

# Current status of RRT in Korea

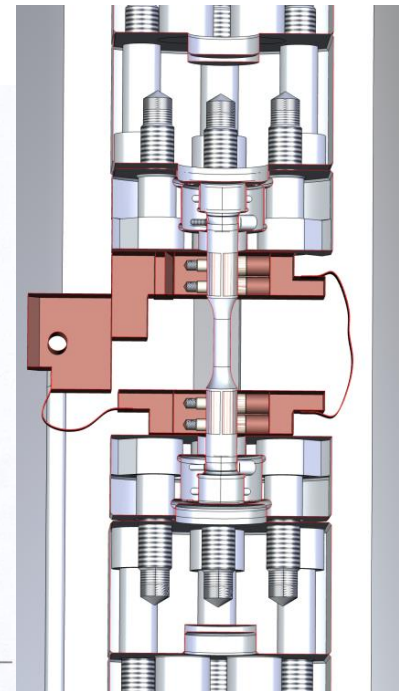
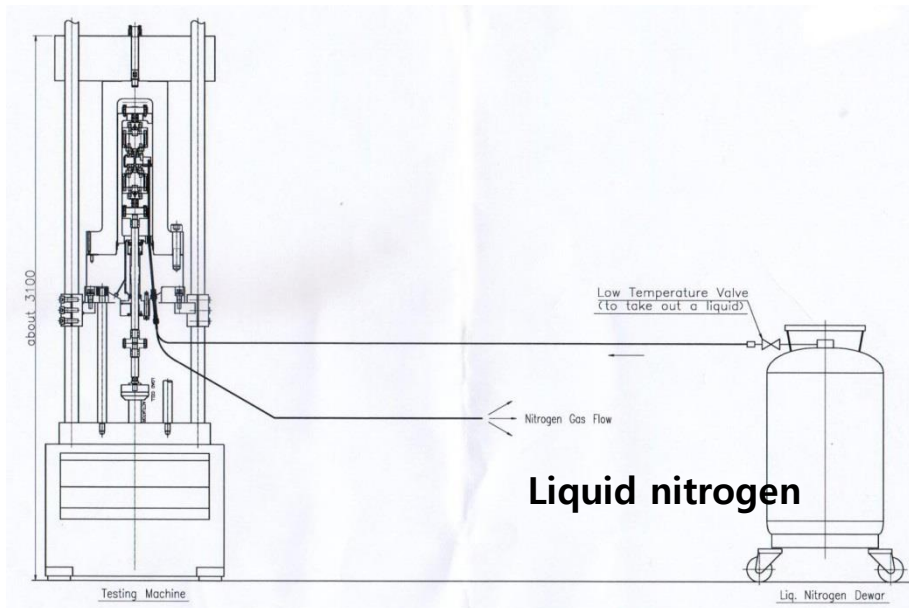
**UN BONG, BAEK**  
**(ubbaek@kriss.re.kr)**

*UN GTR No.13 (Phase 2)–6<sup>th</sup> Meeting, Tianjing China*



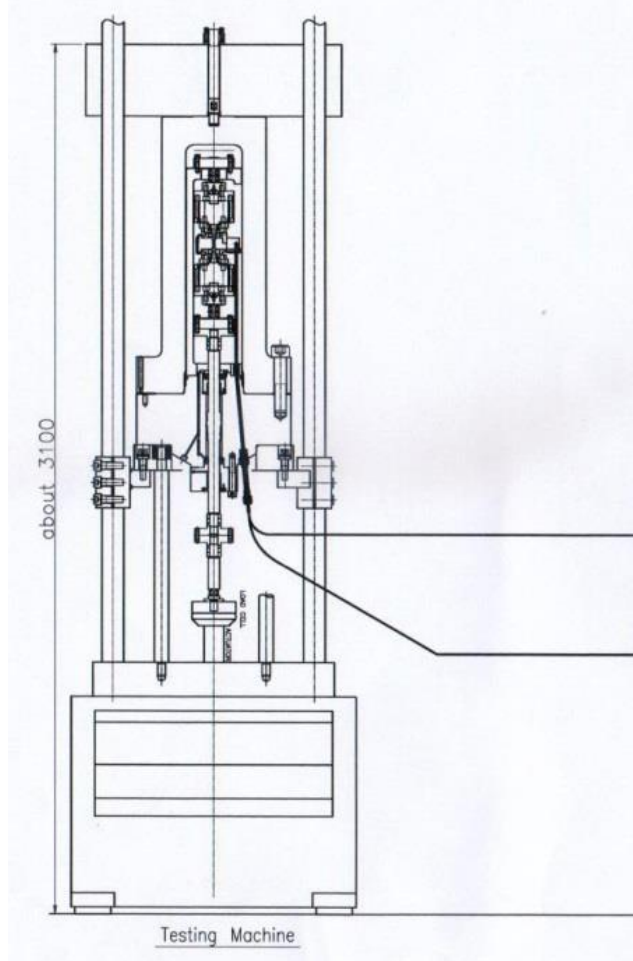
## ● Initial Design Concept

- ✓ Design pressure : 132 MPa
- ✓ Operating pressure : 120 MPa
- ✓ Design temperature : - 90 °C
- ✓ Operating temperature : - 80 °C
- ✓ Inner loadcell : 50 kN



- Change medium from liquid nitrogen to chiller

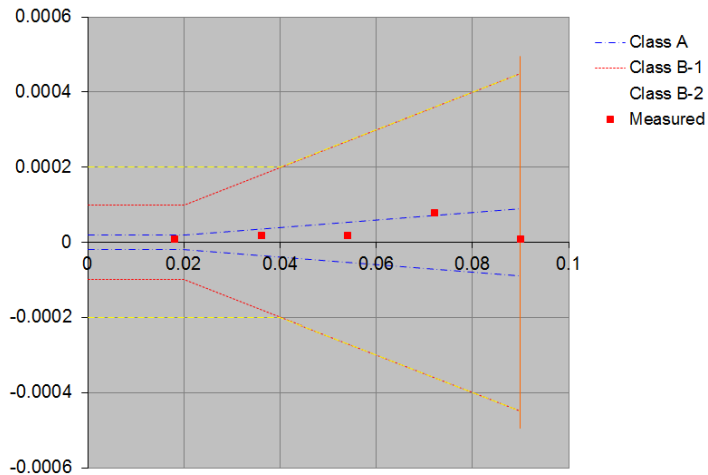
✓ at April



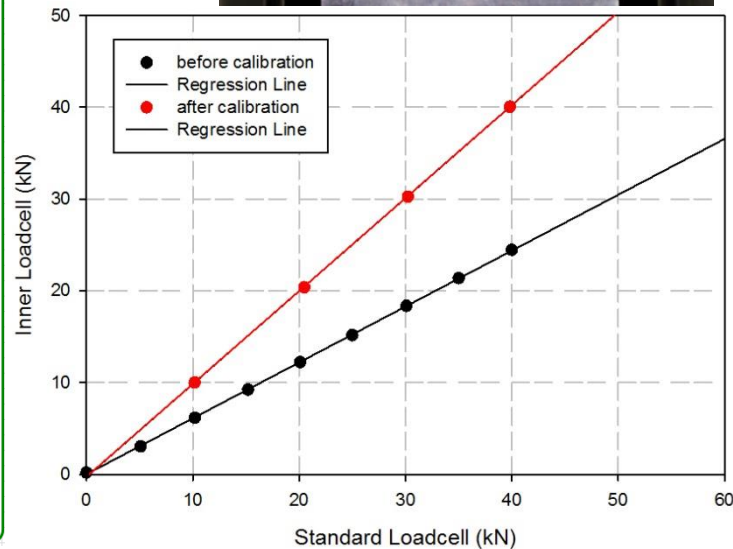
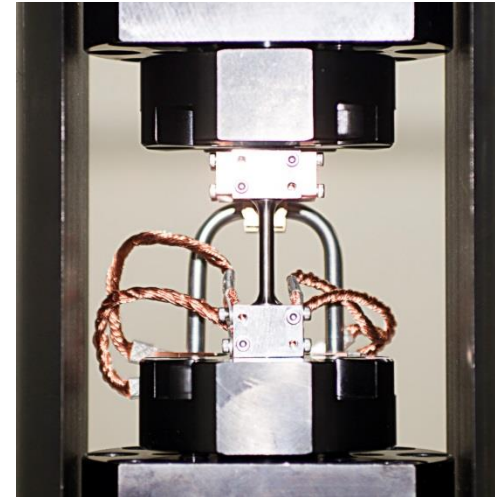
## ● Calibration

- ✓ Extensometer Calibration
- ✓ Inner Loadcell Calibration

Error of Extensometer System (Tension)



Extensometer calibration



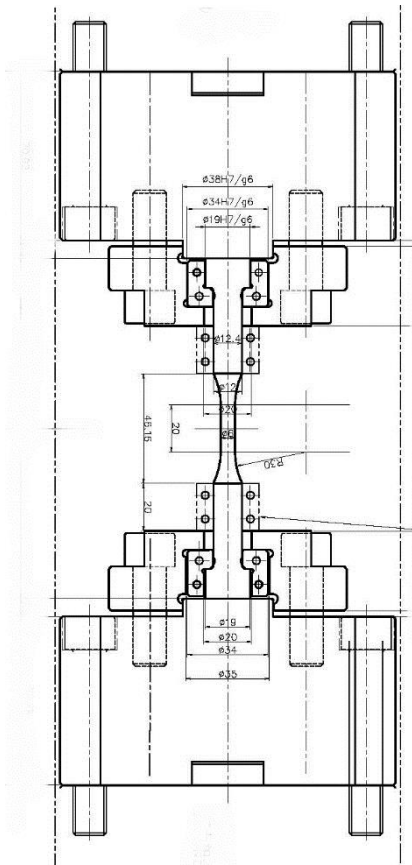
Inner Loadcell calibration



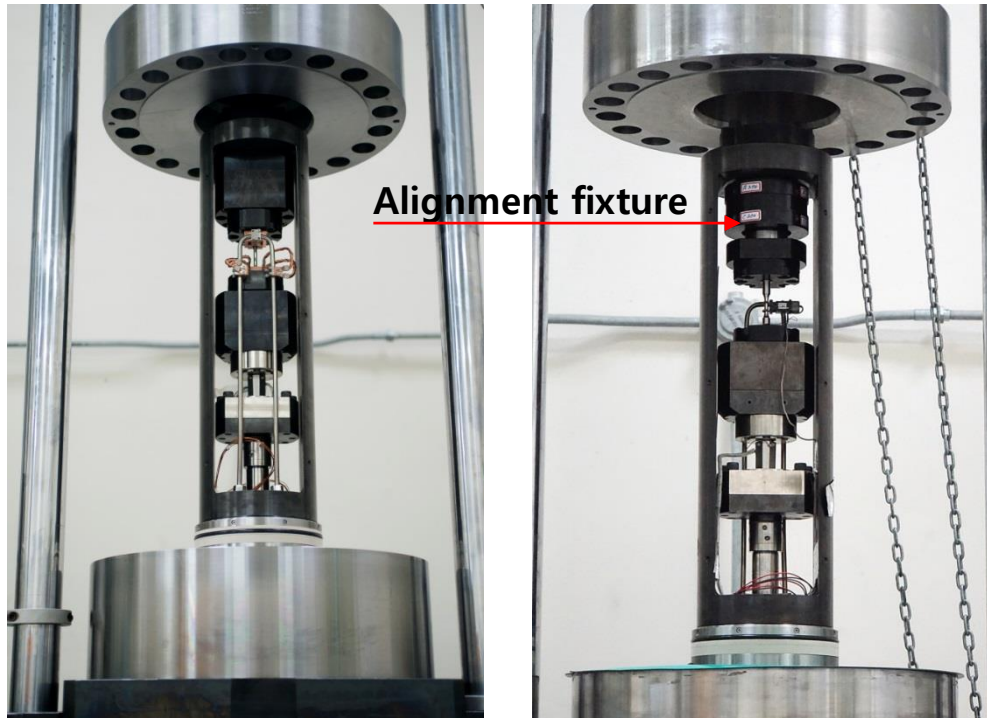
- **Grip**

- ✓ Initial design for button head type specimen

- ✓ Testing for tension/compression

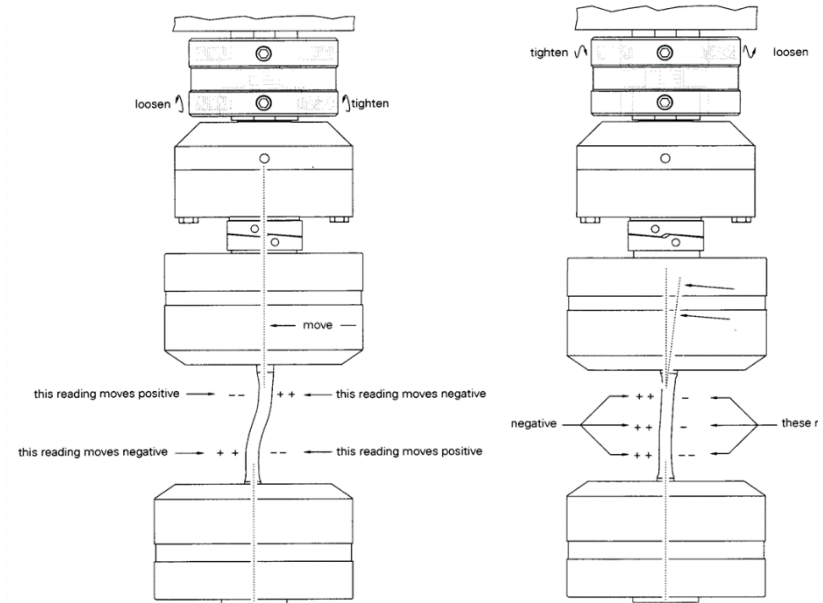


- Apparatus for axial alignment



Original apparatus

Modified apparatus



Concentric alignment

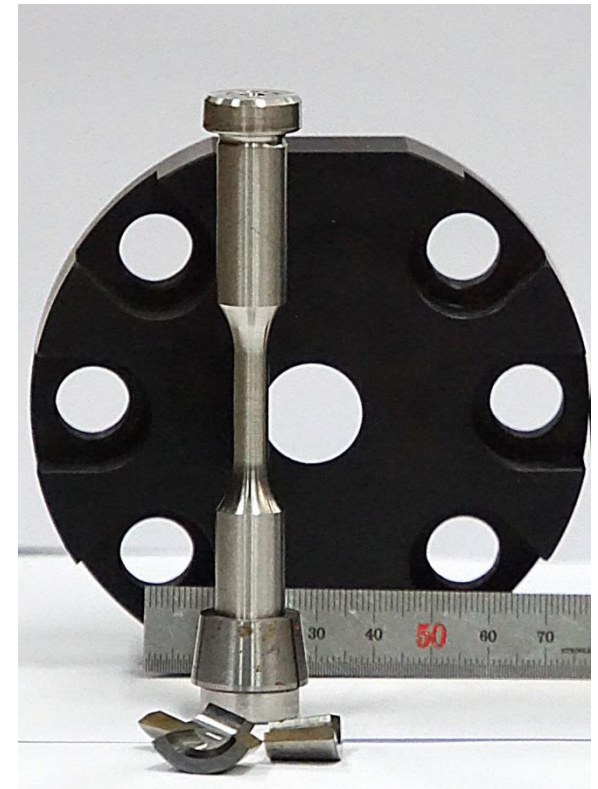
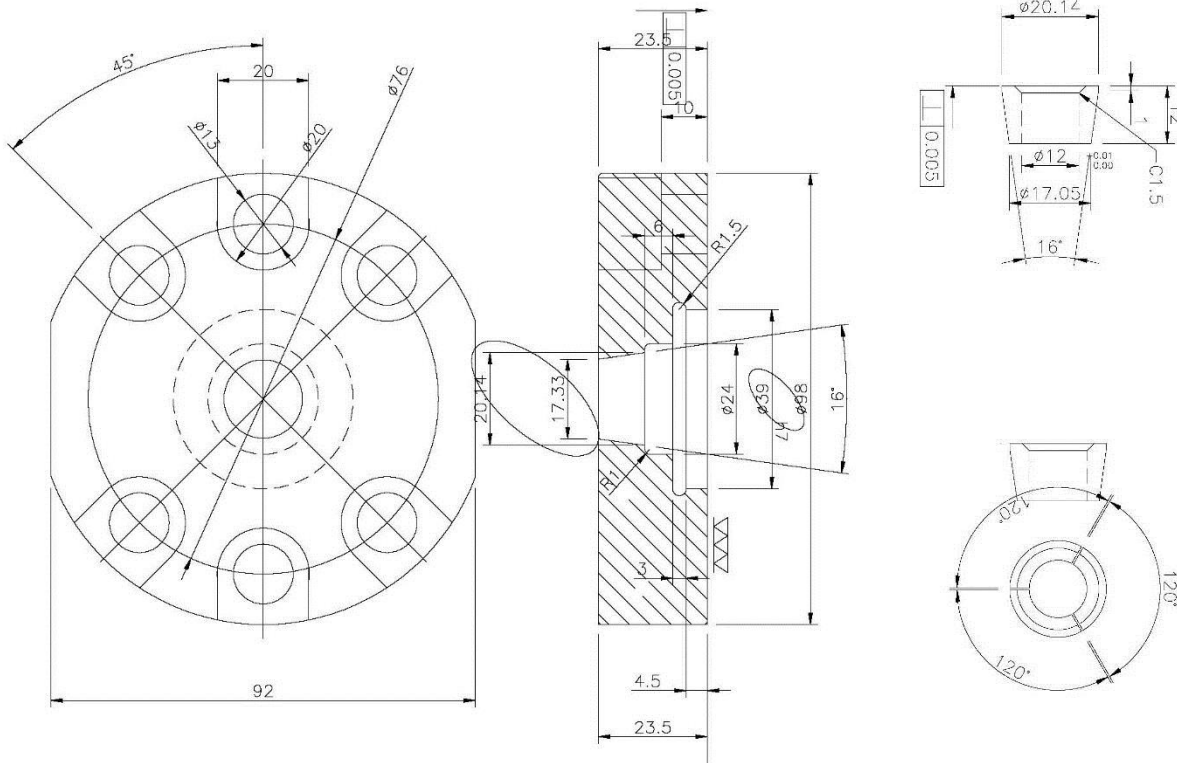
Angular alignment

\* PB(percentage bending)

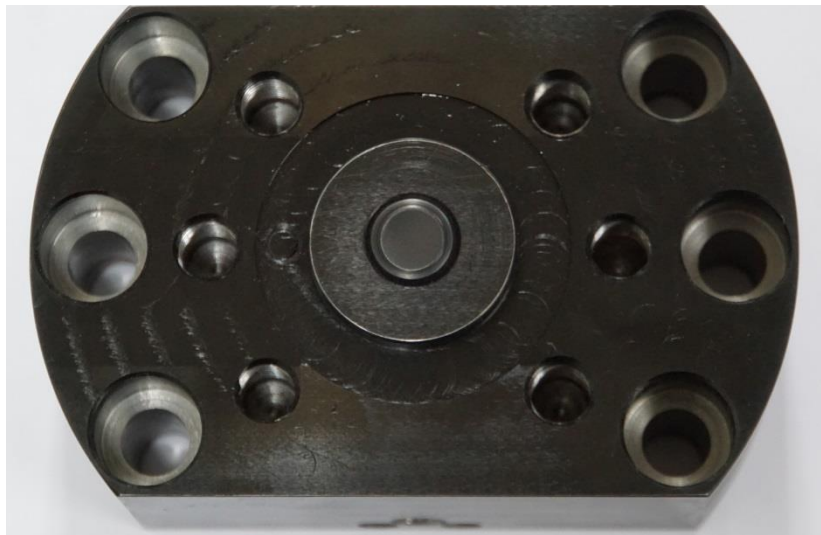
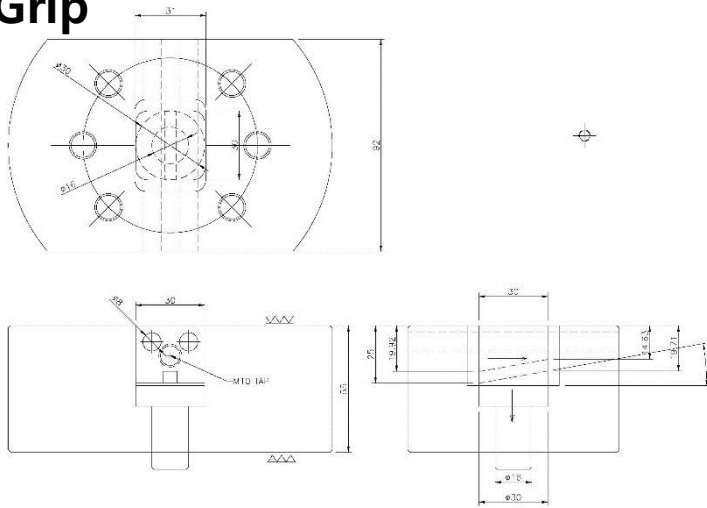
Test Method	ASTM Number	Maximum Allowed PB*
Standard Practice for Conducting Force Controlled Constant Amplitude Axial Fatigue Tests of Metallic Materials	E466-96	±5 % (5)
Standard Test Method for Sharp-Notch Tension Testing with Cylindrical Specimens	E602-91	±10 % (6)
Standard Practice for Strain-Controlled Fatigue Testing	E606-92	±5 % (5)

- **Grip**

- ✓ Modified collet grip for button head type specimen



- **Grip**





- Test specimen for RRT

H<sub>2</sub>FC Hydrogen and Fuel Cells Program

## Test Matrix for *Objective 1*

Test	Test conditions	Environment	Number of tests
SSRT	<math> < 5 \times 10^{-5} \text{ s}^{-1}</math>	Control -40°C	3
		90 MPa H2 -40°C	3
Notched fatigue	Sa = 200 MPa R = 0.1 1 Hz	Control -40°C	3
		90 MPa H2 -40°C	3
Smooth fatigue	Sa = 320 MPa R = -1 1 Hz	Control -40°C	3
		90 MPa H2 -40°C	3

Received specimen from Germany

Not Received from USA

Different design with KU

-> Raw material

Received specimen from Japan

Month	Test method	No. of specimen
July, 2019	SSRT @ -40 °C, N <sub>2</sub>	3
August	SSRT @ -40 °C, 90 MPa H <sub>2</sub>	3
September	Notched fatigue @ -40 °C, N <sub>2</sub>	2
October	Notched fatigue @ -40 °C, 90 MPa H <sub>2</sub>	2
November	Notched fatigue @ -40 °C, 90 MPa H <sub>2</sub>	2



Thank you for your attention !!