



$$\text{Div}(\mathbf{rV}) = 0 \quad (1)$$

$$\text{div}(\mathbf{rVV}) = \text{div}T + \mathbf{rb} \quad (2)$$

$$\text{Div}(\mathbf{rFV}) = \text{div}(\mathbf{Ggradf}) + S_f \quad (3)$$

, ρ , φ  
 . b S<sub>φ</sub>

k-ε

$$T = -\left(p + \frac{2}{3} \rho \mathbf{div} \mathbf{V}\right) \mathbf{I} + \mu \mathbf{D} \quad (4)$$

μ , I , ? D

QUICK

10<sup>-4</sup>

가

가

10%

## 2.2

( )

Tetrahedron

1

410932

가

- 3

-

- RNG k-ε

- Non-equilibrium wall function

-

- 2nd Order Upwind Discretization for Flow, Energy, turbulence dissipation

- : 50 m/s 293 K

- : 10%

- : No slip,

- Outlet :

shooting

shooting

(5)

가

$$\frac{Mass_{In} - Mass_{Out}}{Mass_{In}} < 3\% \text{ of } Mass_{In} \text{ (Mass Conservation)} \quad (5)$$

$P_R + P_a$  가

1

	1,2,3	1	2	3
( $P_R$ )	-34989 Pa	-4695 Pa	-2695 Pa	-2703 Pa

3.

3.1

(1:1)

(1)

5,

8

Momentum Angle( 가 )

Momentum Angle Momentum 가 가

1 Momentum Angle 120 2 0 , 3

60

.2 ,

.3

가

.2

	1	2	3	
1,2,3	3689 Pa	4660 Pa	4091 Pa	-772 Pa
1	1350 Pa	-731 Pa	- 732 Pa	-1549 Pa
2	340 Pa	2724 Pa	120 Pa	-327 Pa
3	138 Pa	106 Pa	3700 Pa	-15 Pa

.3

	1-	2-	2-
1,2,3	4461 Pa	5432 Pa	4863 Pa
1	2899 Pa	818 Pa	817 Pa
2	667 Pa	3051 Pa	447 Pa
3	153 Pa	121 Pa	3715 Pa

(2)

4

3, 6, 9

가

4, 7, 10

가

가

3.2

1:1

1:24.3

.11

.22

(1)

.4

가

가

가

가

.4

	1-	2-	3-
1:1 Scale	4461 Pa	5432 Pa	4863 Pa
1/24 Scale	4699 Pa	5153 Pa	4695 Pa

(2)

11 14 . 가 15  
22 . 가 가  
가 가

(3)

가 .  
. 23 가  
가 . ,  
가 가 가 .  
. 24  
23 24

(4)

25 26 .  
25 26 .

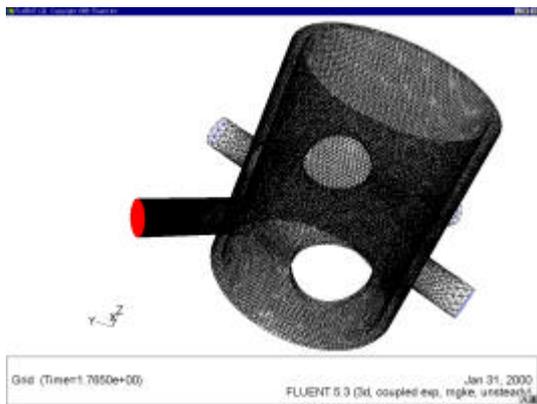
3.3

27 . .2 1 3  
가 . 28 30  
. 29  
( ) Wake Zone

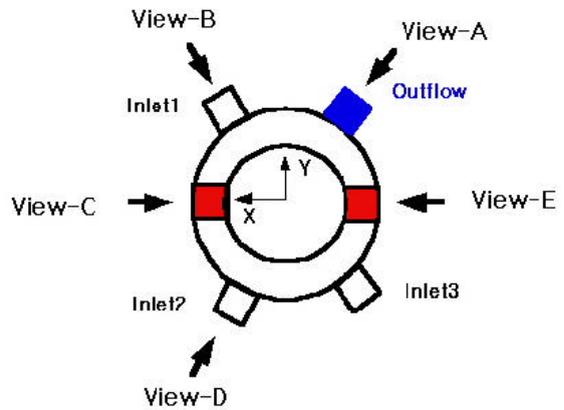
#### 4.

3 가  
· (1) 1:24.3  
1:1 · (2)  
1:24.3 1:1 ,  
· (3) 1:24.3  
1:1 가 , 가

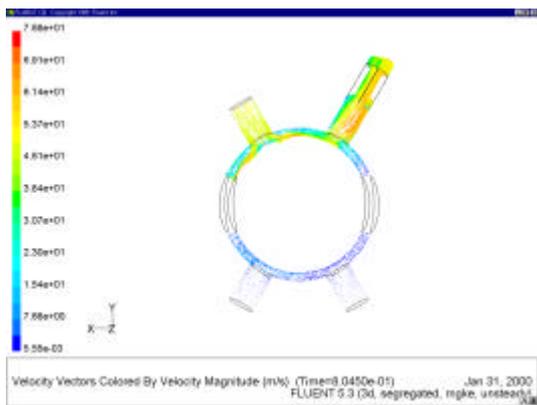
- 1) , "SMART", '99 ,1999
- 2) Do Hyun Hwang, "Air-water mixing experiments for direct vessel injection of KNGR", Master Thesis, KAIST, 1999
- 3) Byung Jo Yun, Tae Soon kwon, Chul Hwa Song, et al., "Experimental Observation on the Hydraulic Phenomena in the KNGR Downcomer during LBLOCA Reflood Phase", Proceedings of the Korea Nuclear Society Spring Meeting, Kori, Korea, May 2000.
- 4) Kyoo H. Bae, Tae S. Kwon, Yong J. Chung, Won J. Lee, Hee C. Kim, and Yoon Y. Bae, "Pre-test Analysis for the KNGR LBLOCA DVI performance test using a best estimate code MARS", NTHAS2 : Second Japan-Korea symposium on Nuclear Thermal Hydraulics and Safety, Fukuoka, Japan, October 15~18, 2000.



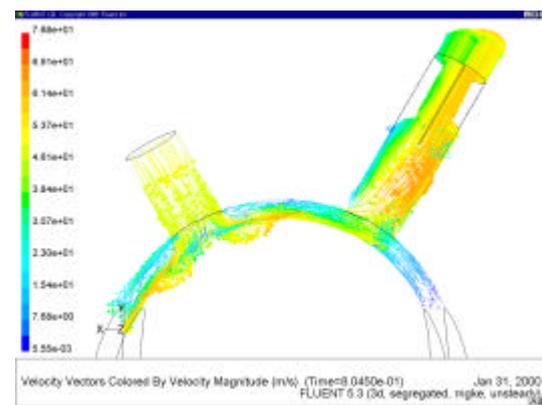
.1 Tetrahedron



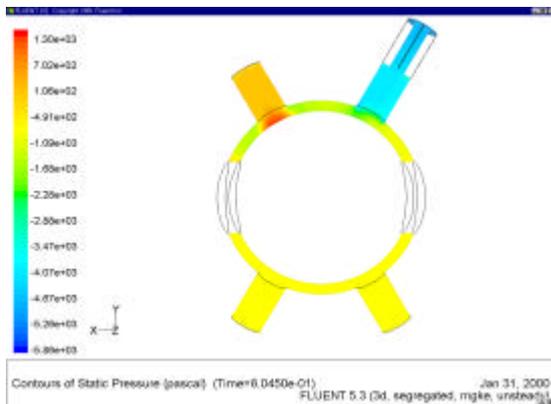
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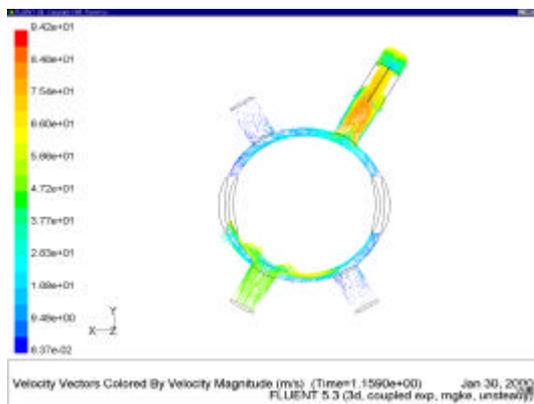
.3 Inlet-1 (1:1)



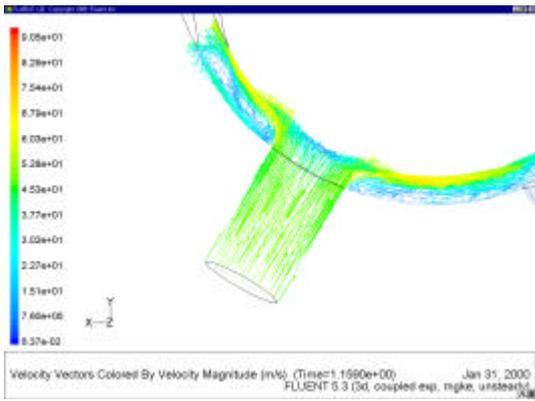
.4 Inlet-1 (1:1)



.5 Inlet-1 (1:1)

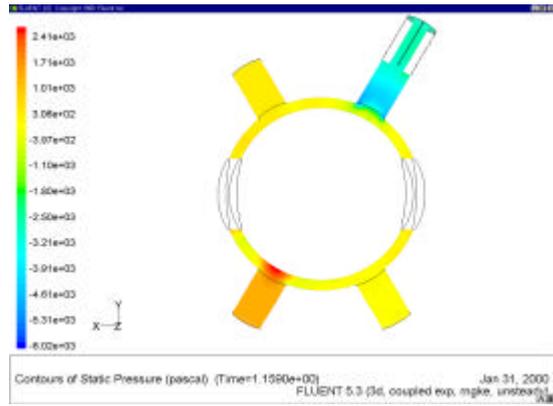


.6 Inlet-2 (1:1)



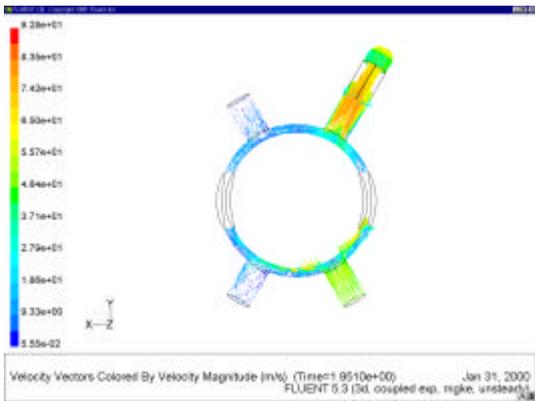
.7 Inlet-1

(1:1)



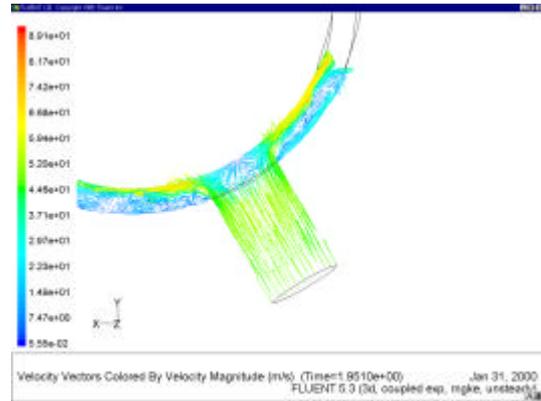
.8 Inlet-1

(1:1)



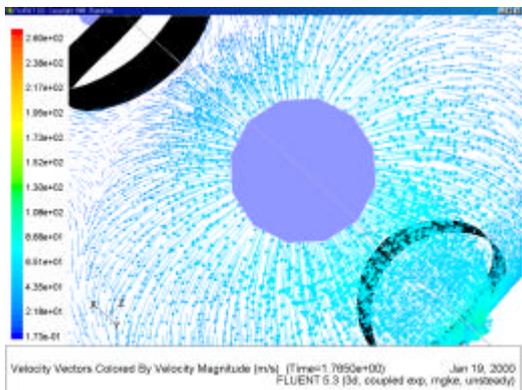
.9 Inlet-2

(1:1)



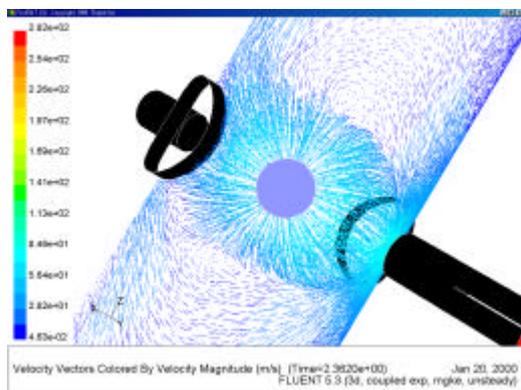
.10 Inlet-1

(1:1)



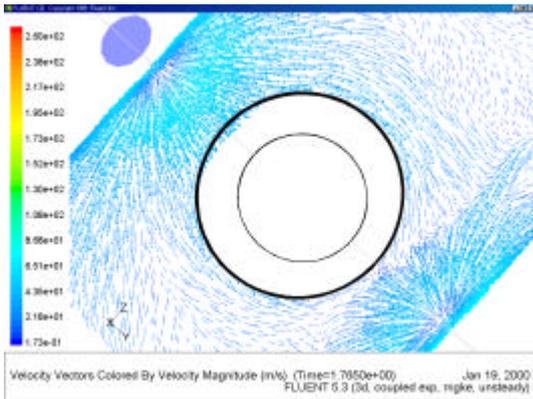
11A

(1:1)



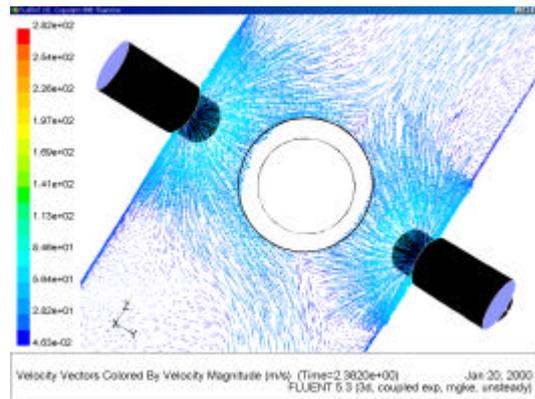
12A

(1:24.3)



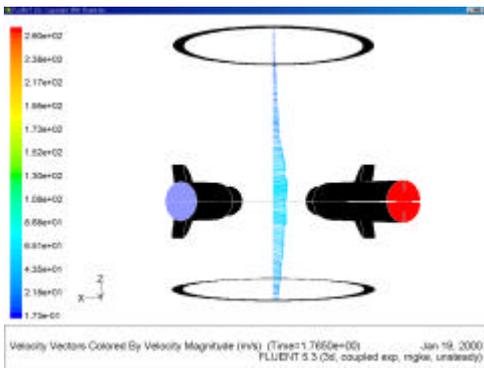
13A

(1:1)



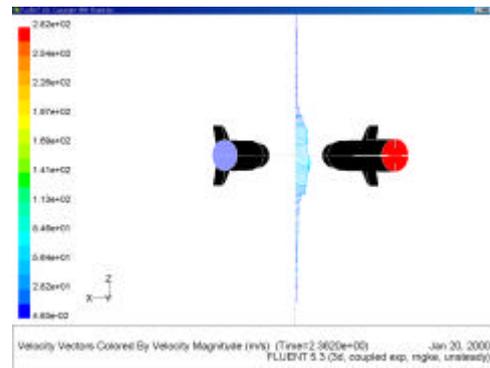
14A

(1:24.3)



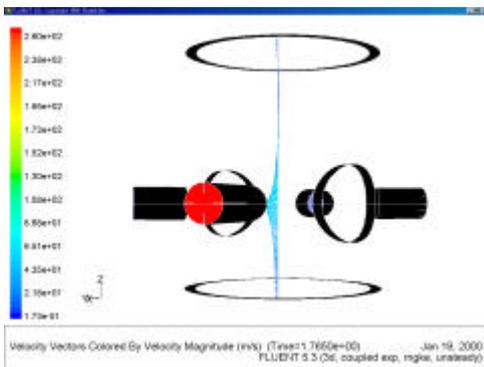
15 Line-1

(1:1)



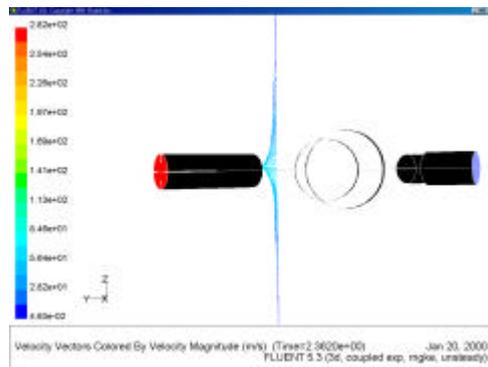
16 Line-1

(1:24.3)



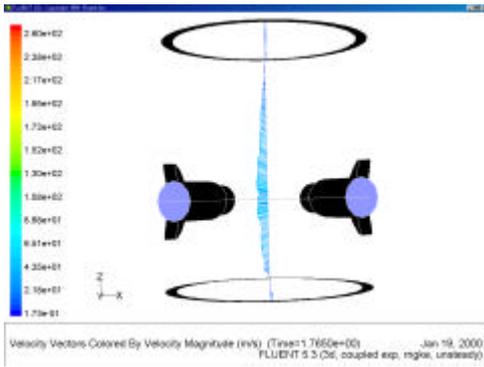
17 Line-2

(1:1)



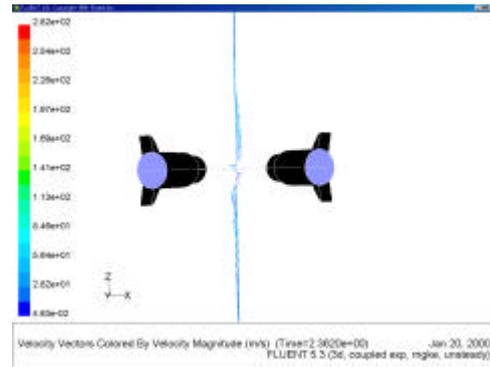
18 Line-2

(1:24.3)



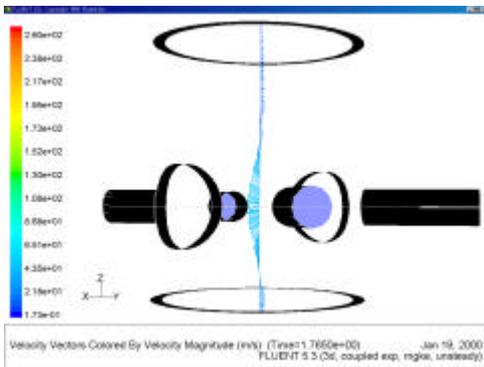
19 Line-3

(1:1)



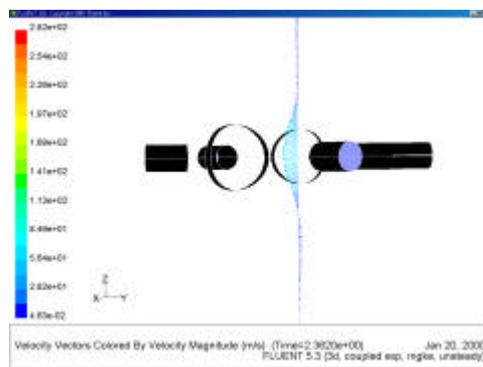
20 Line-3

(1:24.3)



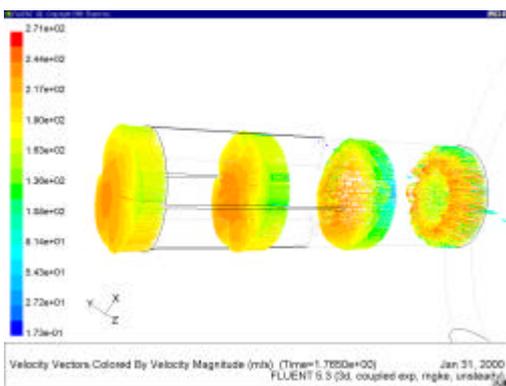
21 Line-4

(1:1)



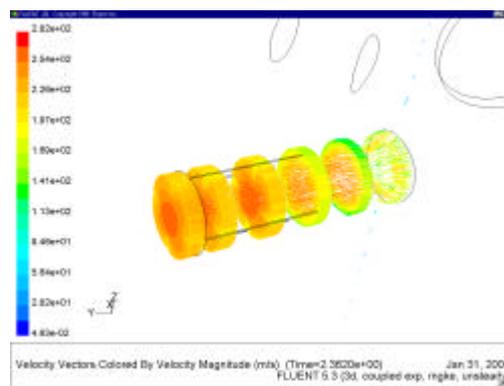
22 Line-4

(1:24.3)



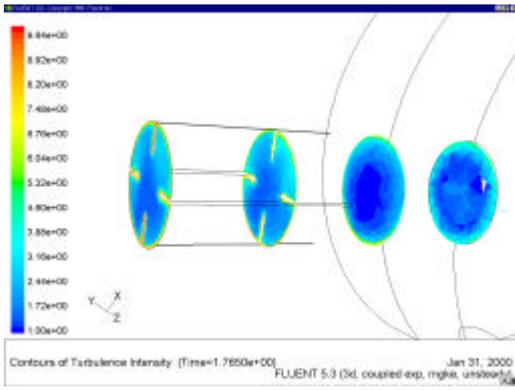
23

(1:1)



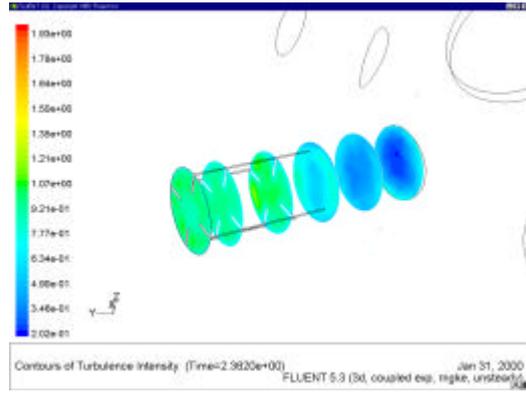
24

(1:24.3)



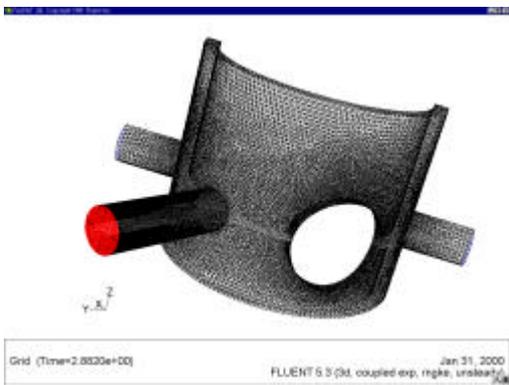
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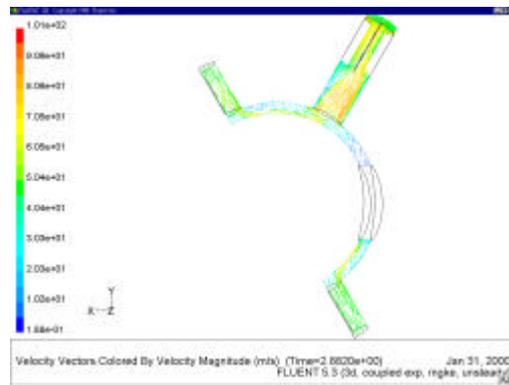


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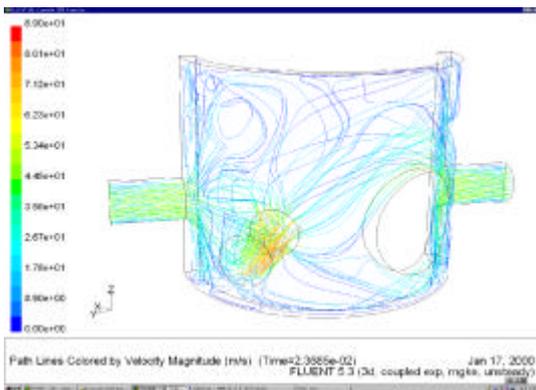
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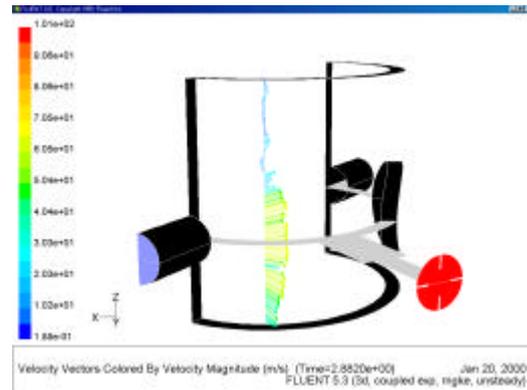
.27



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