



SAND2019-13362PE

MELCOR HTML Output



PRESENTED BY

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- Lightning fast hyper-linked navigation to MELCOR output
- Graphical depiction of core degradation
- Automatic plot generation for enhanced user efficiency
- Trend plots, profile plots, animated plots
- Plots of material property functions, EOS functions, and fluid properties automatically generated for user verification/QA
- Animated temperature profile for greater insight into accident progression
- User customized plots and model specific plots for ultimate flexibility
- Embed user customized HTML input for problem description
- Access to more data: Energy balances, energy/mass error plots, aerosol size distribution plots, CPU, distribution of aerosol sectional mass, core degradation, candled material distributions, ...



3 User Customized Plots

- User can easily add plots of control functions or any plot variable to HTML output.
- Controls
 - Time units can be changed in HTML plot
 - Log/Linear scale for x or y axis
 - Maximum and minimum values can be selected by user

- Minimal Input Required

```
CF_HTML 4
1 'Integral Hydrogen Mass' 'Int H2' 'Int H2 (Exp)'
2 'Vapor Temperature SG-HL-313' 'CVH-TVAP.313' 'TEPF717'
3 'Vapor Temperature SG-HL-316' 'CVH-TVAP.316' 'TEPF719'
4 'Vapor Temperature SG-HL-319' 'CVH-TVAP.319' 'TEPF721'
```

Y-Axis

YMIN

YMAX

Log

Scale

X-Axis

XMIN(sec)

XMAX(sec)

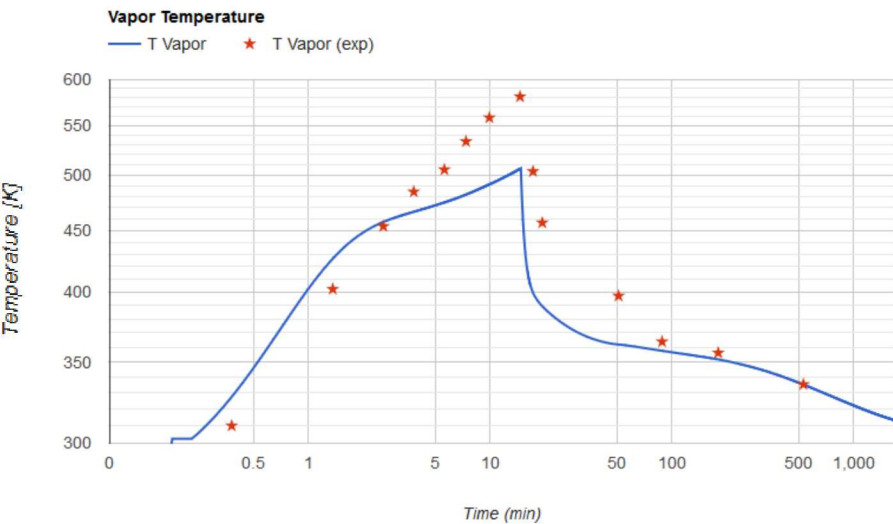
Log

Scale

Minutes

Time Scale

Refresh



4 Static and Animated Profiles

- Temperatures, mass, power, surface area, volumes
- Static plots generated automatically at each time edit
 - MELGEN plots provide graphical means for verifying input
- User can create animations of component temperature profile
 - Local COR atmosphere fluid temperature also supported
 - Controls
 - Playback speed
 - Scroll to time frame
 - Maximum and minimum temperature scale

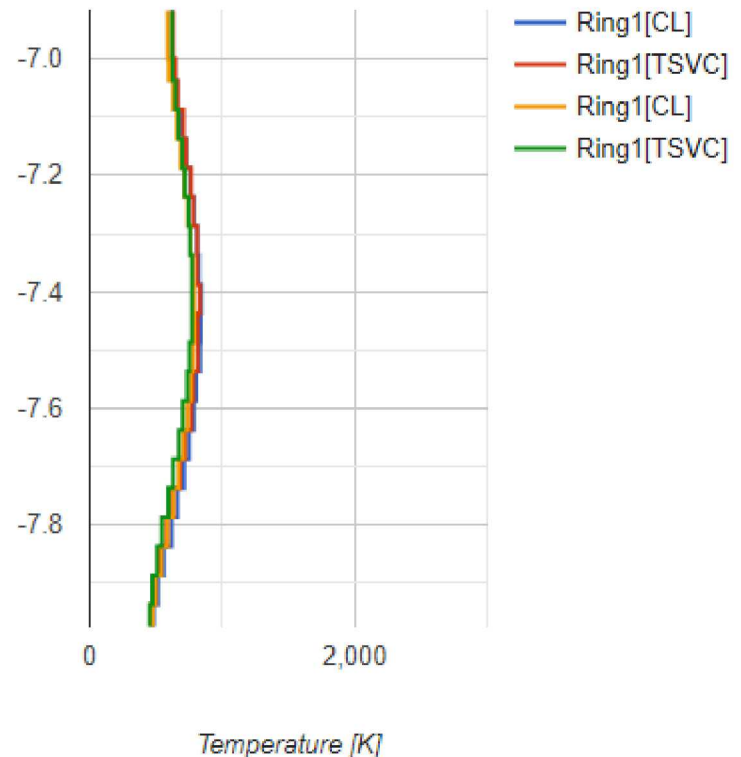
speed

time

0 TMP (low)

3000 TMP (hi)

Animated Temperature Profile at 1000(sec)



Minimal Input Required

```
COR_AXPLT 2
1 RING1 3 CL 1 FU 1 NS 1 20.0 0
2 RING1b 4 CL 1 TSVC 1 CL 2 TSVC 2 20.0 0
```

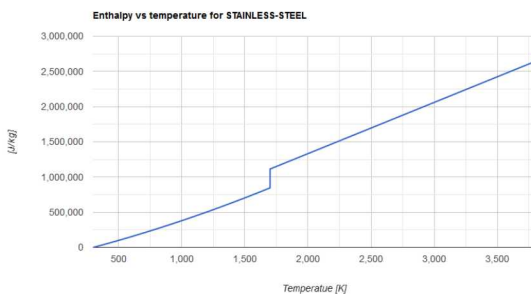
MATERIAL PROPERTIES PACKAGE

Show Properties for fiberglass

Show Properties for STAINLESS-STEEL

Show Properties for ZIRCALOY

- Materials
 - User-defined materials
 - Default Materials
- Properties
 - Thermal conductivity
 - Enthalpy
 - Heat capacity

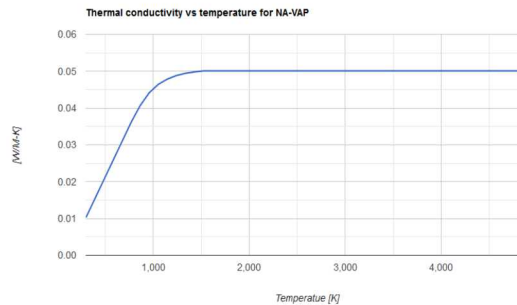


NON CONDENSIBLE GAS PACKAGE

Show Properties for POOL

Show Properties for NA-VAP

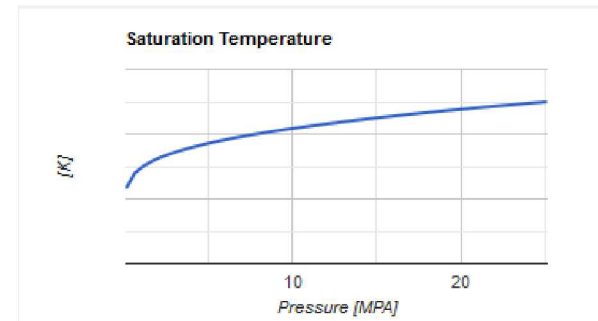
- Viscosity
- Thermal conductivity



Equation of State PACKAGE

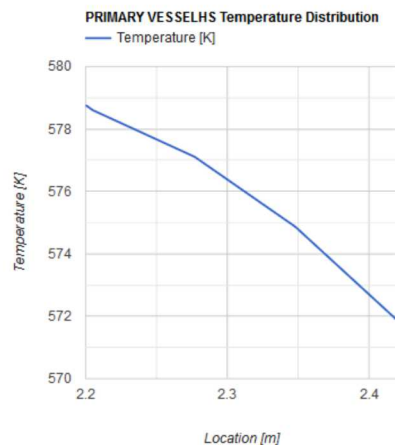
EOS Properties for Na

- Saturation Pressure
- Saturation Temperature
- Liquid Density at saturation
- Vapor density at saturation
- Liquid specific enthalpy at saturation pressure
- Vapor specific enthalpy at saturation pressure
- Liquid specific heat
- Vapor specific heat

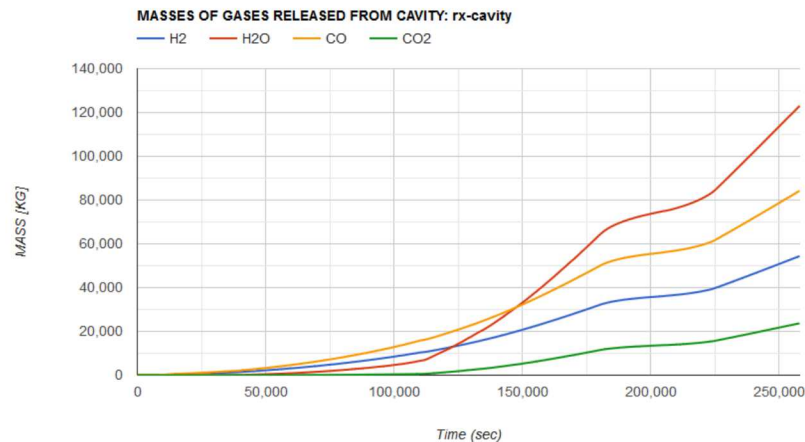


Automatically Generated Model-Dependent Plots

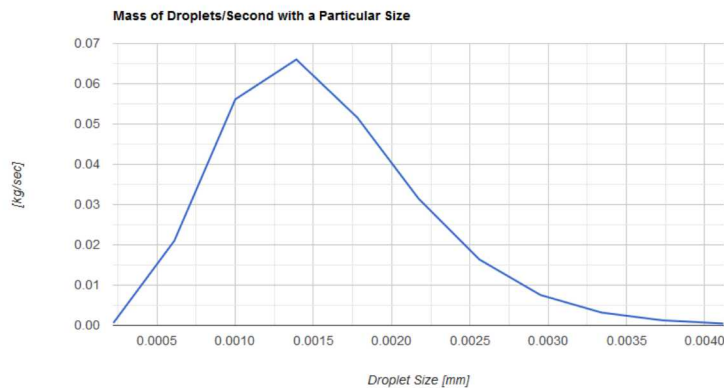
HS PACKAGE



MCCI MODELS



NA SPRAY FIRE MODEL



User HTML Description

User can provide formatted description of calculation, including pictures.

Used for documentation of test results.

Pictures depicting nodalization, boundary conditions, and results from previous calculations.

HTML commands embedded in document.write statements.

Example:

```
document.write("Key models exercised in the MELCOR analysis of this test include:")
document.write("<ul>")
document.write("<li>Agglomeration behavior of hygroscopic and non-hygroscopic aerosol species</li>")
document.write("<li>Condensation of water vapor.</li>")
document.write("<li>Settling of aerosols.</li>")
document.write("<li>Sodium spray fires</li>")
document.write("<li>Radiant heat transfer in an enclosure</li>")
document.write("<li>Radiant heat transfer to an intermediate gas</li>")
document.write("</ul>")
document.write("<br>")
document.write("<h2>Depiction of AB-5 Experimental Apparatus</h2>")
document.write("<img src='../TestPicture.png' ALT='COR State' Width=50% >")
document.write("<br>")
document.write("<img src='../Dimensions.png' ALT='COR State' Width=40% >")
document.write("<img src='../Conditions.png' ALT='COR State' Width=40% >")
document.write("<br>")
document.write("<h2>Previous Results</h2>")
document.write("<img src='../Pressure.png' ALT='COR State' Width=37% >")
document.write("<img src='../Temperature.png' ALT='COR State' Width=40% >")
document.write("<img src='../AerosolMass.png' ALT='COR State' Width=40% >")
document.write("<br>")
document.write("document.write('Key models exercised in the MELCOR analysis of this test include:')")
document.write("<ul>")
document.write("<li>Agglomeration behavior </li>")
document.write("<li>Condensation of water vapor.</li>")
document.write("<li>Settling of aerosols.</li>")
document.write("<li>Sodium spray fires</li>")
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document.write("<br>")
document.write("</br>")
```

Background

The Aerosol Behavior Code Validation and Evaluation (ABCOVE) experiments investigate breeder reactors (LMFBRs). The experiments provide a basis for judging the adequacy of aerosol attenuation in containment buildings during postulated accidents. The ABCOVE Systems Test Facility (CSTF) located at the Hanford Engineering Development Laboratory.

This MELCOR assessment uses the MELCOR sodium chemistry (NAC) package, based on sodium atmospheric chemistry.

Key models exercised in the MELCOR analysis of this test include:

- Agglomeration behavior of hygroscopic and non-hygroscopic aerosol species
- Condensation of water vapor.
- Settling of aerosols.
- Sodium spray fires
- Radiant heat transfer in an enclosure
- Radiant heat transfer to an intermediate gas

Depiction of AB-5 Experimental Apparatus

