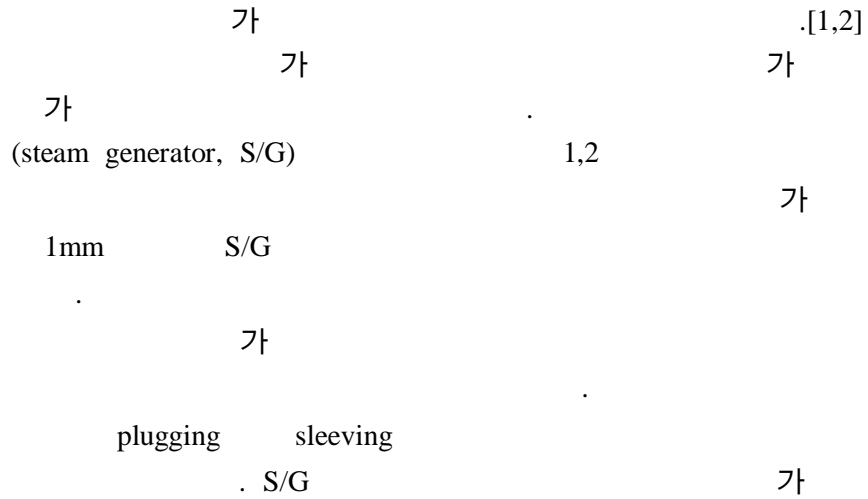




1.



2.

2.1

Fig. 1

A. System:

- Room temperature operating
- Fluid : water
- Pressure rating: 51.7 MPa (7500 psi)
- Flow capacity: 45.6 liter/min.(12 GPM)

B. Units:

- Suction Tank : 3013 liter(793 gallon)
- High pressure pump unit
- Test module & Protective enclosure
- System programmer (Data acquisition)
- Control panel : Diverter valve(3 way)  
Control valve  
Pressure indicator(2 ea), and Flow rate indicator

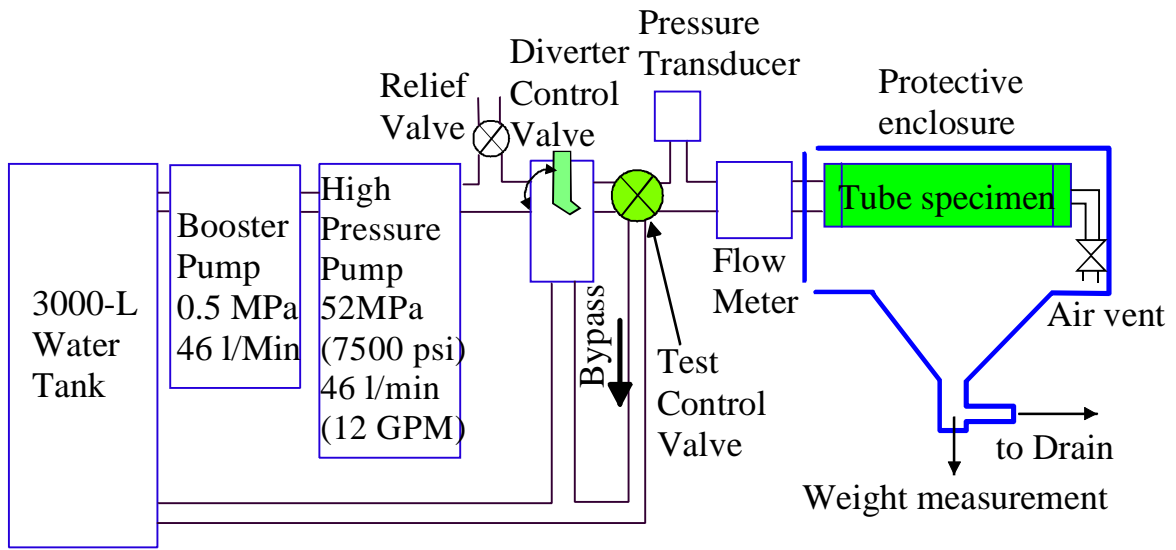


Fig. 1 Leak and burst testing system of KAERI

가

가

(Lexan) 2

valve

Test control valve

valve

flow meter

2.2

Alloy 600

20 ~ 30cm

가 (Electro Discharge Machining)

Table 1

2.3

가

가

Table 1 Information of the leak and burst test on EDM notched tubes

Tube ID	Heat	Type, EDM notch (LxD)*	Tube length, mm
KY56001	alloy 600 *	5x100	300
KY56004	"	5x80	"
KY56005	"	10x80	"
KY56006	"	5x80	200
KY56013	"	60x80	"
KY56014	"	60x80	"
KY56015	"	60mm long axial x 5 mm circum x 60%TW	300
KY56016	"	"	300
KY56017	"	"	300
KY56018	"	"	300

가 . 가 , 가 (bladder) 3.2 mm Tygon(trade mark) tube 가

3.

Fig. 2-(a) 5mm 60% 가 (b)  
 1.037 l/min 37.2 MPa  
 1 2 가 8 MPa  
 가



(a)

(b)

Fig. 2 가

(a), (b)

Fig. 3 60 mm 가

80%

(tearing)

(ligament)

22.3 MPa(3240 psi)

42.3 l/min

Fig. 4 60 %

60mm

5 mm

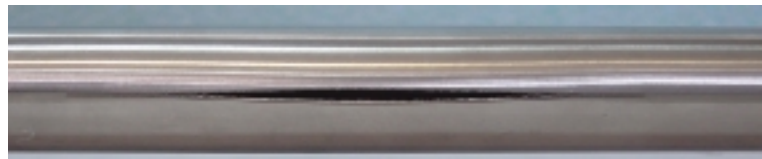


Fig. 3

(60 mm long, 80% TW)

4.5MPa/sec

35 MPa

가

1

가

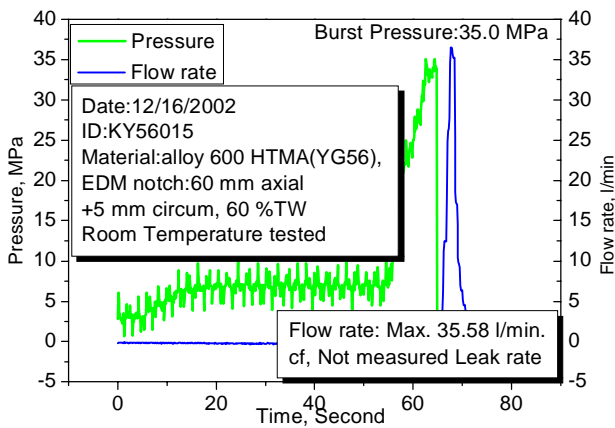


Fig. 4 /

(60 mm axial x 5 mm circum., 60 %TW)

33 MPa

Fig. 5  
53 l/min

44.2 l/min

가

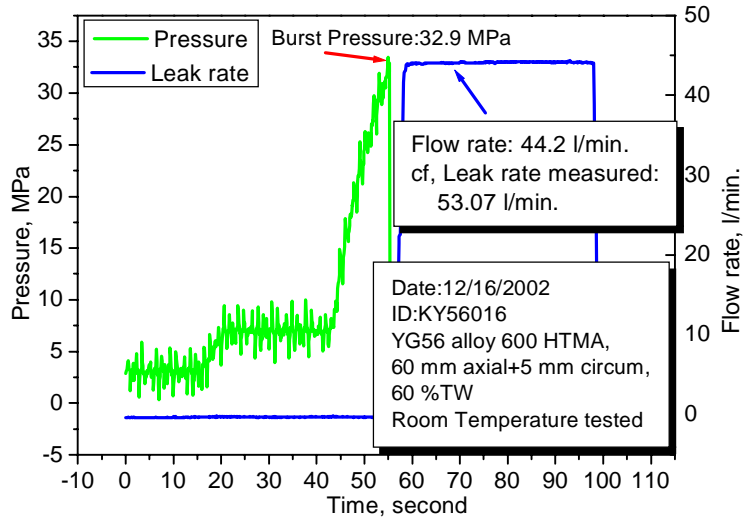


Fig. 5 (60 mm axial x 5 mm circum x 60 %TW)

Table 2 Fig. 6

60% 60 mm

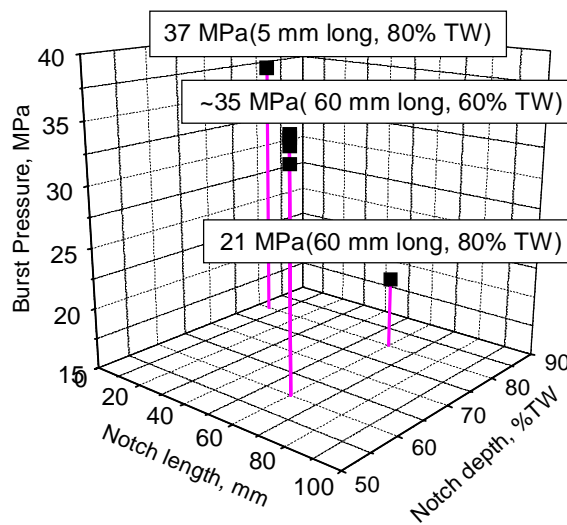


Fig. 6 Relationship among notch length, notch depth, and burst pressure

35 MPa 가 80% 가 80% 21 MPa  
 MPa 가 가 5 mm 37  
 가 가

Table 2 Summary of the leak and burst test on mechanical flawed SG tubes

Tube ID	Heat	Type, EDM notch (LxD)*	Tube length, mm	Test date	Bladder	Leak @ 10.8 MPa (1560)	Burst pressure or final leak rate MPa, l/min
KY56001	alloy 600*	5x100	300		NO	No record	-
KY56004	"	5x80	"		NO	No record	-
KY56005	"	10x80	"			-	-
KY56006	"	5x80	200	11/20/02	NO	-	37.2, 1.037
KY56013	"	60x80	"	11/20/02	NO	-	20.9, 42.3(PC data)
KY56014	"	60x80	"				
KY56015	"	60mm axial x 5 mm circum x 60%TW	300	12/16/02	NO	NO	35.1, 35.58
KY56016	"	"	300	12/16/02	NO	NO	32.9, 53.07
KY56017	"	"	300	01/09/03	3.2mm t Tygon	NO	34.8, 34.93***
KY56018	"	"	300	01/09/03	3.2mm t Tygon	NO	34.2, 32.94***

Cursory ECT:Not applied

\*alloy 600 HTMA(YG56), as received, \*\* length, mm, depth % tubewall

\*\*\* Measured with Teflon plug and tygon tube inserted after the burst

4.

가 가 bladder  
 , 60%  
 tearing bladder 가 가

5.

[1] J.S.Kim, S.S.Hwang, et al., 'Destructive analysis on pulled tubes from Ulchin unit 4' Korea Atomic Energy Research Institute, 2003.

[2] P.E. MacDonald, NUREG/CR-6365, Steam Generator Tube Failures, 1996.