

## Heat Analysis of Tritium Transport Vessel by Tritium Decay Heat

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373-1

150

-3

Heating 7

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### Abstract

Heat analysis of tritium transport vessel accomplished in consideration of tritium decay heat. This is the study on not only the first storage vessel of tritium but also the second storage vessel, transport vessel and its inner insulating materials. The decay heat of tritium to helium-3 was considered. Heat analysis was conducted by using the computer code, Heating 7 that is widely used in heat transfer fields. In the results, there is no significant effect of decay heat on the outer wall of tritium transport vessel.

1.

2006

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 , Heating-7

## 2. HEATING 7 Code<sup>[1]</sup>

HEATING 1,  
 2, 3 , ,  
 가 boundary 가  
 boundary , ,  
 가 .HEATING input 가  
 HEATING 7 extrapolation, direct-solution, conjugate gradient  
 가 point-successive-overrelaxation iterative method ,  
 Crank-Nicolson implicit, Classical Implicit Procedure (CIP), Classical Explicit Procedure (CEP),  
 Levy explicit method 가 finite-different schemes . HEATING 7

1. (geometry type) .
2. .
3. .
4. .
5. .
6. .
7. .
8. , .
9. .
10. .

(가)

heating

가

가

가

가

( )

(regions)

Heating

가

가

1

2

, 2

4

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6

1.

1

가

(gap)

2.

3.

가

4.

5.

( ) Solution Techniques

Heating 7

(steady-state)

(transient)

3

2 explicit

, 2 implicit

. Heating

3.

가 1 가

, 1 2 ,

가

1 17W .<sup>[2]</sup> ,

1 1, 2 가

, , Ti 1 .<sup>[3][4]</sup> 가

500 kCi 17W

, 1 2

2 가 가

, 20

72 (3 ) 1

가 90 1

가 1 , , 1 2

가 2 1 2

가 , 2

가 가

, 가 가

, 1 , 1 가

가

가

800 가 30

2 가 250

800

3

, 1, 2

20 2 130

650

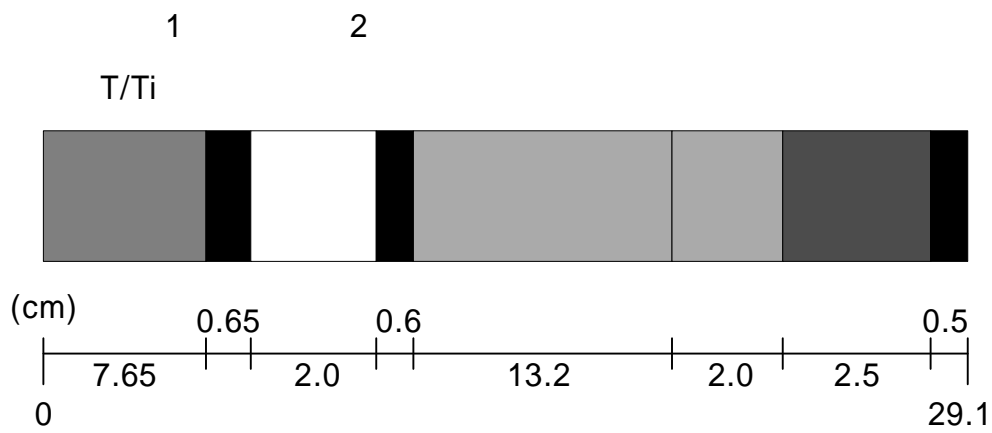
2

가

4.

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1. ORNL, "Multidimensional, Finite-Difference Heat Conduction Analysis Code System - Heating 7", PSR-199.
2. IAEA, "Safe Handling of Tritium", IAEA Technical Reports Series No. 234.
3. Frank Kreith, "Principle of Heat Transfer", West Publishing, 1993.
4. Frank P. Incropera, "Fundamentals of Heat and Mass Transfer", Wiley, 1990.

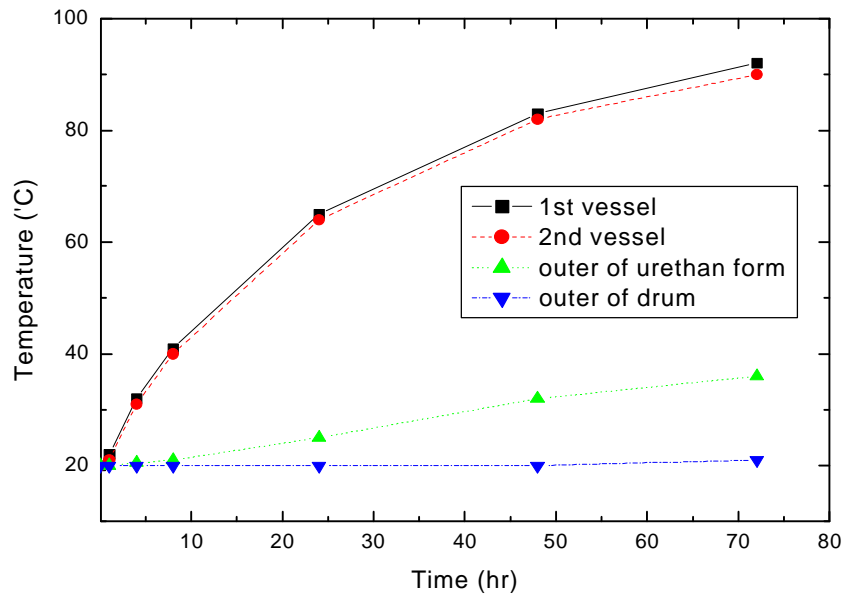


1.

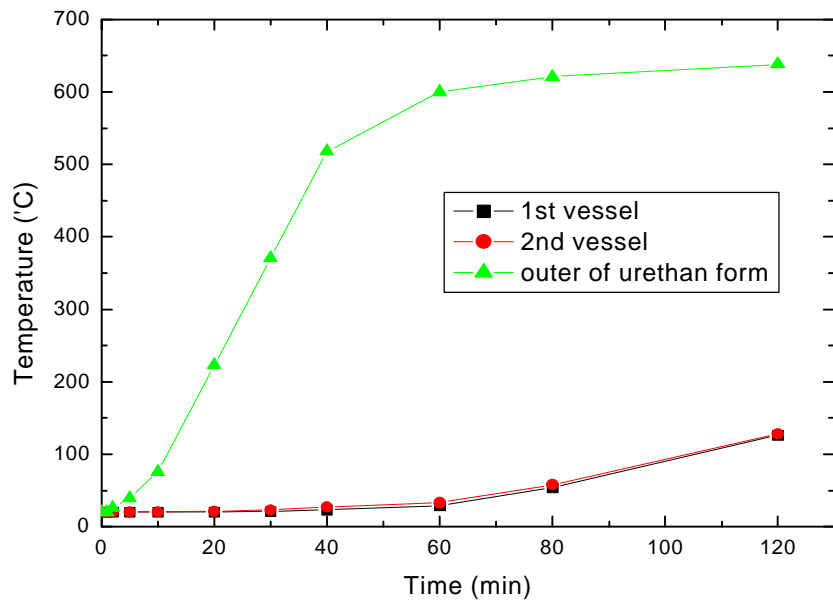
1

1.

	(W/m K)	(kg/m <sup>3</sup> )	(J/kg K)
	0.026	70	1045
	0.027	55	1210
	0.036	105	795
( )	36	7753	486
(316L)	14.1	7817	461



2.



3.

800