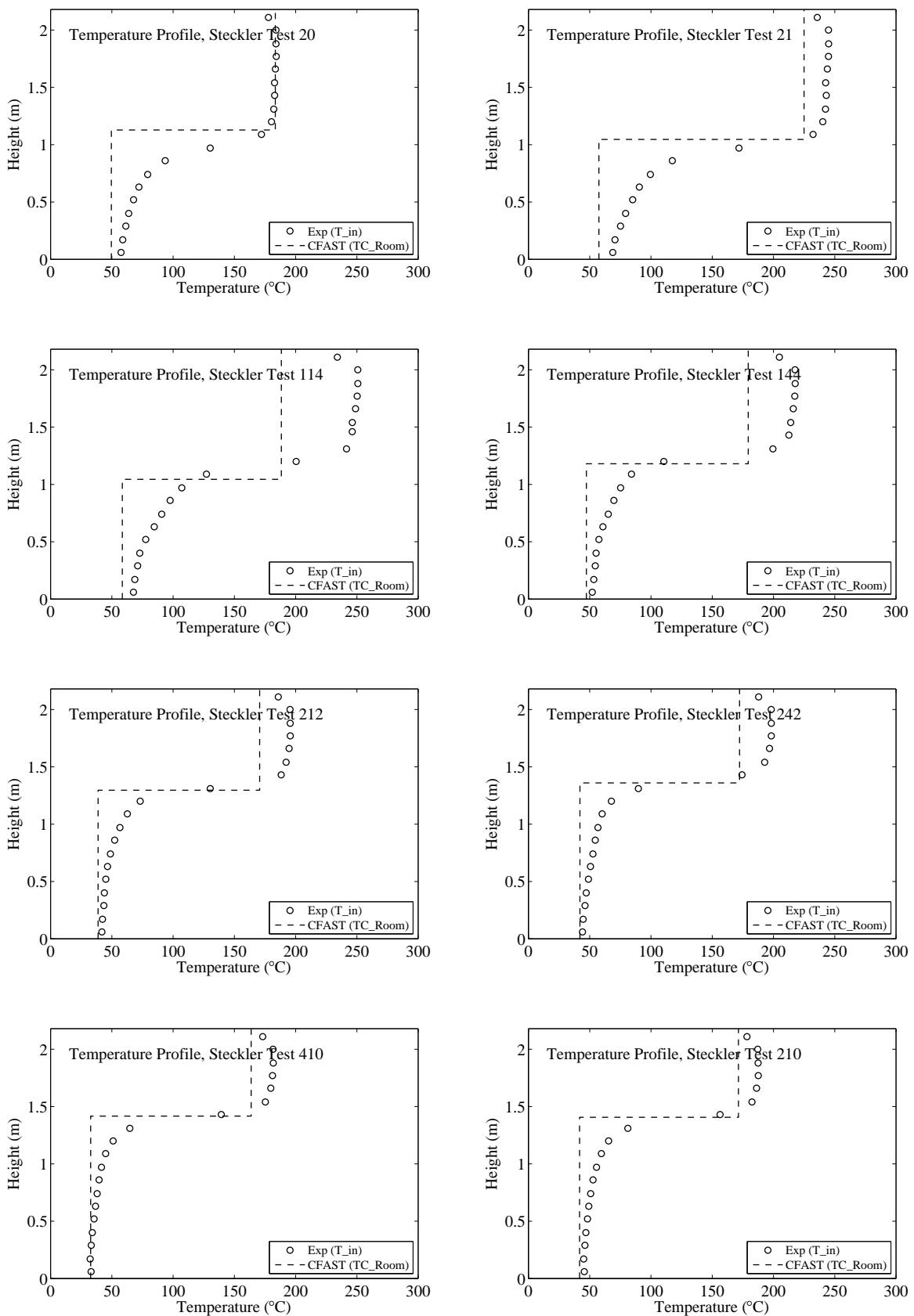
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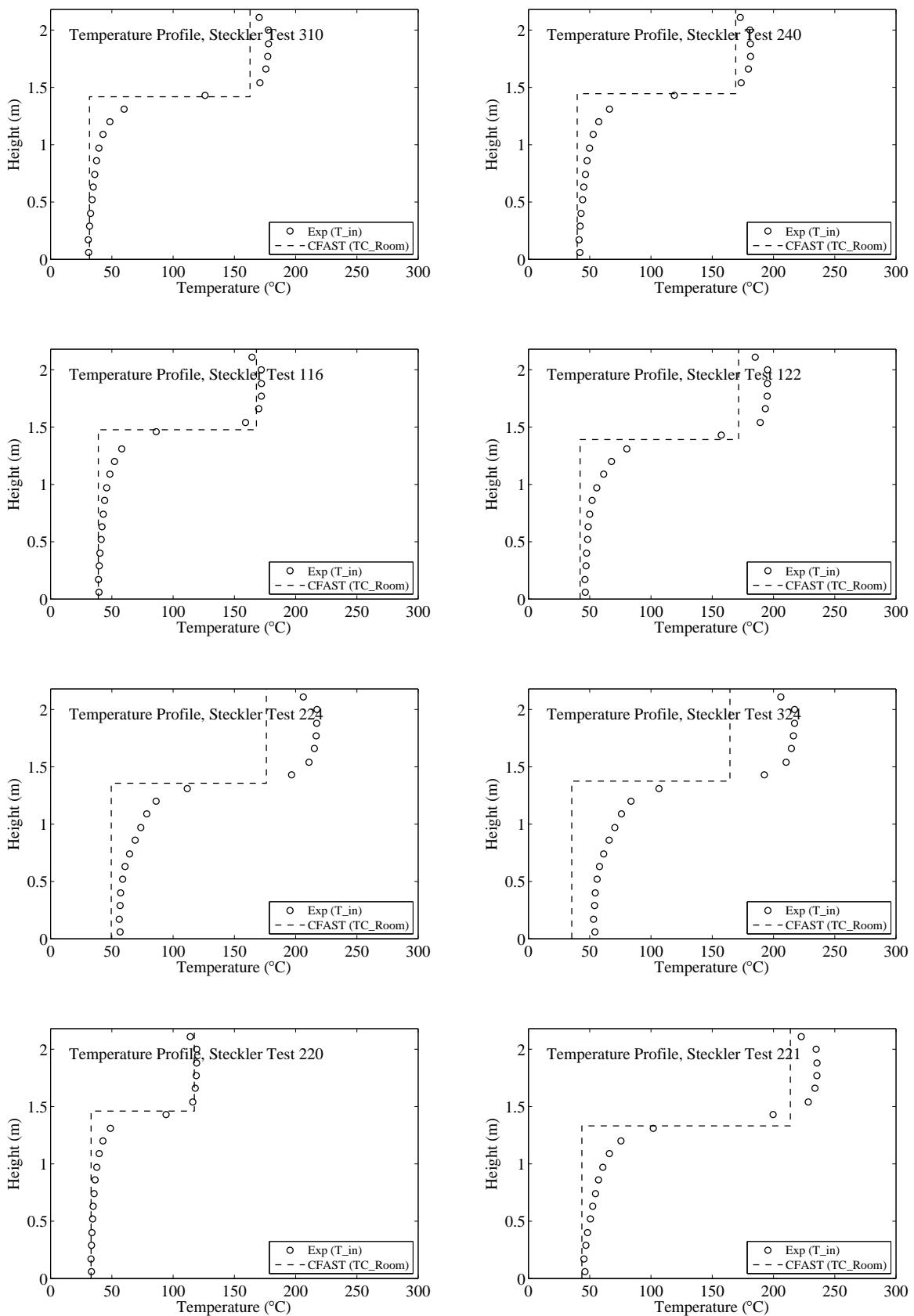
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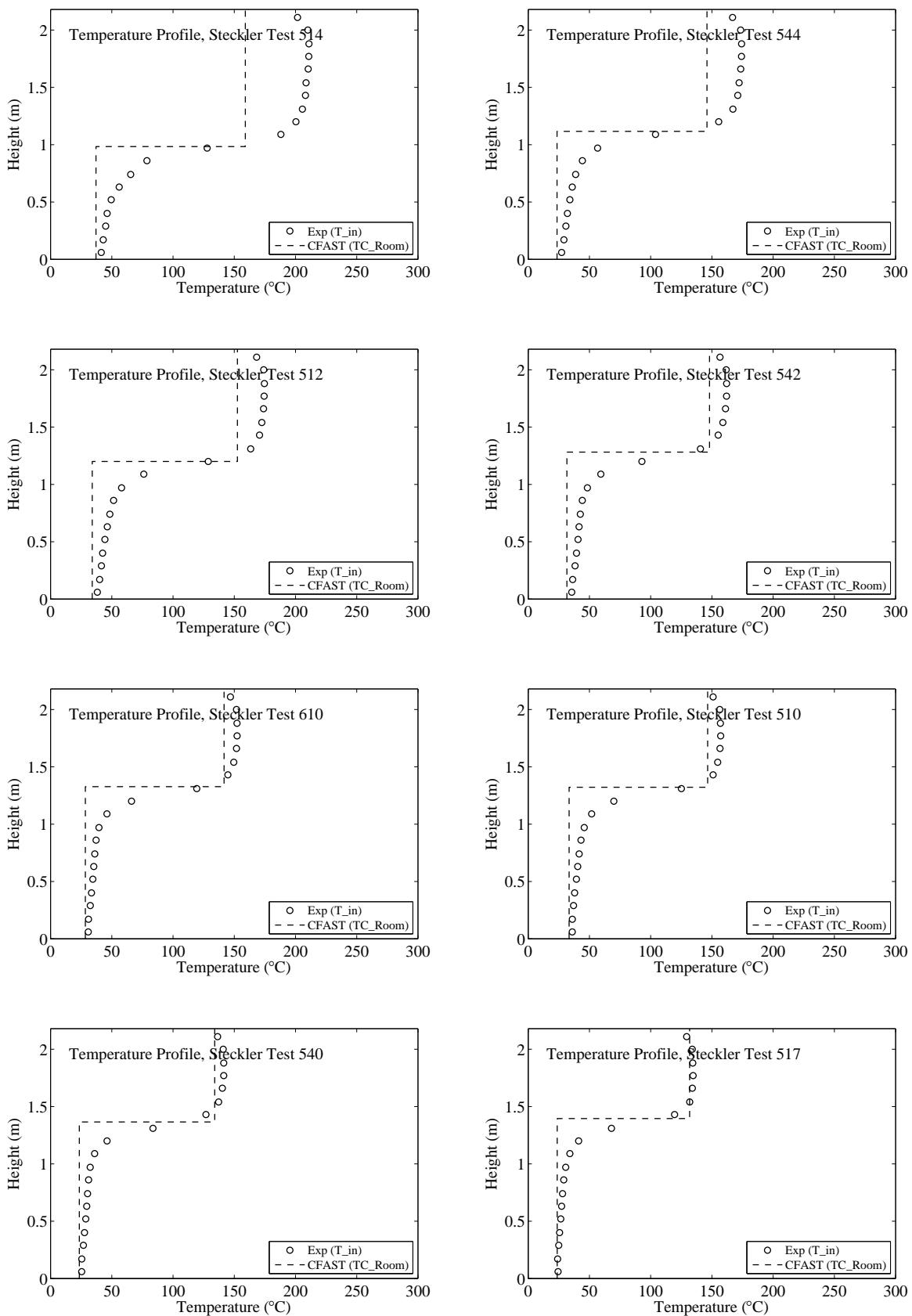
## STECKLER COMPARTMENT EXPERIMENTS

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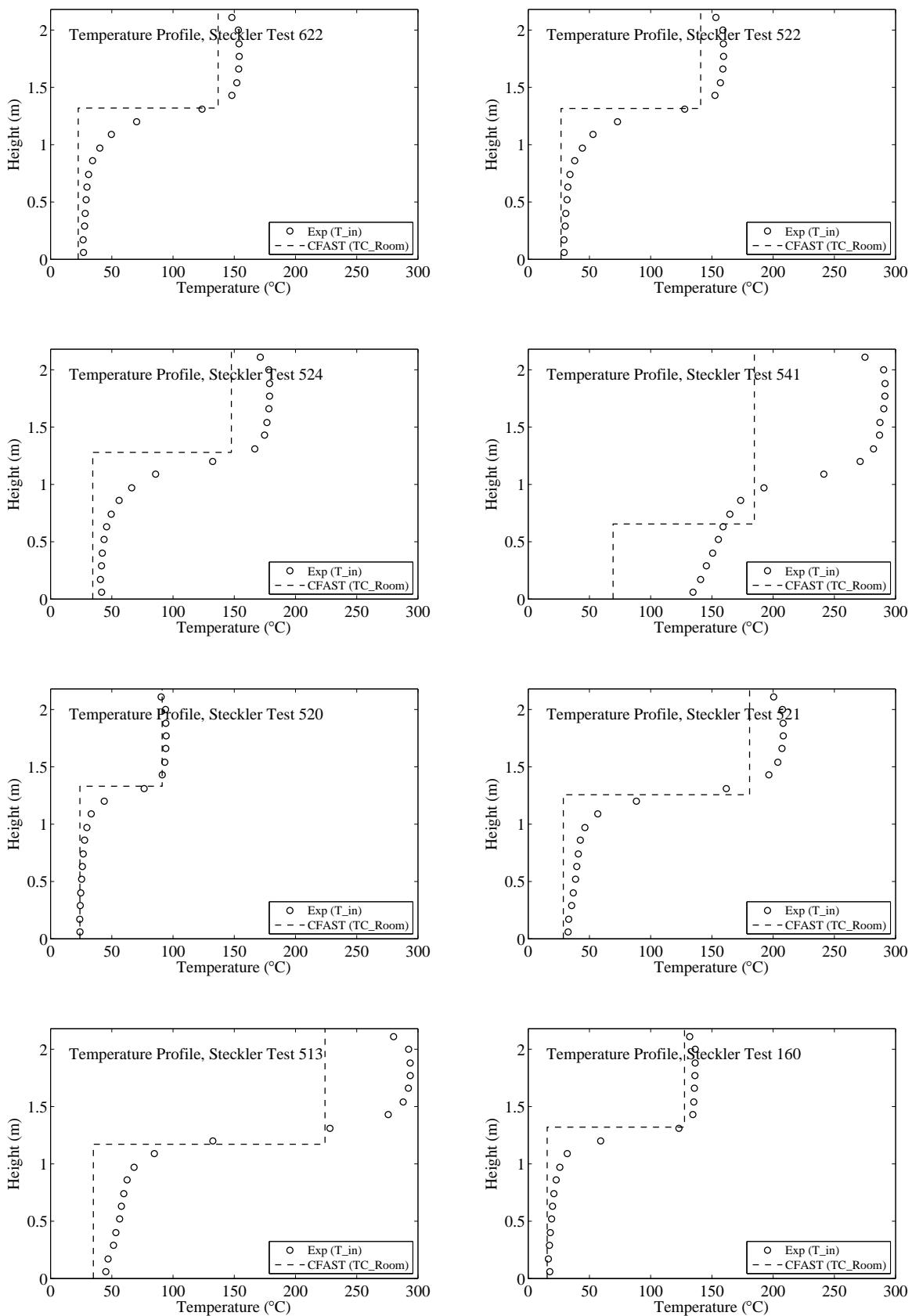
## STECKLER COMPARTMENT EXPERIMENTS

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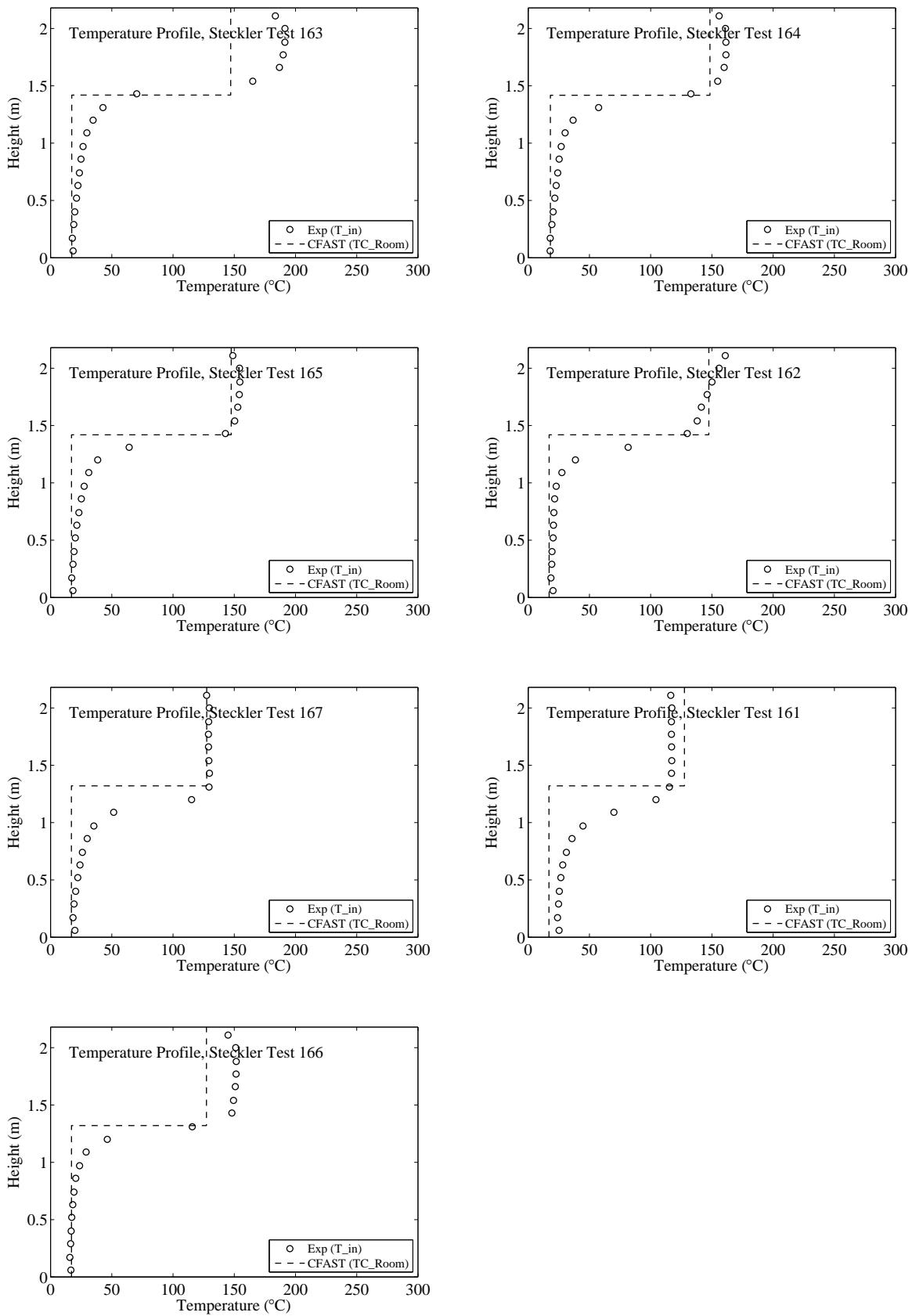
## STECKLER COMPARTMENT EXPERIMENTS

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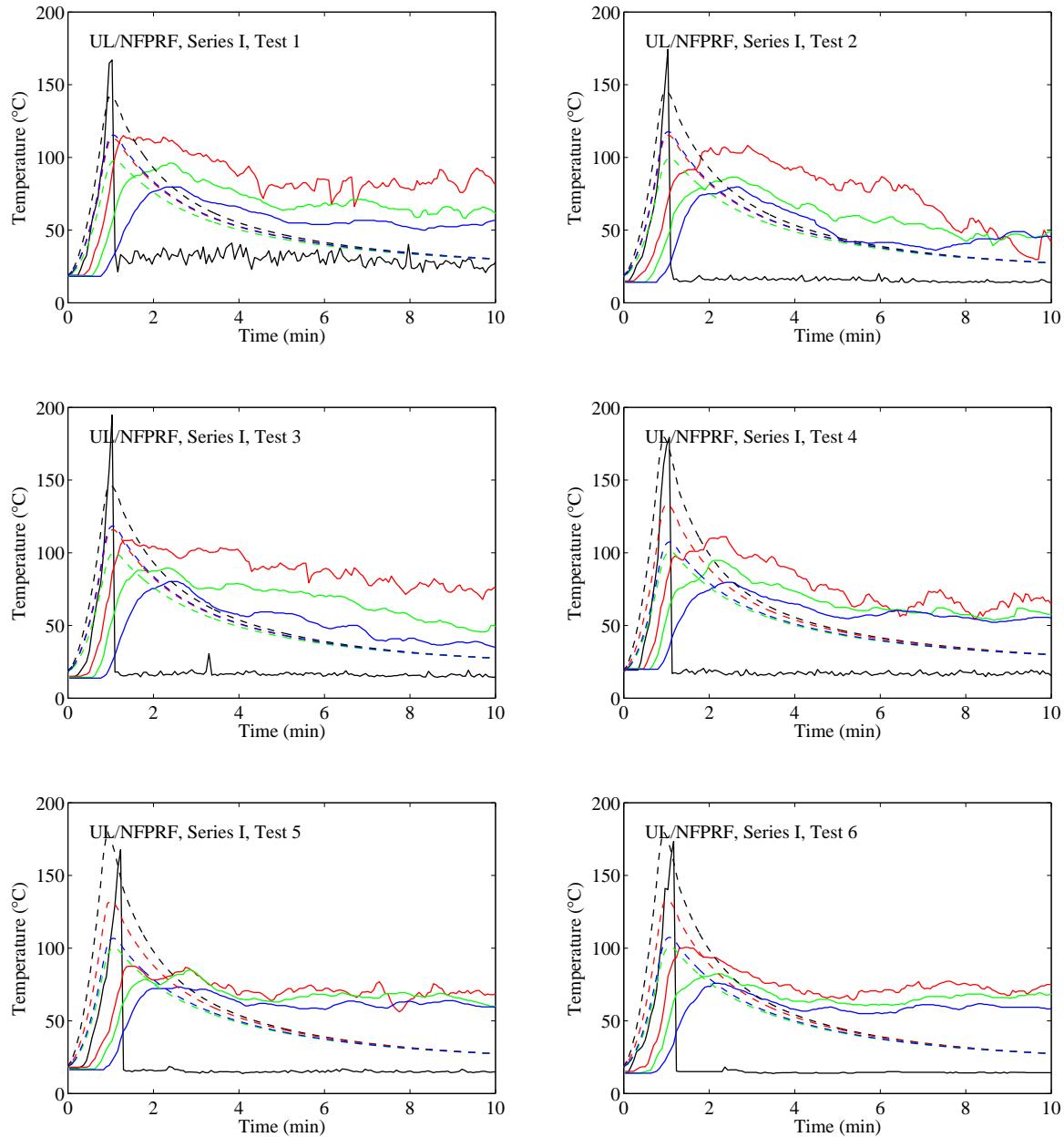


## STECKLER COMPARTMENT EXPERIMENTS

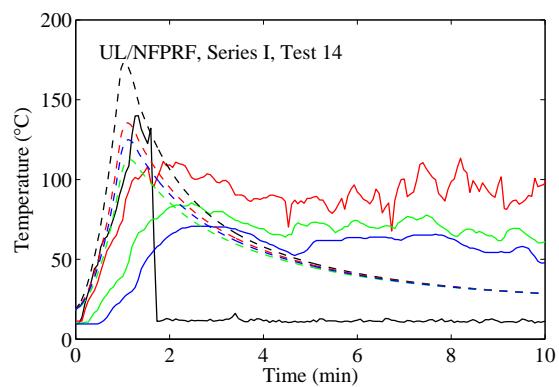
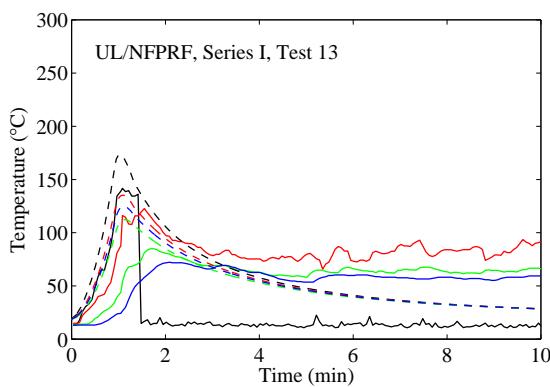
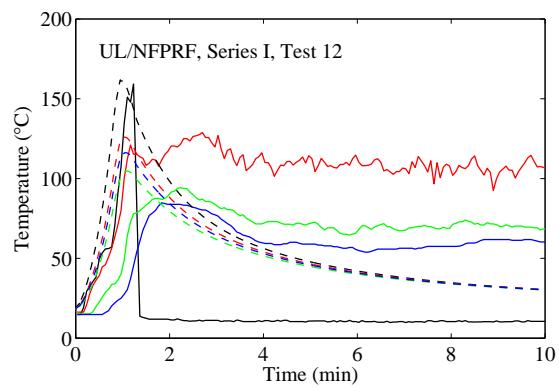
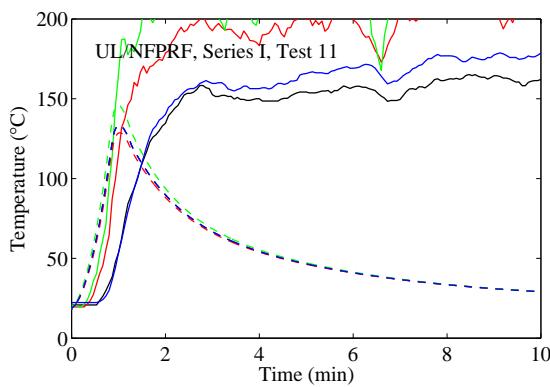
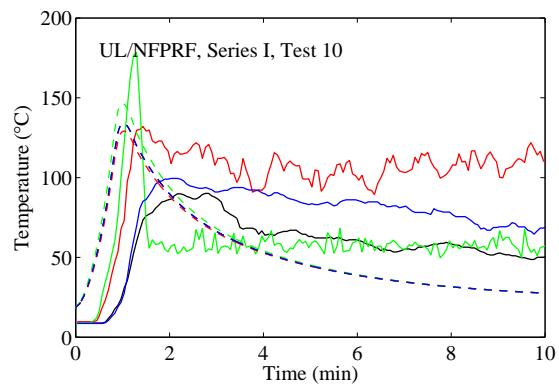
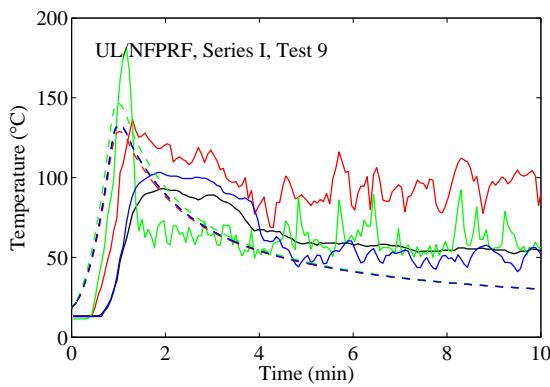
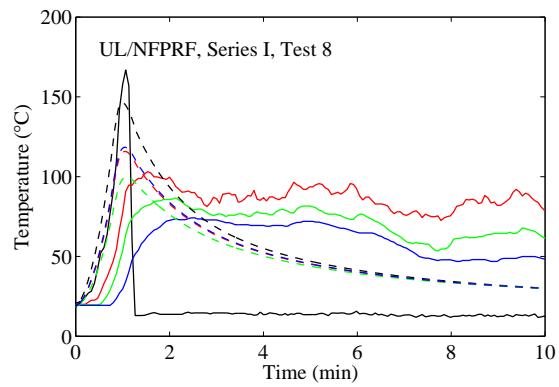
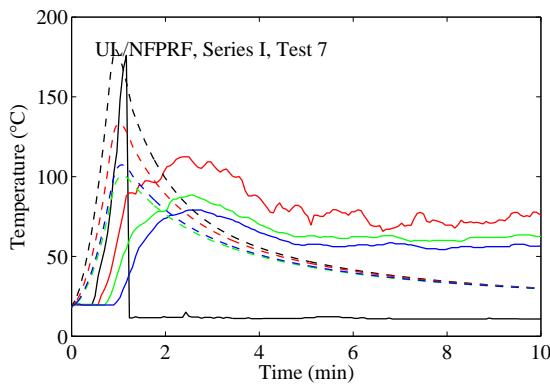
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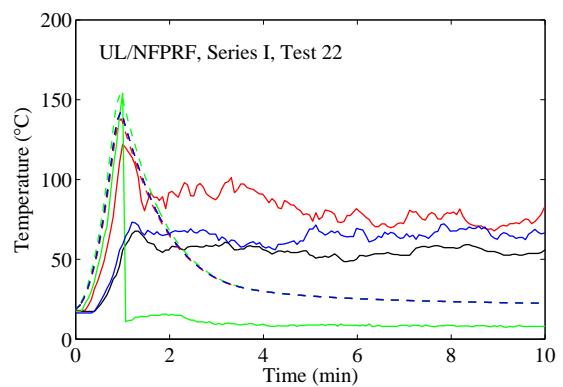
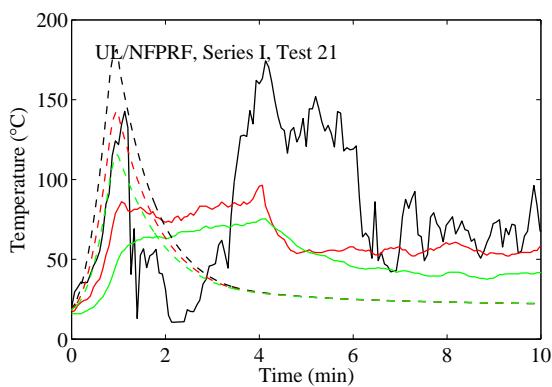
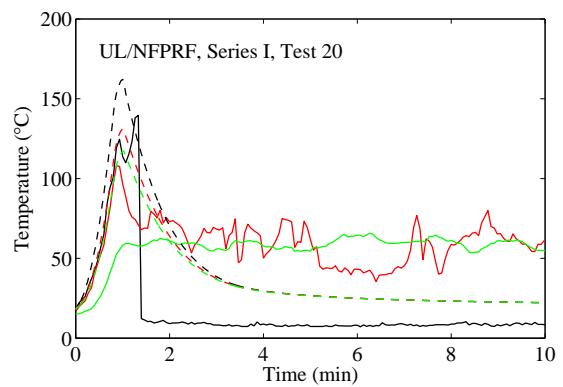
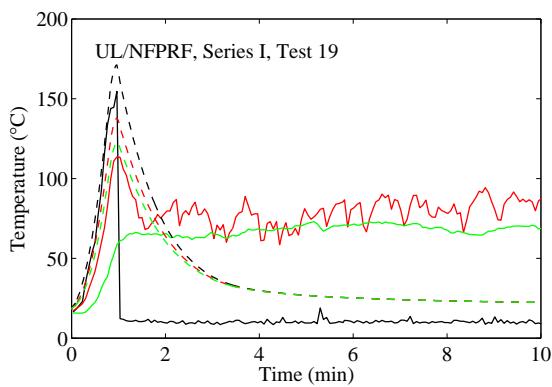
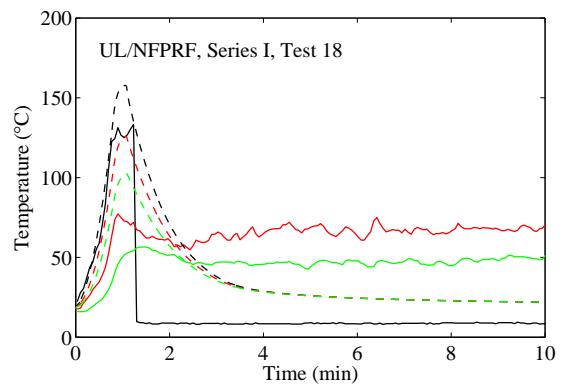
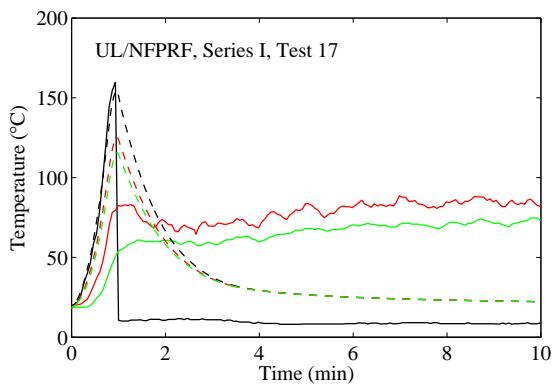
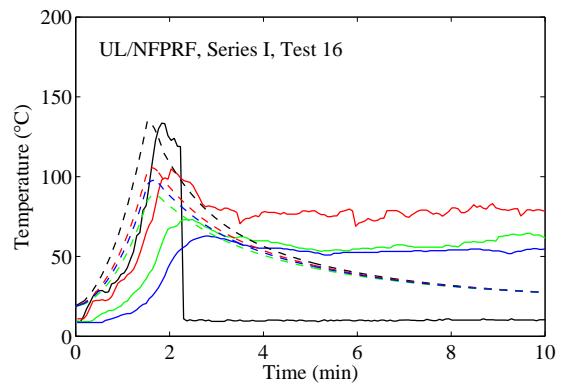
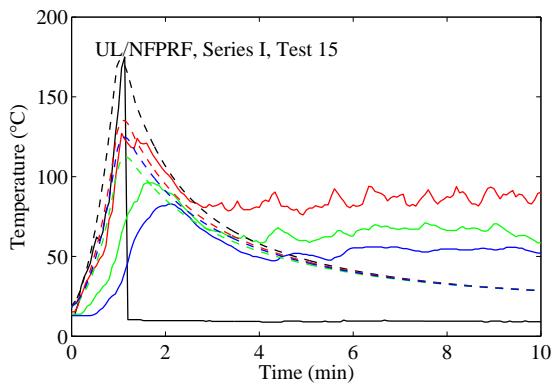
## B.10 UL/NFPRF Series I Experiments



## UL/NFPRF SERIES I EXPERIMENTS

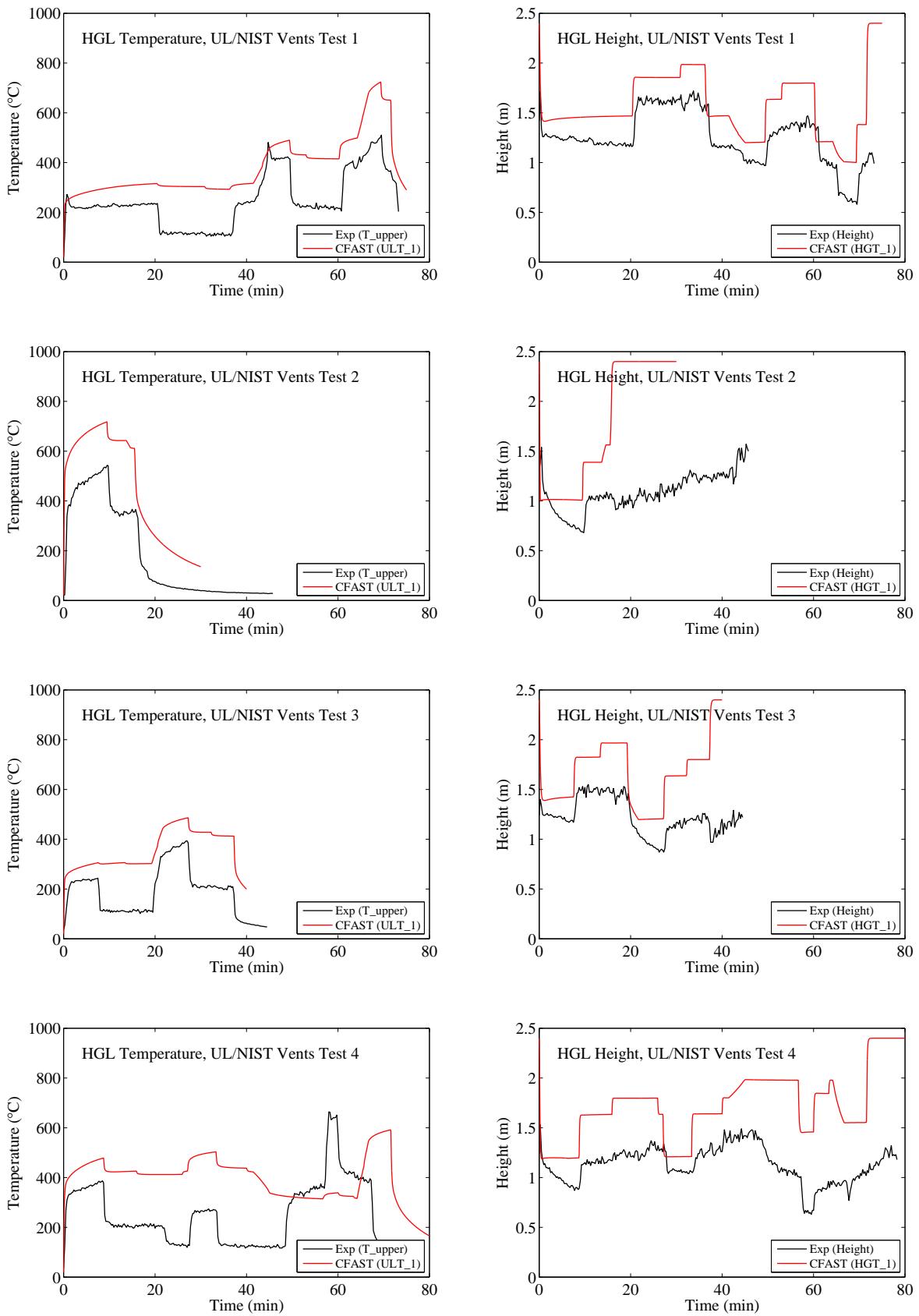


## UL/NFPRF SERIES I EXPERIMENTS

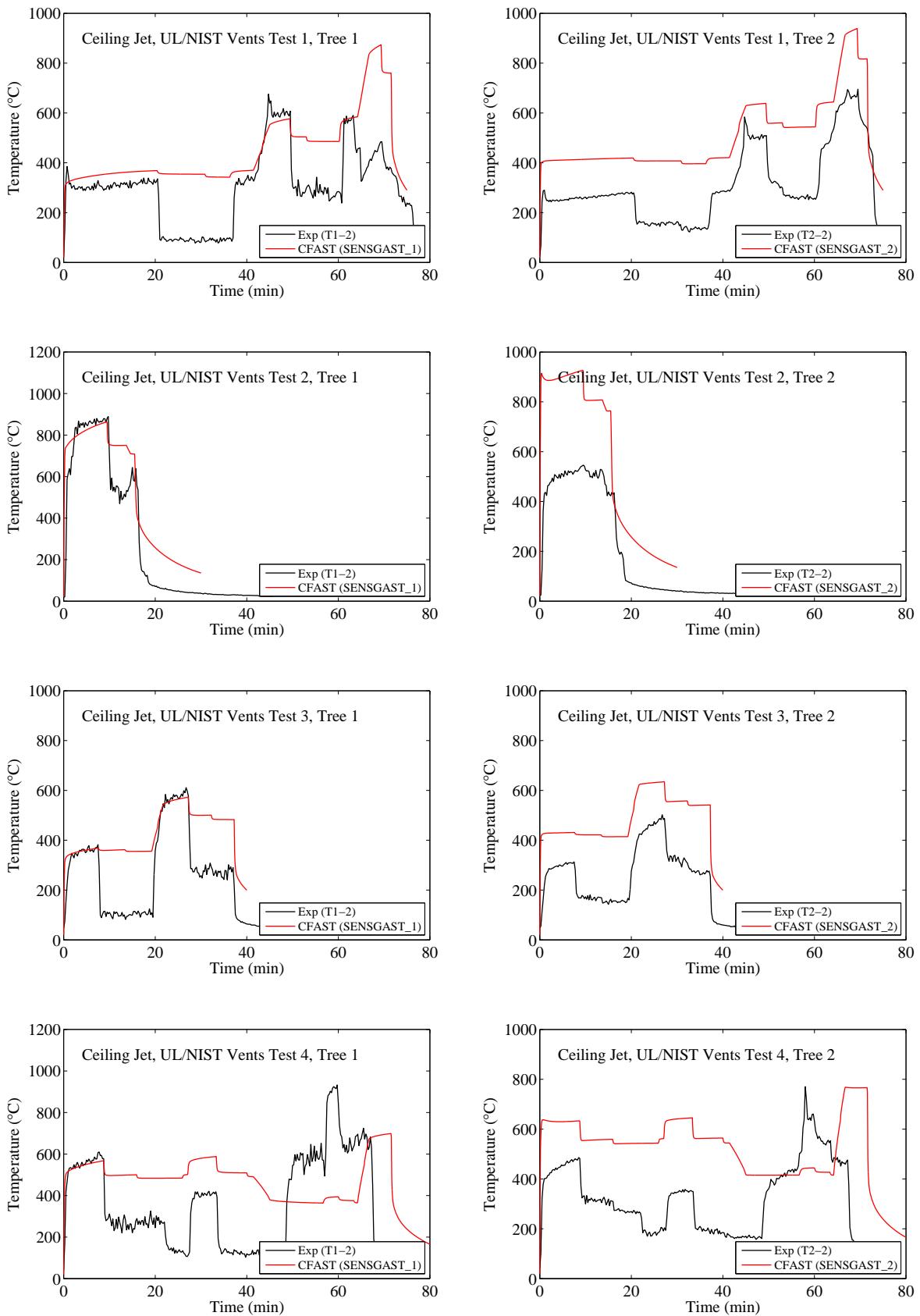


## B.11 UL/NIST Vent Experiments

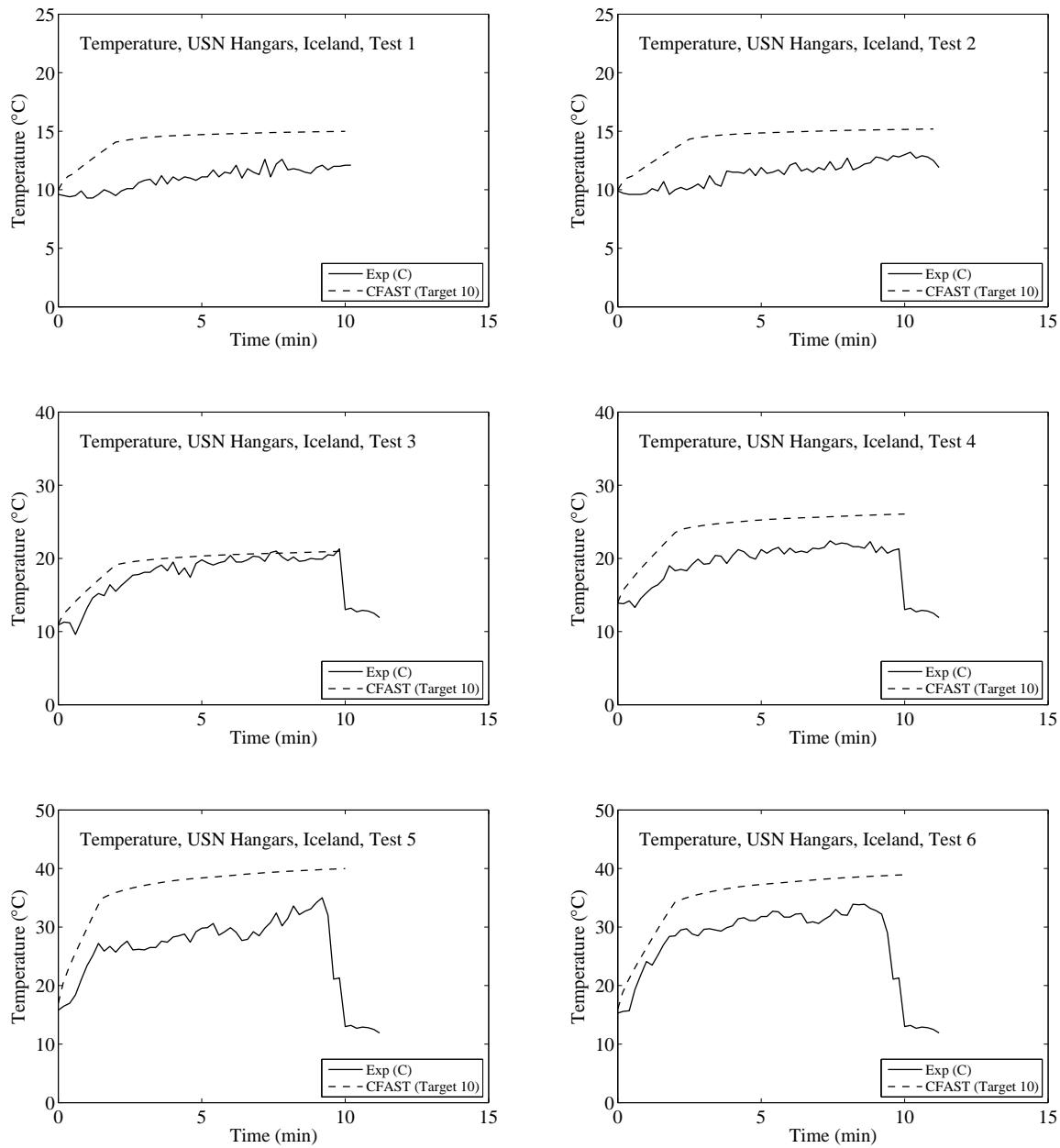
## UL/NIST VENT EXPERIMENTS



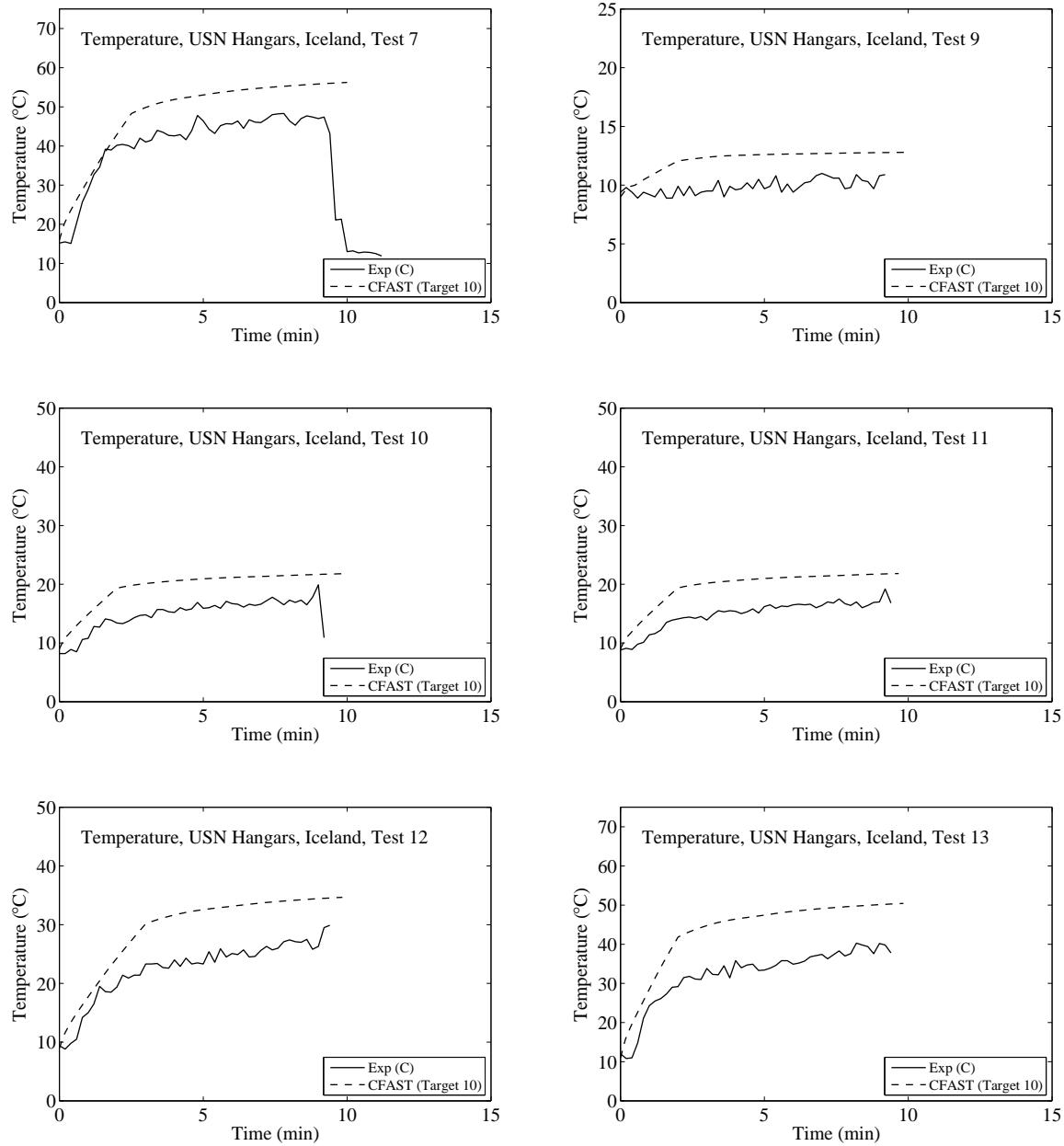
## UL/NIST VENT EXPERIMENTS



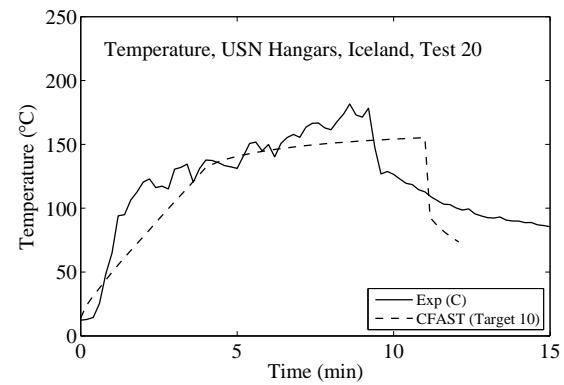
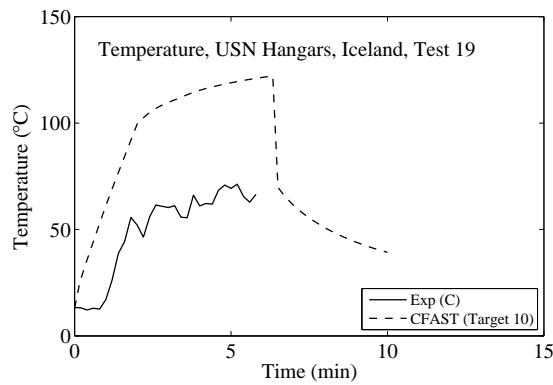
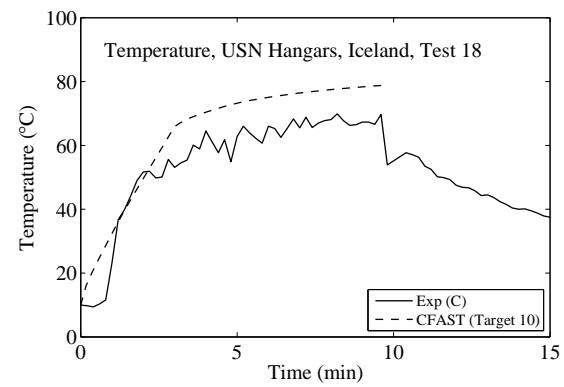
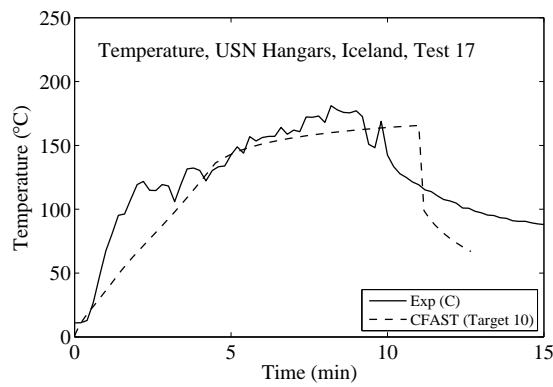
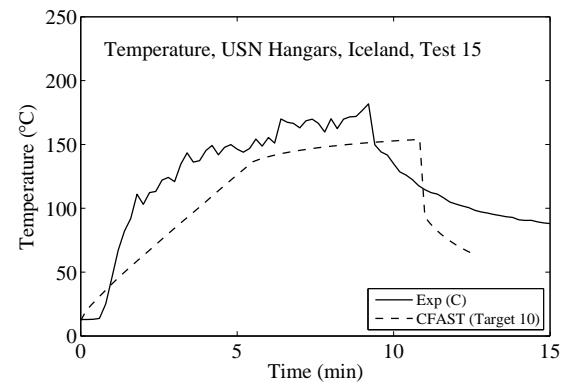
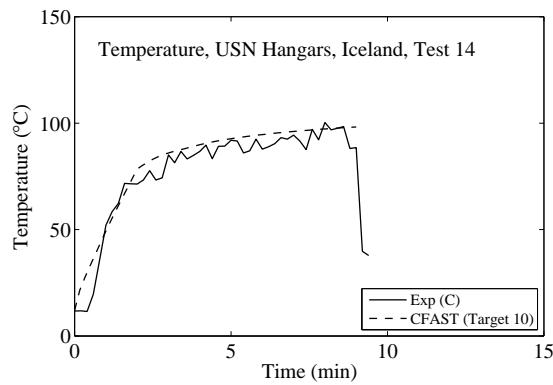
## B.12 USN High Bay Hangar Experiments



## USN HIGH BAY HANGAR EXPERIMENTS

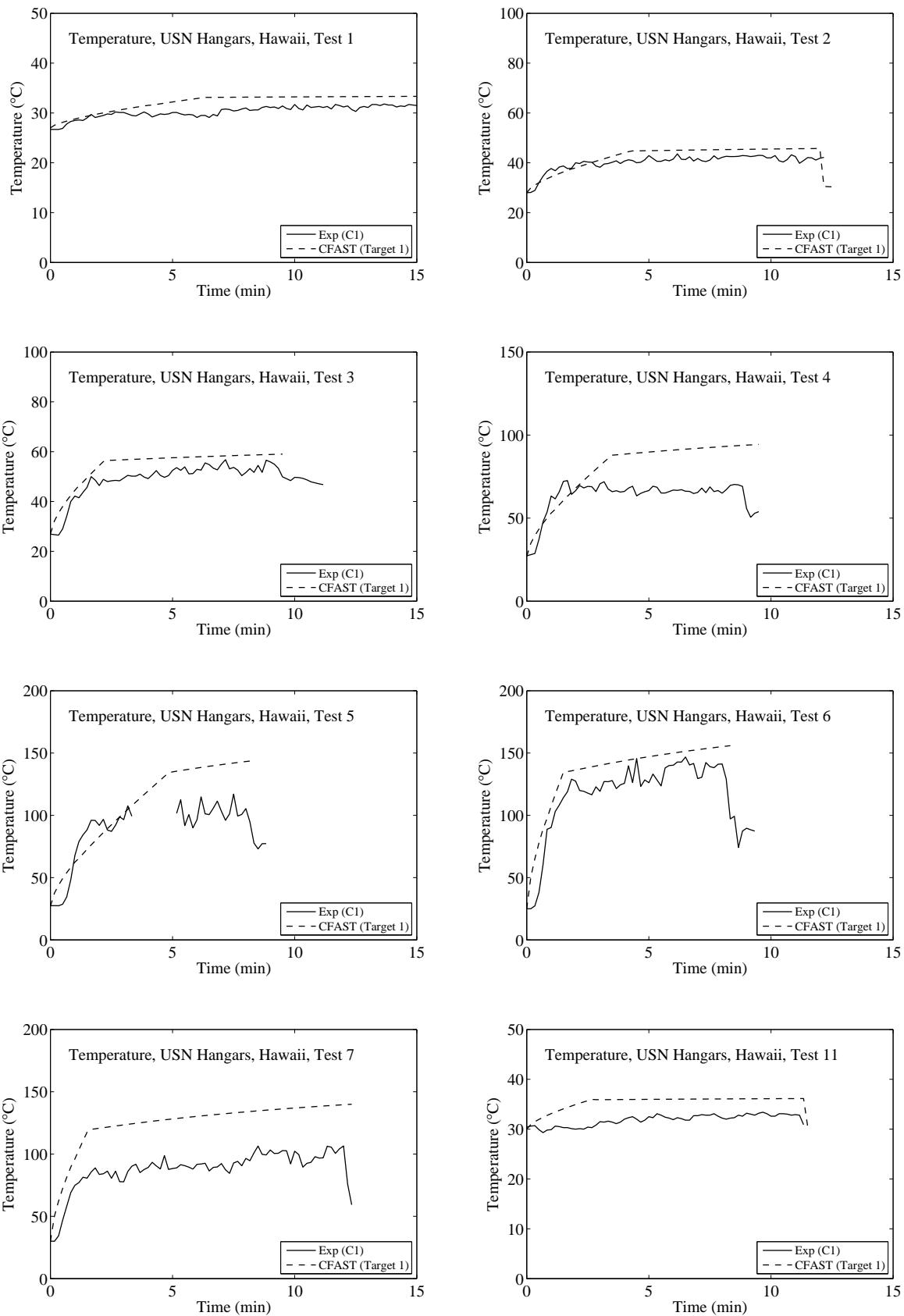


## USN HIGH BAY HANGAR EXPERIMENTS



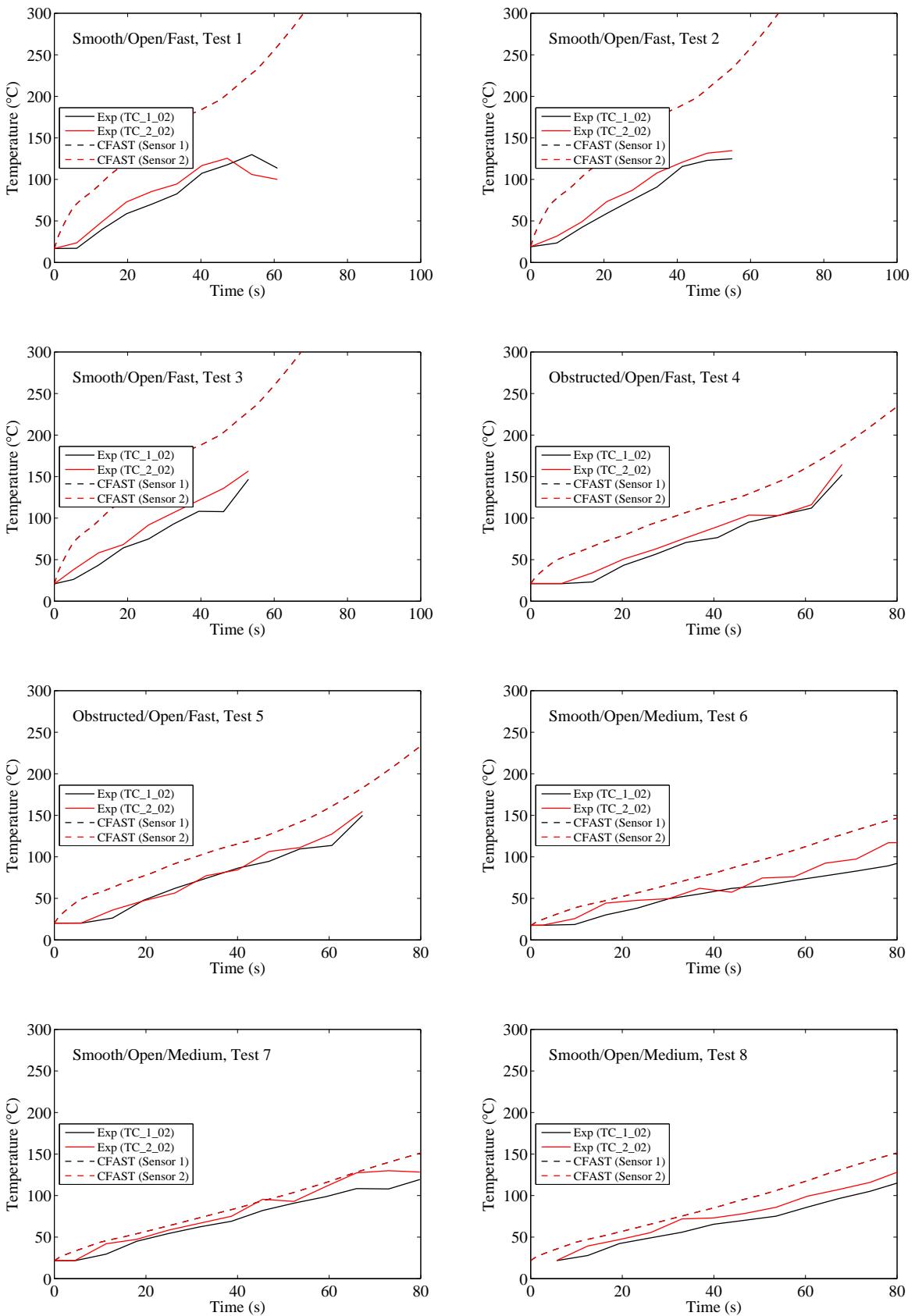
## USN HIGH BAY HANGAR EXPERIMENTS

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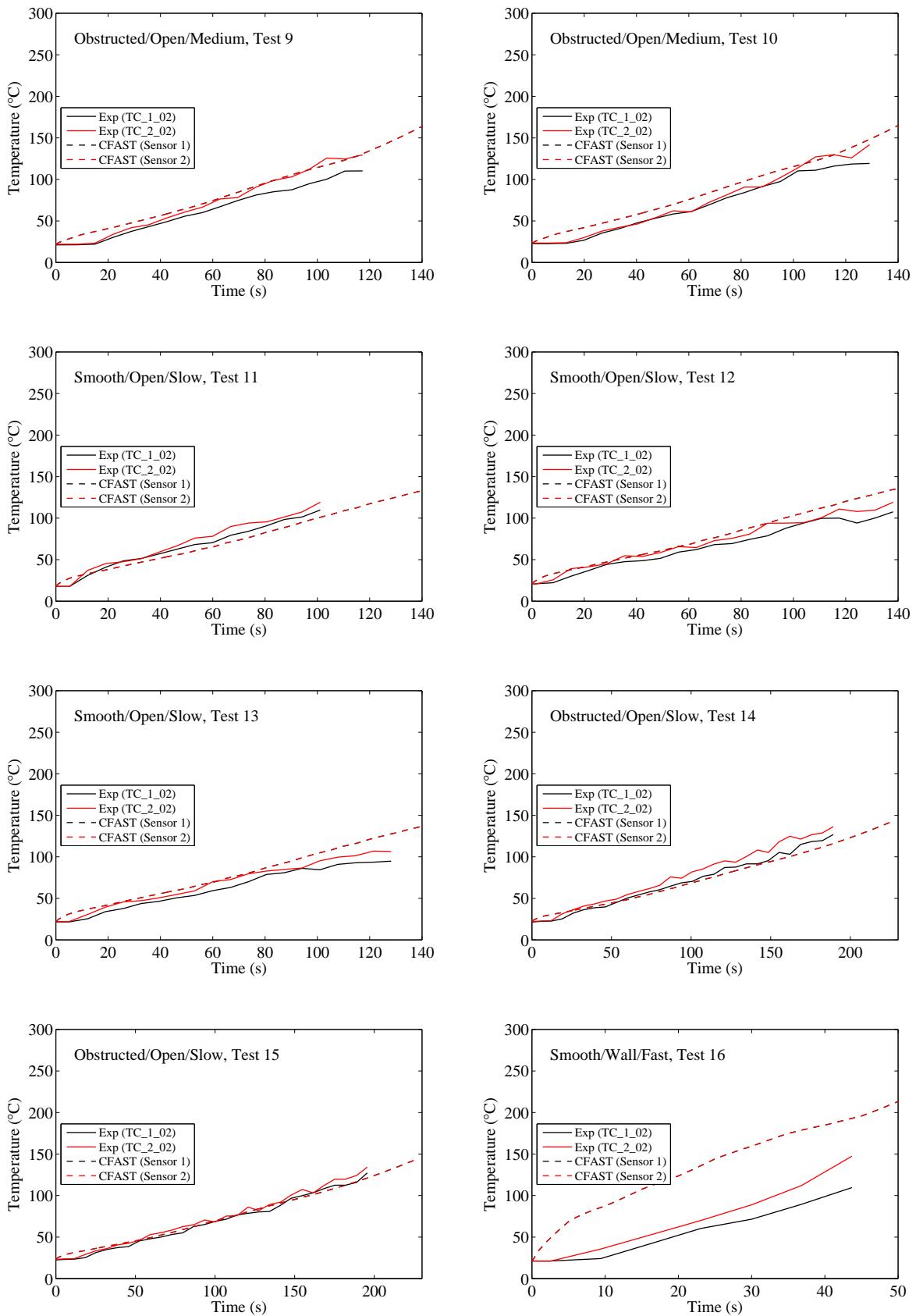


## B.13 Vettori Flat Ceiling Experiments

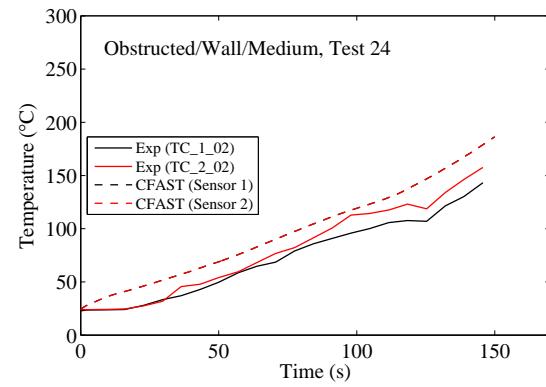
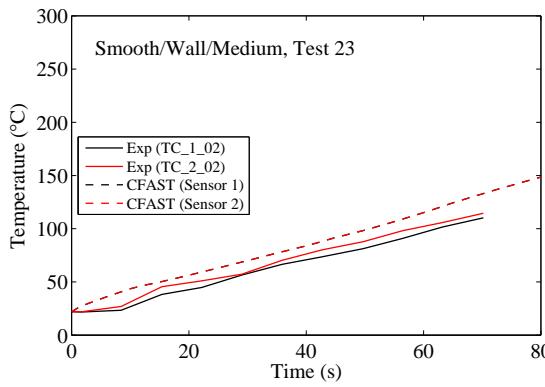
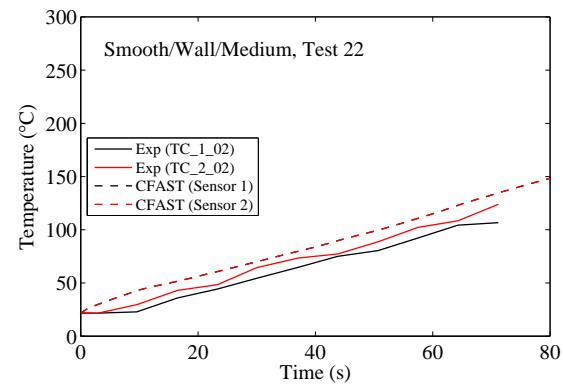
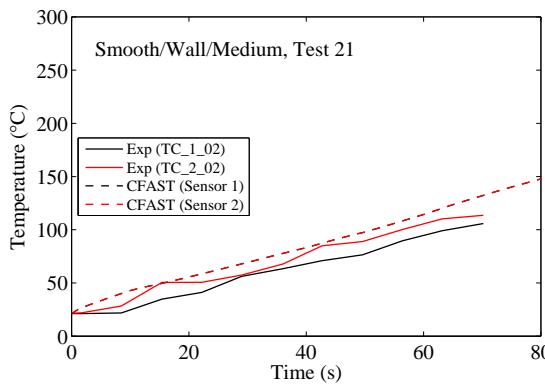
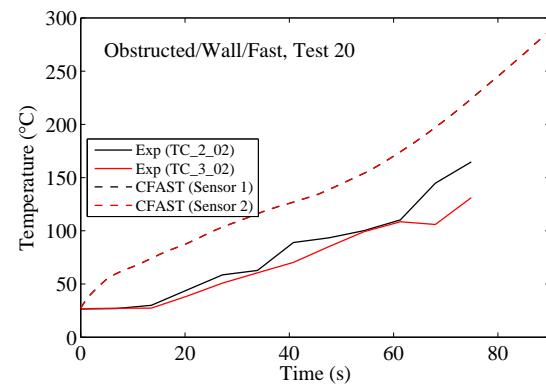
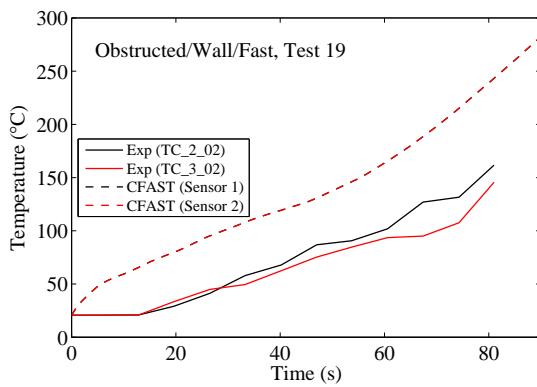
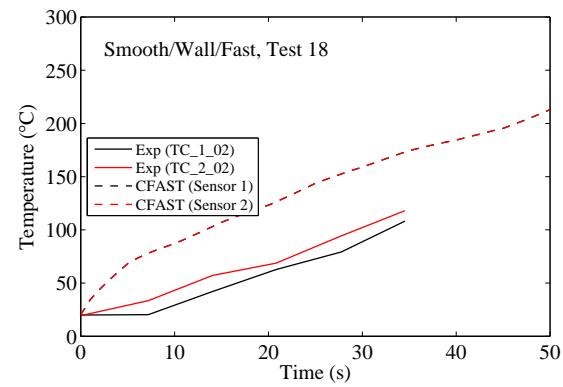
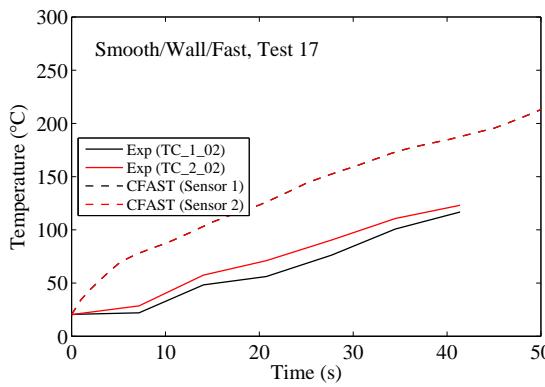
## VETTORI FLAT CEILING EXPERIMENTS



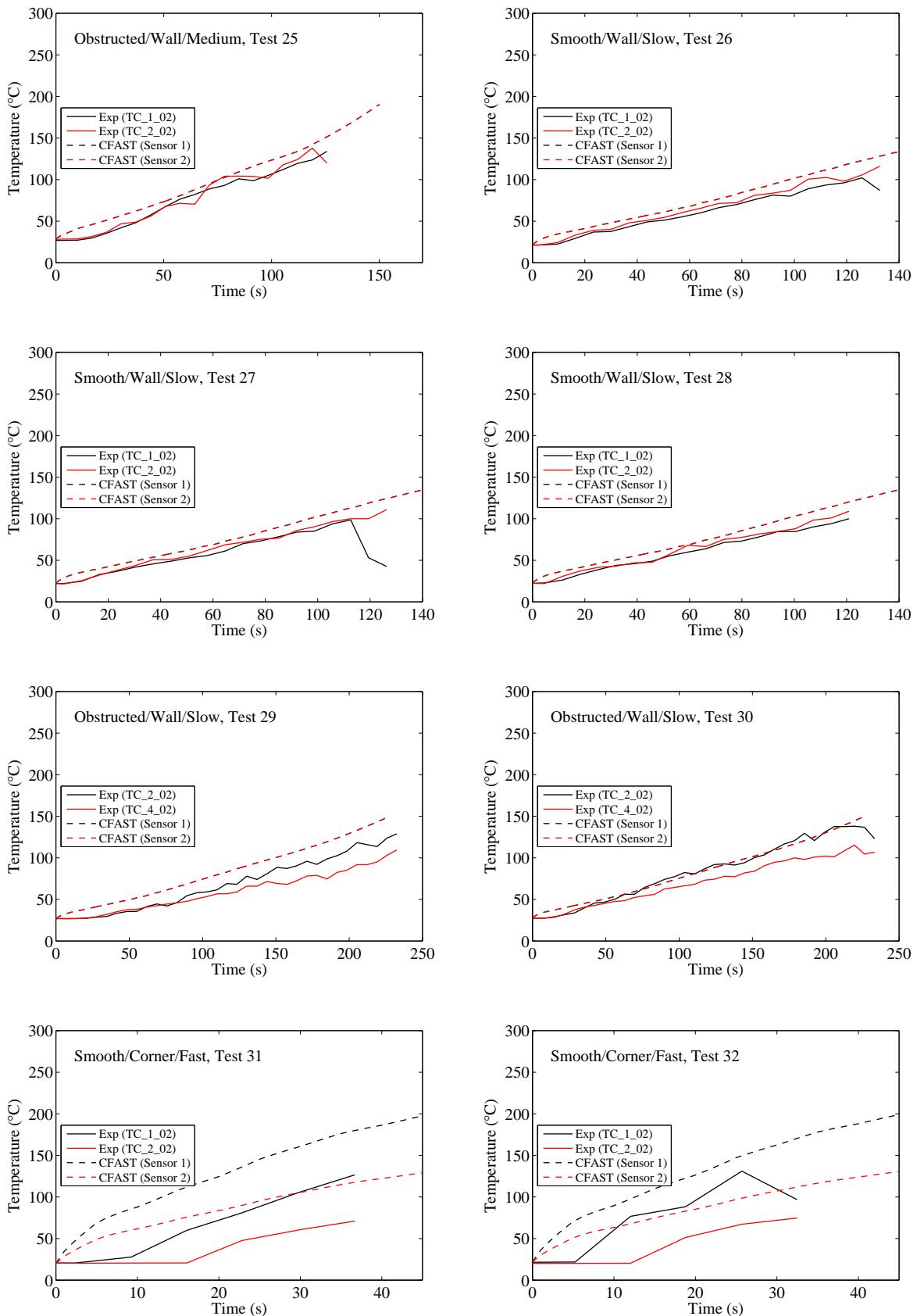
## VETTORI FLAT CEILING EXPERIMENTS



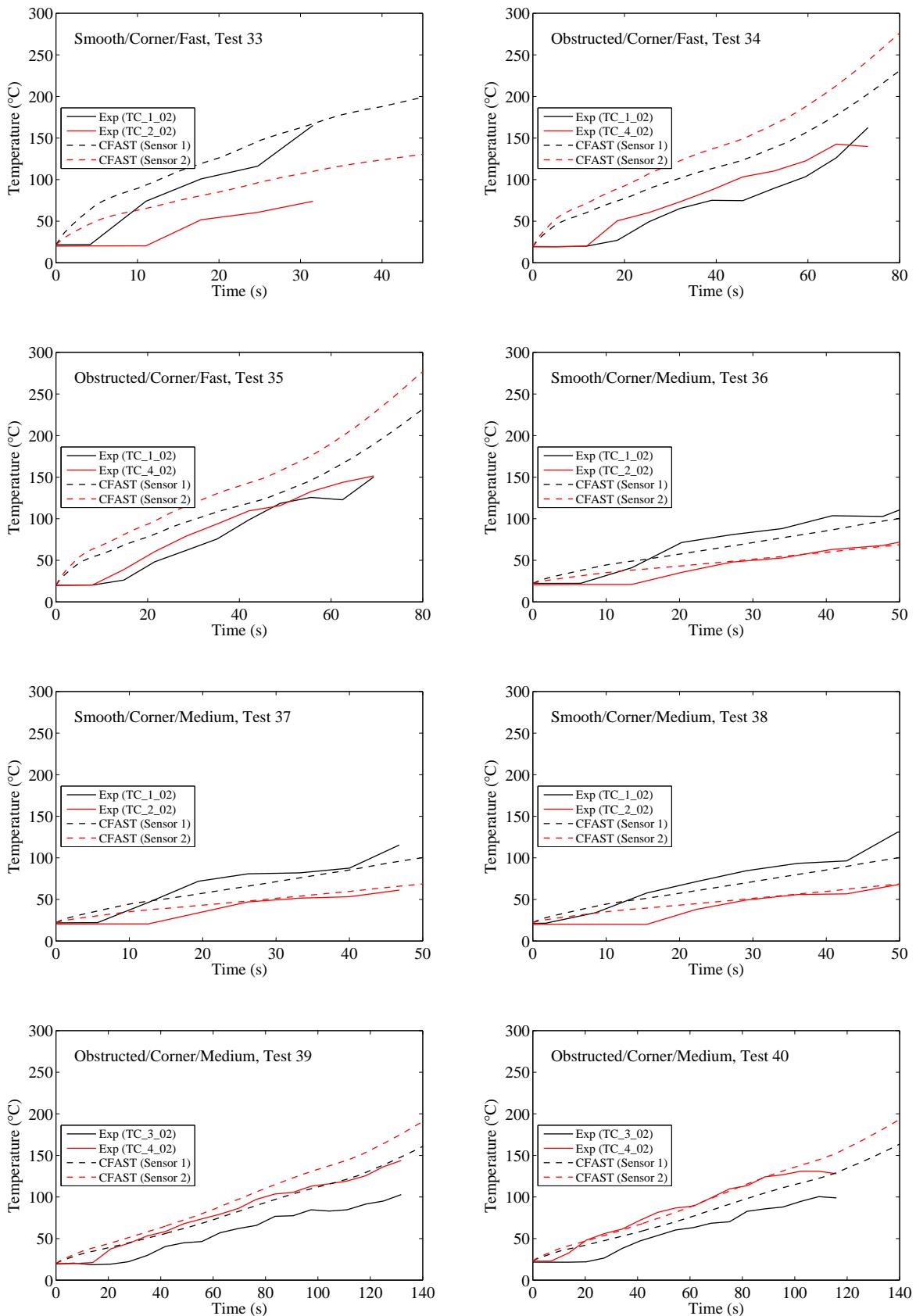
## VETTORI FLAT CEILING EXPERIMENTS

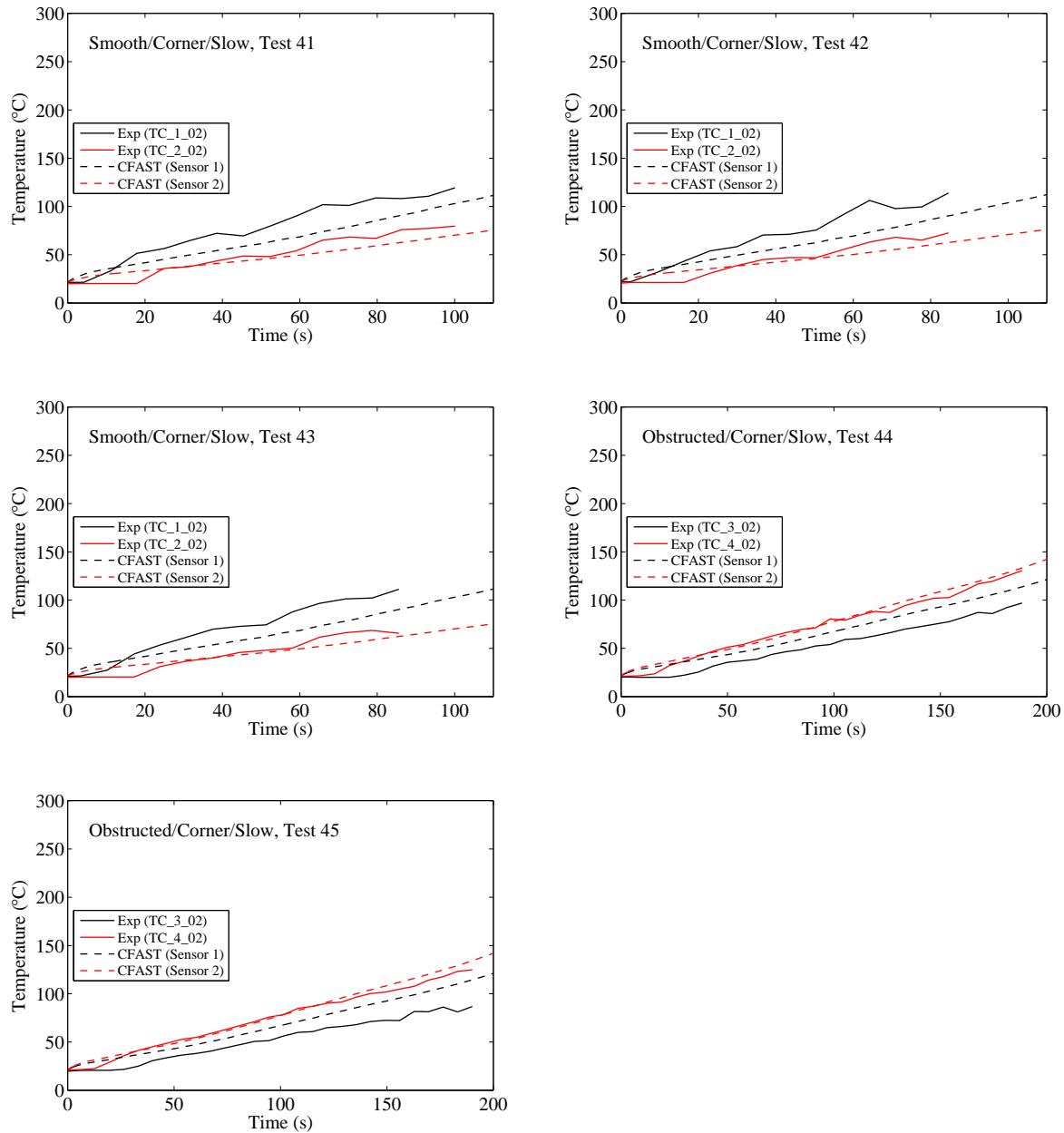


## VETTORI FLAT CEILING EXPERIMENTS

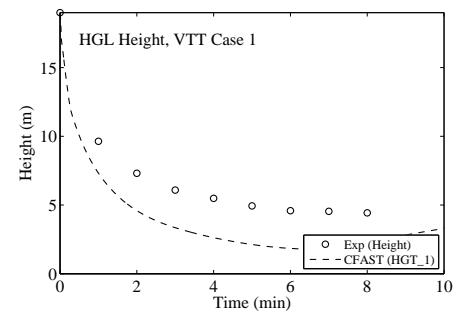
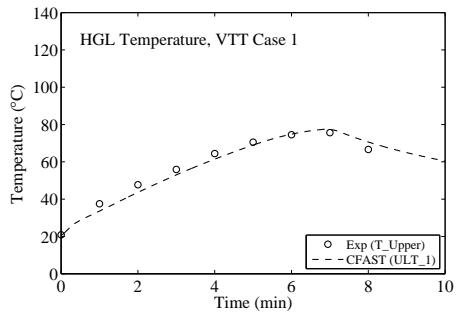
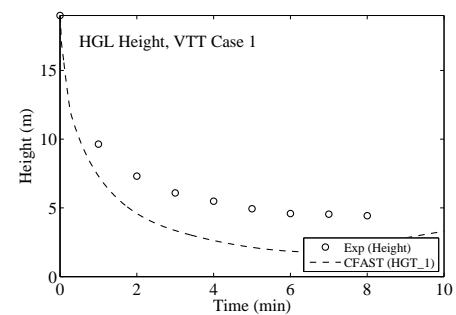
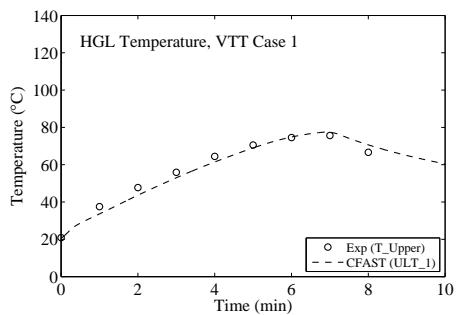
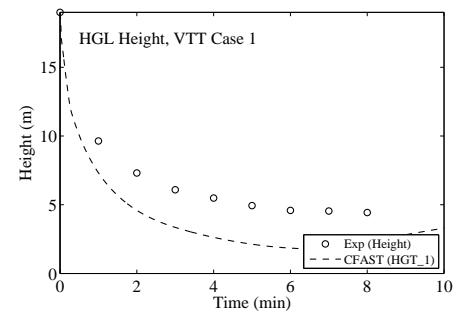
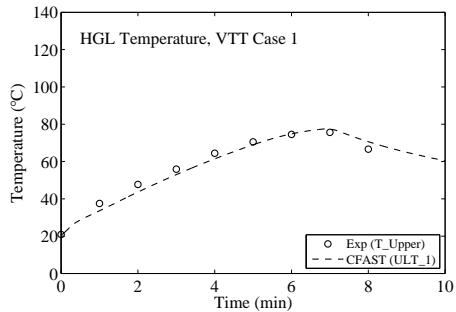


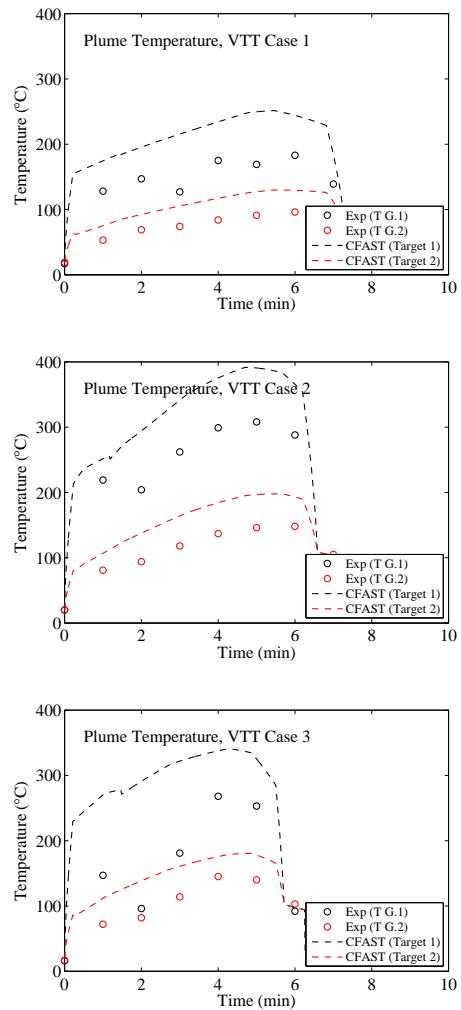
## VETTORI FLAT CEILING EXPERIMENTS





## B.14 VTT Large Hall Tests





## B.15 WTC Test Series

