

# KALIMER

## Design Characteristics and Case Study for KALIMER Reactor Head

150

KALIMER

가 . KALIMER

(cold deck)

30cm

가 .

### Abstract

In this paper, the description of the characteristics of conceptual design for KALIMER reactor head and the evaluation of the integrity of the design by the analysis of thermal stresses for the various thickness cases of reactor head have been carried out. The KALIMER reactor head adopts cold deck concept under which insulation and shield plates are installed. In this study the design methods of reactor head and the design requirements on the deformation limit of reactor head were introduced. It was evaluated from the analysis that the allowable limits of the stresses and the deformation for the reactor head with the thickness of 30cm subjected to steady state thermal load were satisfied.

### 1.

, (500°C )

가

150 MWe

KALIMER (Korea Advanced LIquid MEtal Reactor)

[1].

(hot deck) / (insulation & shield plate)  
(cold deck) KALIMER

20, 25, 30, 35, 40 cm

가  
가 30 cm

## 2. KALIMER

### 2.1 KALIMER

KALIMER Fig. 1 가 30cm  
2 4 (IHX), 4 (EMP), Fig.  
KALIMER 1

316SS, 304SS  
45cm

### 2.2

- 6.35mm
- 가 0.1% 가 가
- 가 40°C 가
- 52°C 가 가
- (Head Access Area: HAA) 56 cm
- 
- 가 (ISI)
-

2.3

Fig. 1 가  
가 IHX, ,

가

(degradation)

가 가

(ASME Section III Subsection NH)

ASME Sec.III

(rib)

가  
가 가  
17 13

2.4

2 IHX, EMP

3.4

가 2 ledge ledge IHX IHX riser  
IHX 1 16mm 316 22mm  
22 가 45cm 30

3.

3.1

가

2 IHX, EMP

9

3 1/4 EMP 가 IHX,

가

3.2

3 IHX 가 EMP (CV) Z CV CV

3.3

가 , CFX4.2[2] 1 2 [3]. 가 가 2 223°C, 230°C 7°C 가 emissivity 0.6, 0.2

3.4

KALIMER

ASME Section III NB

6.35mm

가

20cm, 25cm, 30cm, 35cm

40cm

ANSYS [4]

가 20cm

(stress intensity)

IHX

2

96.38 MPa

AMSE Section III

NB

413.64 MPa

가

1.053 cm

0.635cm

가 25cm

72.13

MPa, 0.61 cm  
 30cm  
 5 6 58.95 MPa, 0.384cm  
 가 35 cm 40 cm 51.02 Mpa, 45.84 MPa  
 0.264cm 0.194cm 가  
 가 25cm  
 30cm

4.

KALIMER  
 가  
 KALIMER  
 230°C  
 가 가 20cm, 25cm, 30cm, 35cm 40cm  
 3Sm (413.64 MPa) 가 100 MPa  
 가  
 가 25cm  
 30cm  
 0.384cm 0.635cm 가  
 /

1. KALIMER Design Concept Report, KAERI/TR-888/97.  
 2. CFX 4.2, CFX International, U.K., 1997.

3. , KALIMER

,KALIMER/FS200-ER-06/1999, KAERI.

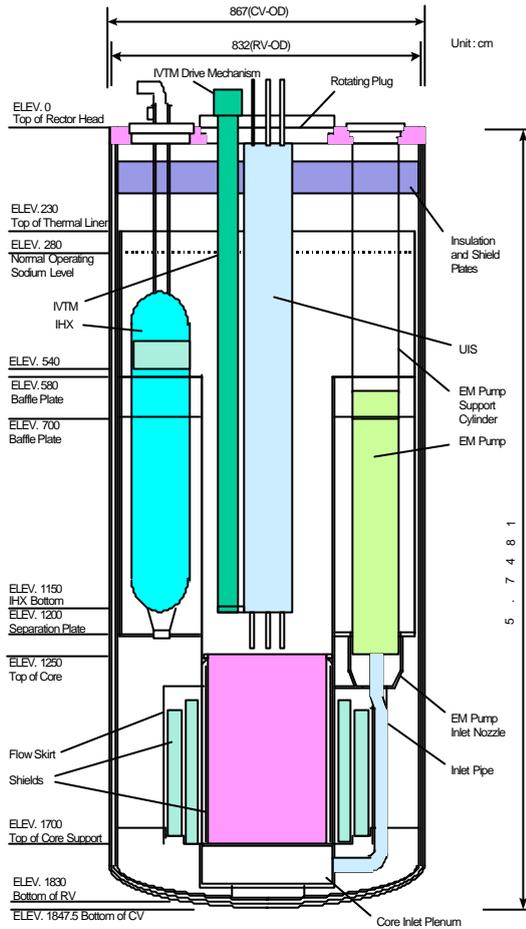
4. ANSYS Version 5.5, 1998, Swanson.

**Table 1. KALIMER**

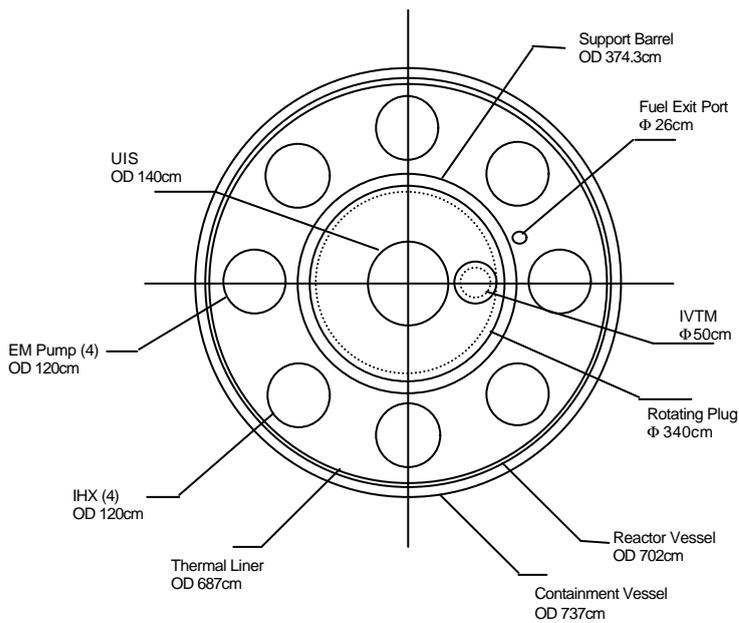
		KALIMER
		<b>16.0 mm</b>
		<b>22.0 mm</b>
	(EA)	<b>22</b>
		<b>316SS</b>
	-	<b>45 cm</b>
		<b>30cm</b>
		<b>304SS</b>
		<b>702cm</b>
		<b>5cm</b>
	(shell)	<b>17.6m</b>
		<b>316SS</b>

**Table 2. KALIMER**

(cm)	(cm)	(MPa)
<b>20</b>	1.053	96.38
<b>25</b>	0.610	72.13
<b>30</b>	0.384	58.95
<b>35</b>	0.264	51.02
<b>40</b>	0.194	45.84
	<b>0.635</b>	<b>413.64</b>



**Fig. 1 KALIMER**



**Fig. 2 KALIMER**

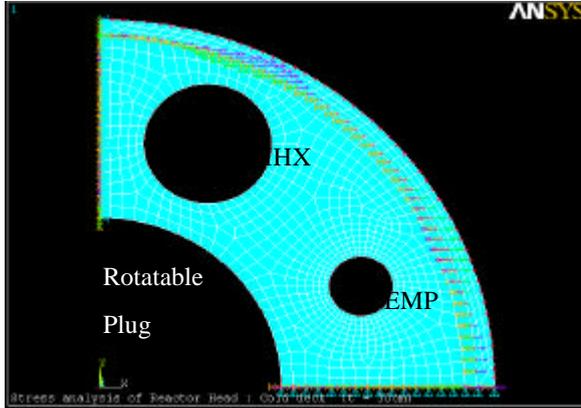


Fig. 3

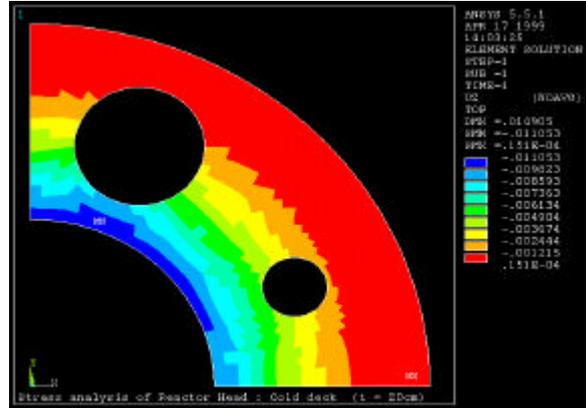


Fig. 4

( : 20cm)

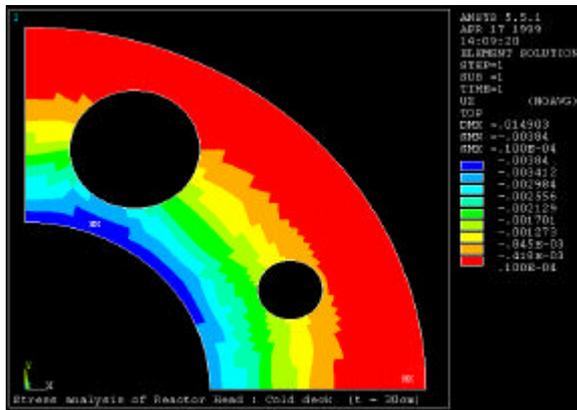


Fig. 5

( : 30cm)

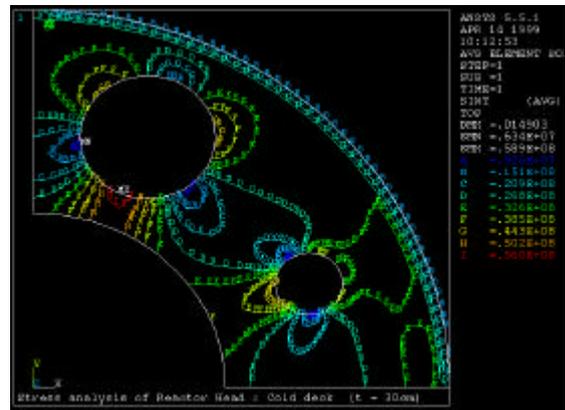


Fig. 6

( : 30cm)