

## Drop Performance Test and Evaluation for HANARO Shutoff Units

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### Abstract

The function of the Shutoff units of the HANARO is to rapidly insert the shutoff rod into the reactor core for safe shutdown of reactor. This paper describes drop performance test and evaluation for a shutoff unit for the technical verification of lifetime extension and localization of the HANARO shutoff units. We have performed preliminary drop performance tests for a shutoff unit at 1/2-core test loop and analyzed through the comparison with the test results performed during design verification test and the results of the periodic performance test in HANARO. It shows that the results of the local fabrication,

installation and alignment for the shutoff unit meet the basic performance requirements, Furthermore, the performance evaluation method of the periodic drop test of the HANARO shutoff units is a conservative method comparing with the real drop time.

## 1.

1/2-

[4].

(HANARO)

4

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AECL SPEL (Sheridan Park Engineering Laboratory)

[1].

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[2],

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[3].

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## 2.

### 2.1 1/2-

1/2-

,

13 ,

4 ,

3 .

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(plenum),

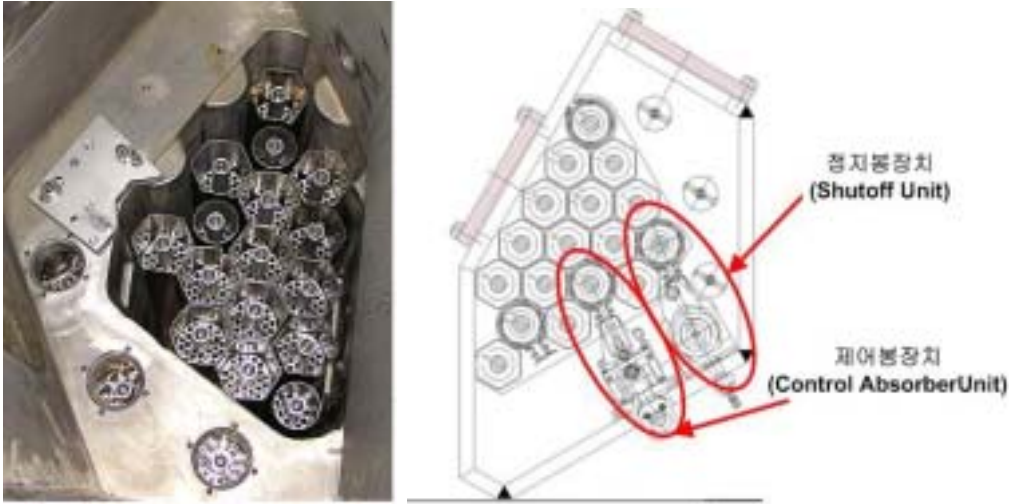
,

(chimney)

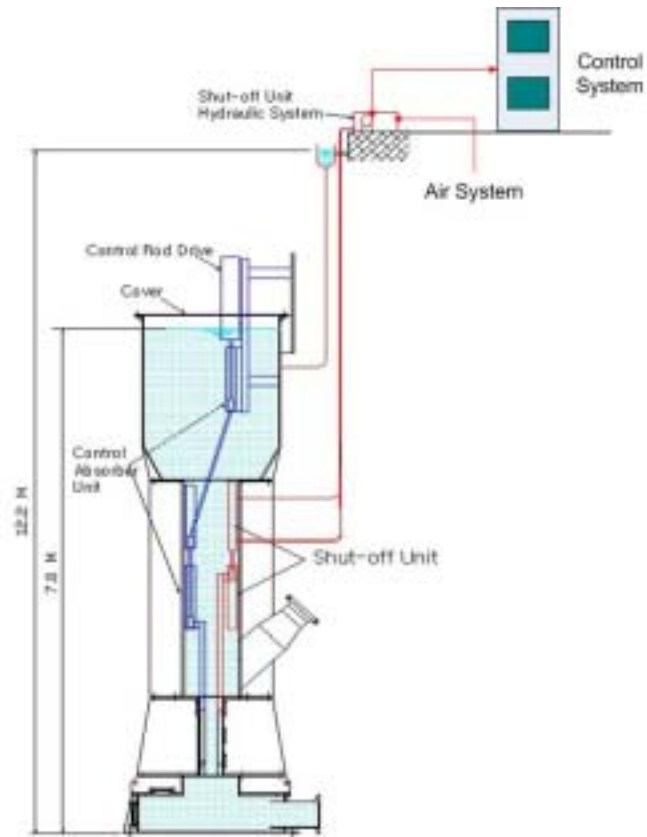
(window)

1 1/2-

2



1. 1/2-



2. 1/2-

1/2-

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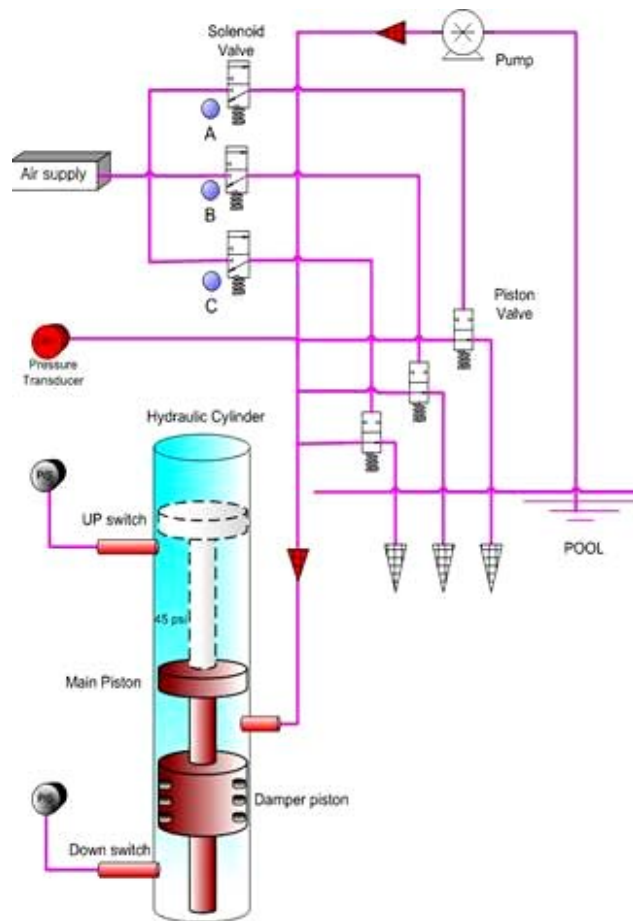
1,2

2.2

(shroud)

가

3



3.

가 가  
가  
가 , 3

가 3

### 2.3

shroud tube( 가 )

가  
, shroud tube,

(telescope),

target

target

shim

target 7m  
1.06mm

0.2-

1.2mm

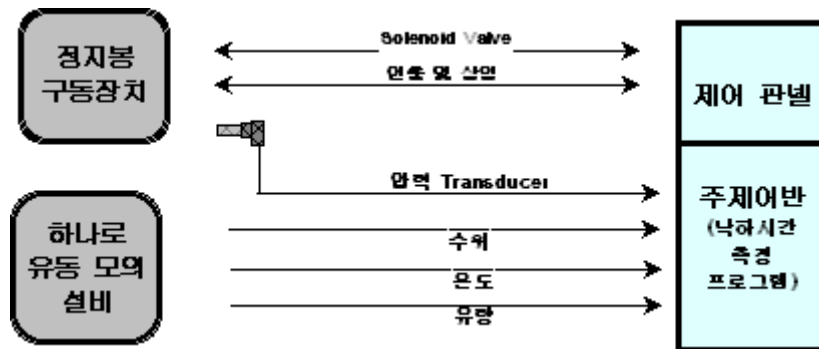
가  
3 (seal)

가

flushing

2.4

4  
가 ( 3 ) 가



4.

5 1/2-



5.

2.5

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2.5.1

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AECL(Atomic Energy of Canada Limited)

( ), ,

700 1, 100, 350, 600, 699mm

600mm

6

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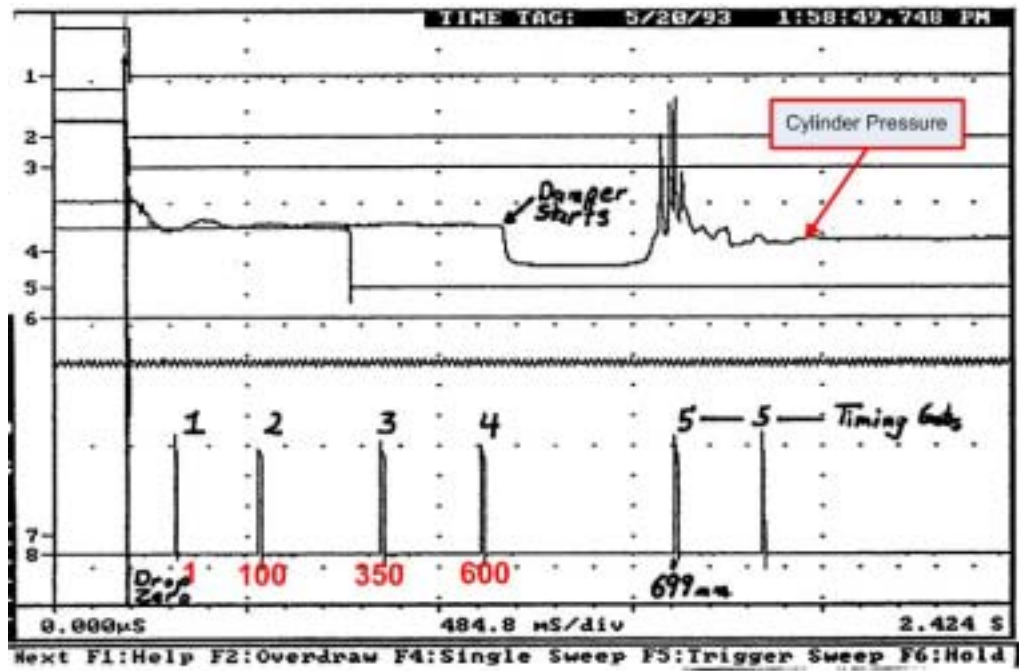
timing gate #5가

647mm

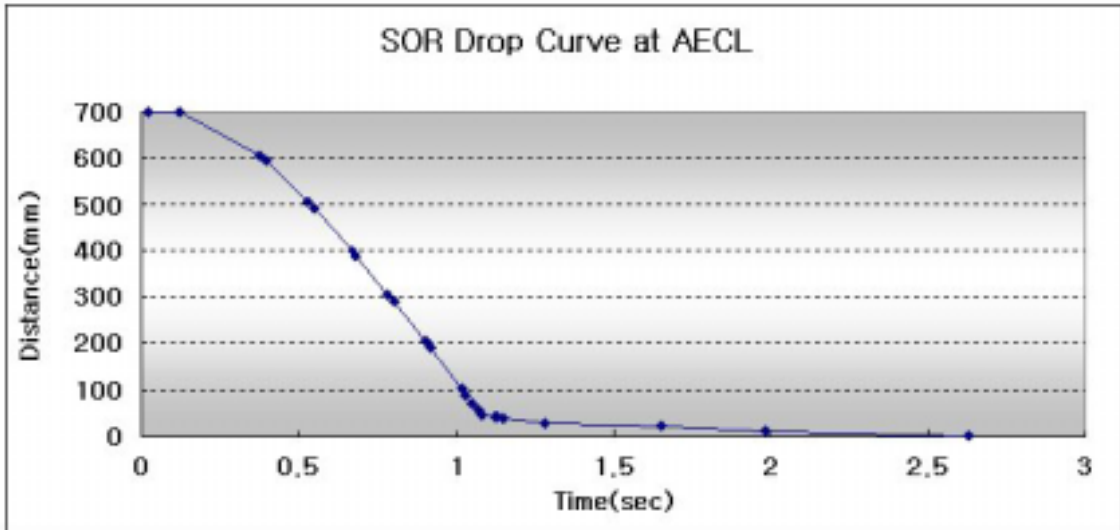
647mm

6

647mm



6. AECL



7. AECL

2.5.2

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6

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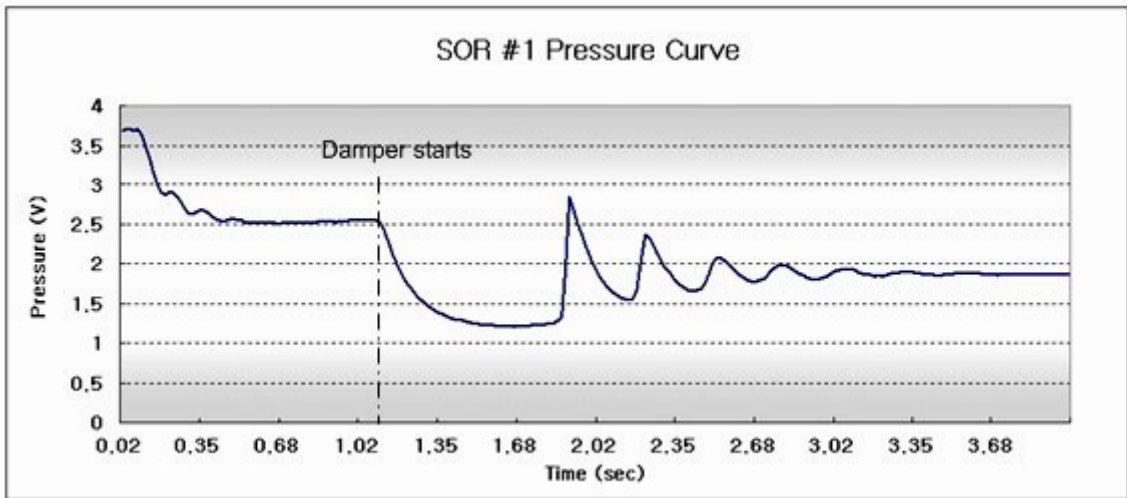
(647mm)

1.13

8

(700mm)





8.

2.5.3 1/2-

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2/1-

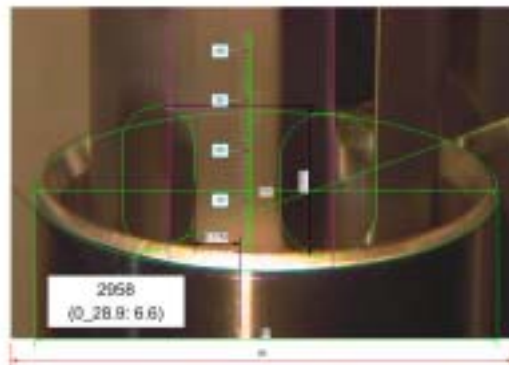
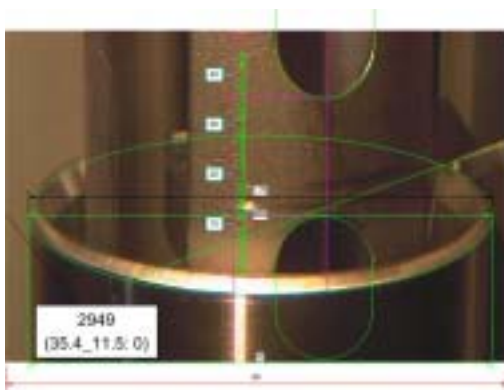
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60 frame

9



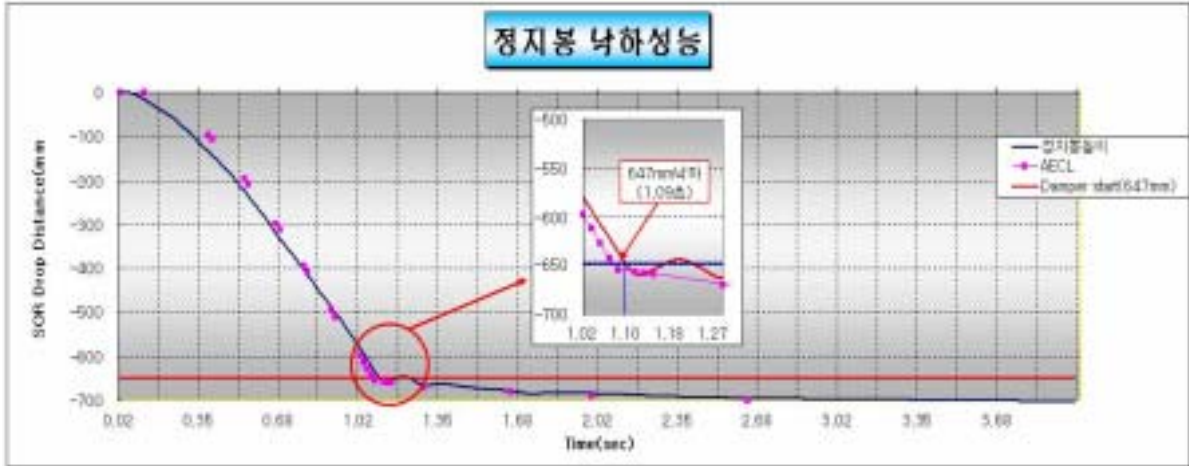
9.

10

AECL

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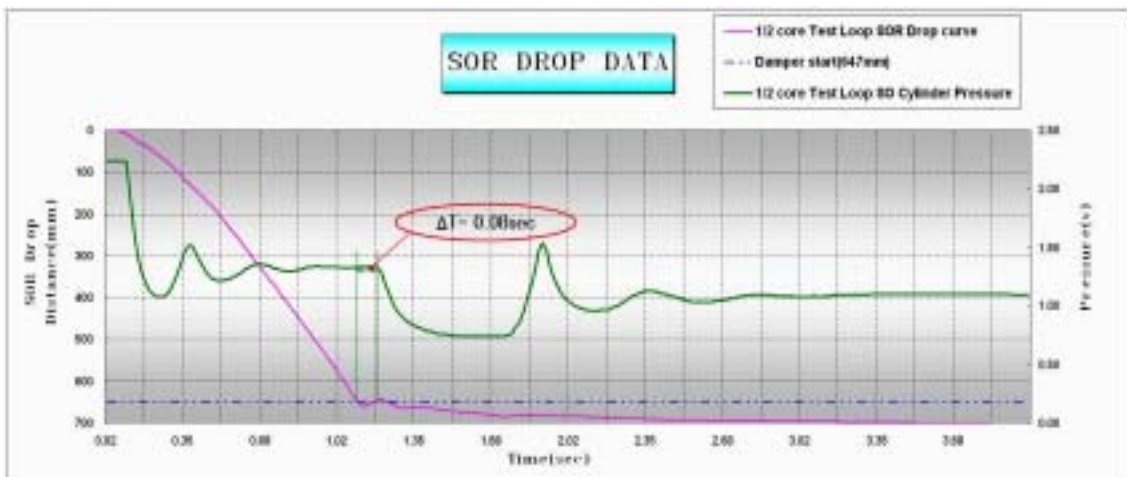
10.

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0.08 (7%)



11. 1/2-

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[4]

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3.

(1)

1/2-

(2)

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(3)

0.08 (7%)

(4)

(5)

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(6)

4000

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1. R.R. Bodner, KRRR Shut-off Unit Test Report, AECL/KAERI, TR-37-31730-001, Rev.1, 1994.1.14
2.            11 ,            / ,            ,  
KAERI/TR-1633/2000, 2000.8,
3.            8 ,            ,  
2003            , 2003.10.30
4.            3 ,            가            ,  
2003            , 2003.10.30