

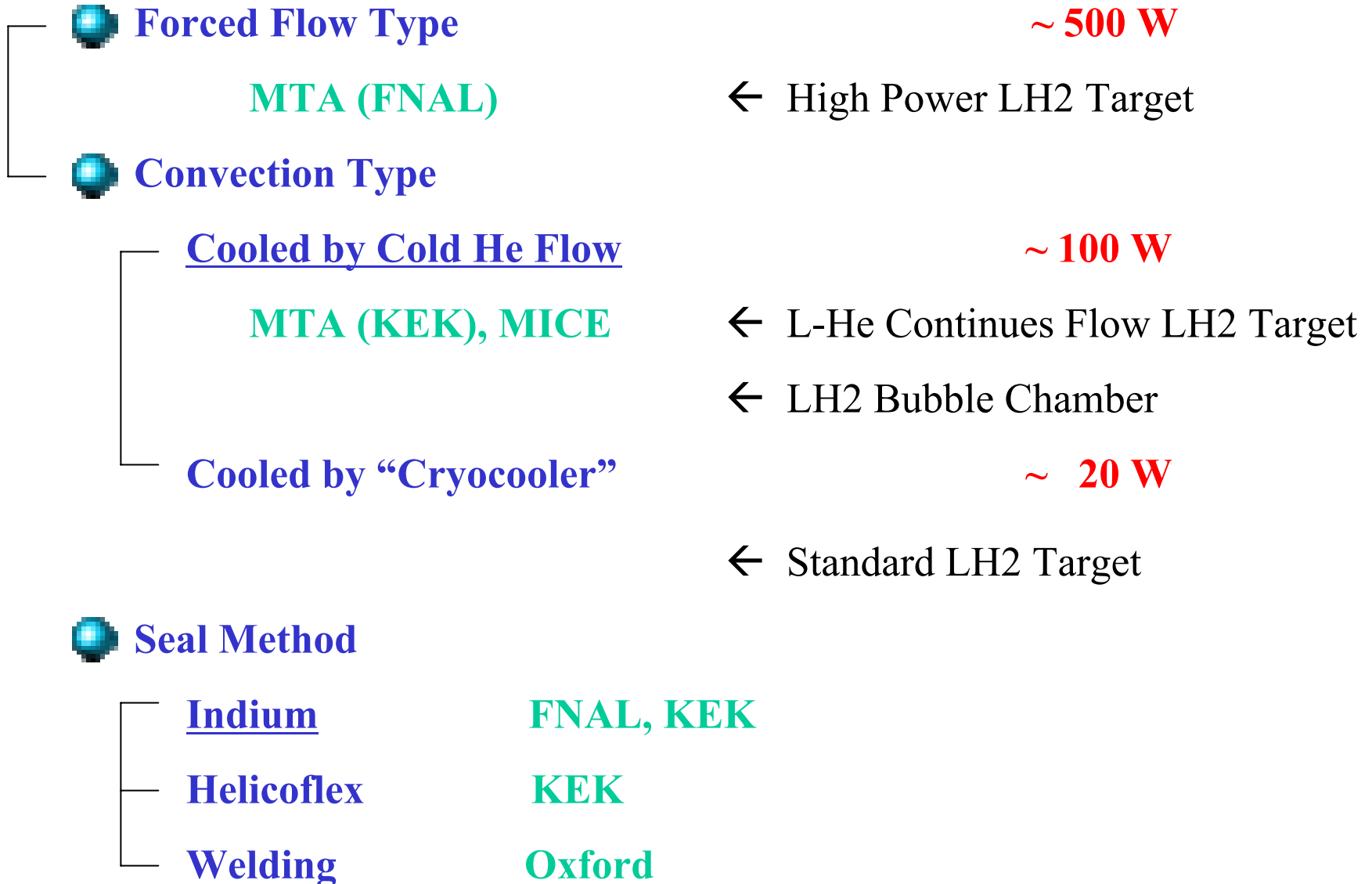
LH2 Absorber R&D

MUTAC Meeting
BNL
April 28-29, 2004

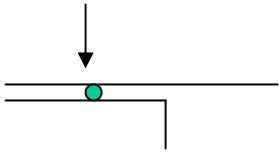
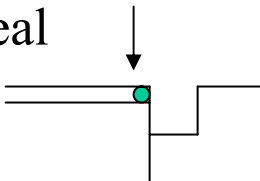
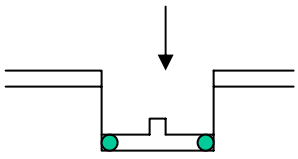
Shigeru Ishimoto (KEK)



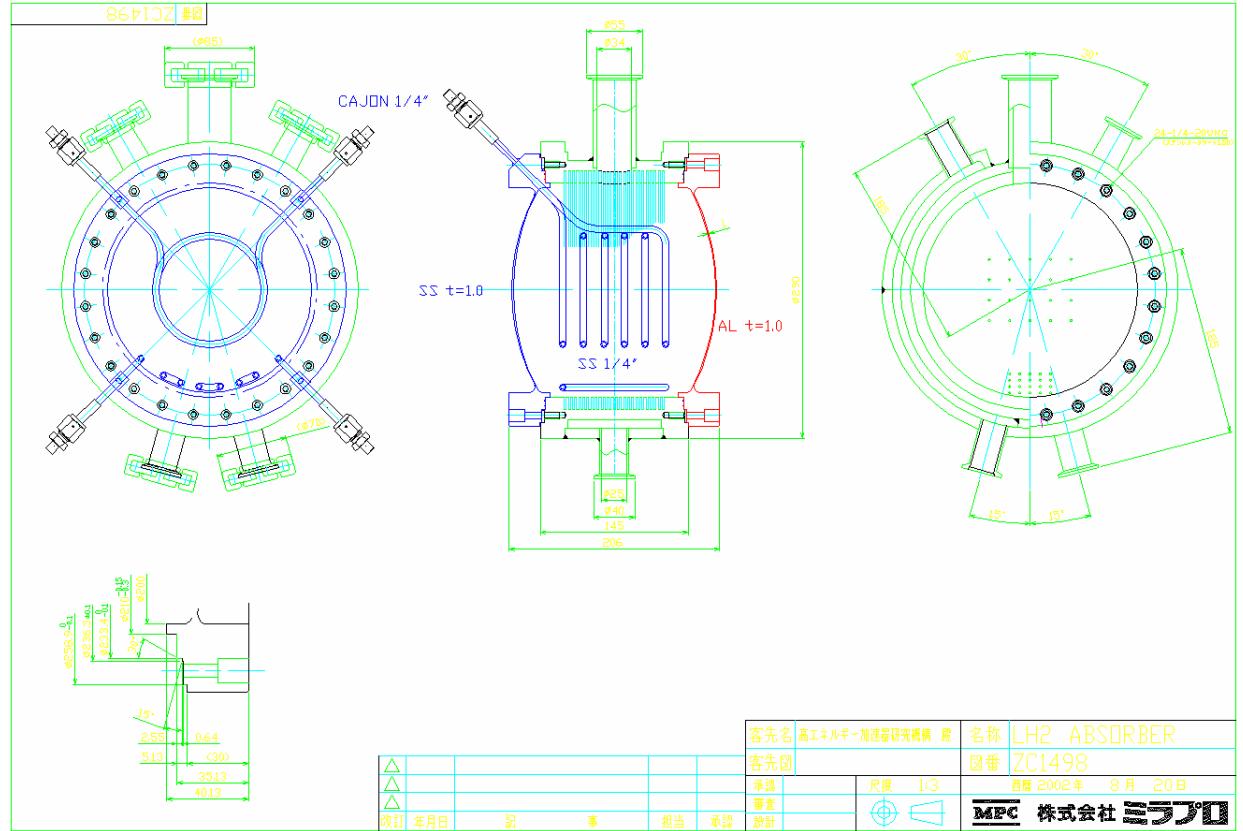
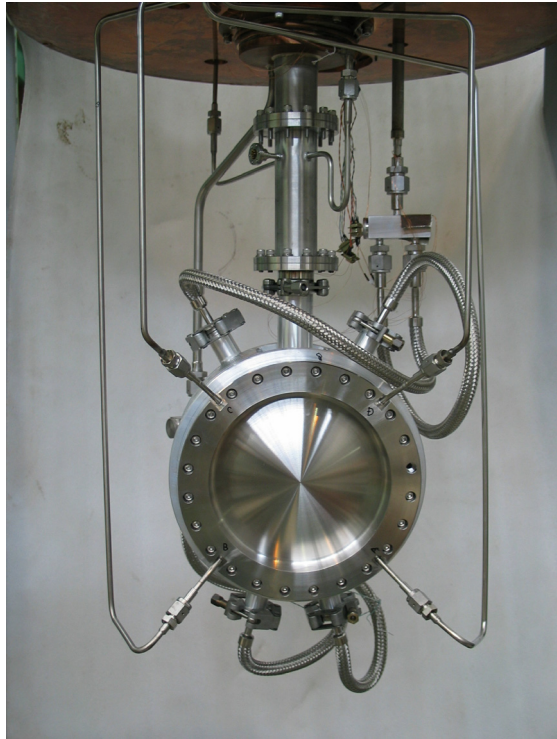
- (1) Mucool Absorber Present Status*
- (2) MICE Absorber Present Status*
- (3) MICE Absorber Test Process and Test Cryostat*



Convection Type Absorbers

Absorber	Diameter	Bolts	Seal	Flange structure
Absorber I (2001)	φ220 mm one loop	S-S 24 - 1/4"	In φ1 mm single	flat seal 
Absorber II (2002)	He-flow φ210 mm two loop He-flow	S-S 24 - 1/4"	In φ1 mm single	flat seal
				corner seal 
Absorber III for MICE (2003/2004)	φ300 mm two loop He-flow	S-S 24 - M6 Helisert	In φ1 mm double	2 corner seals key structure 
			Helicoflex	

Absorber II (2002)



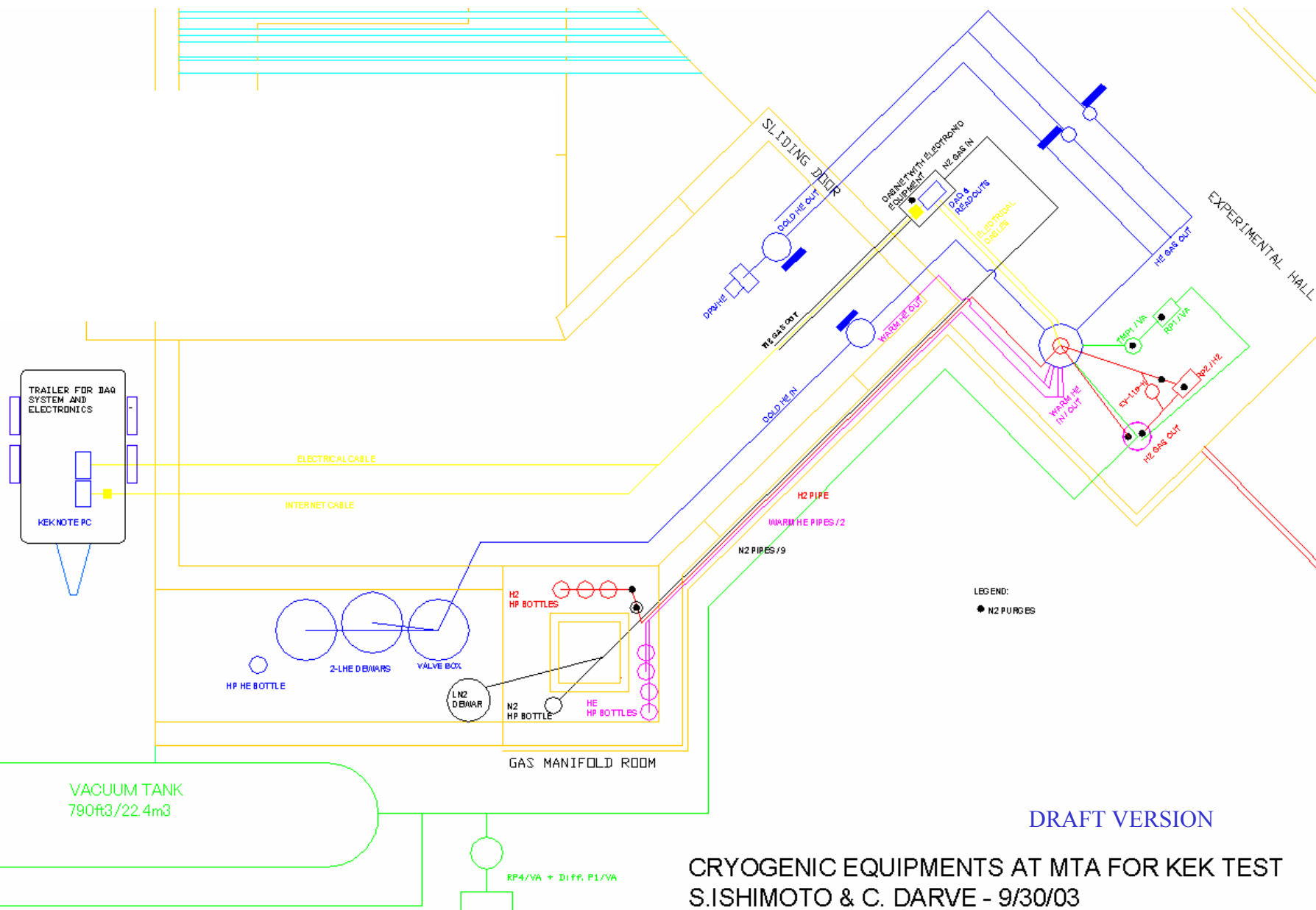
KEK Test Cryostat at MTA/FNAL



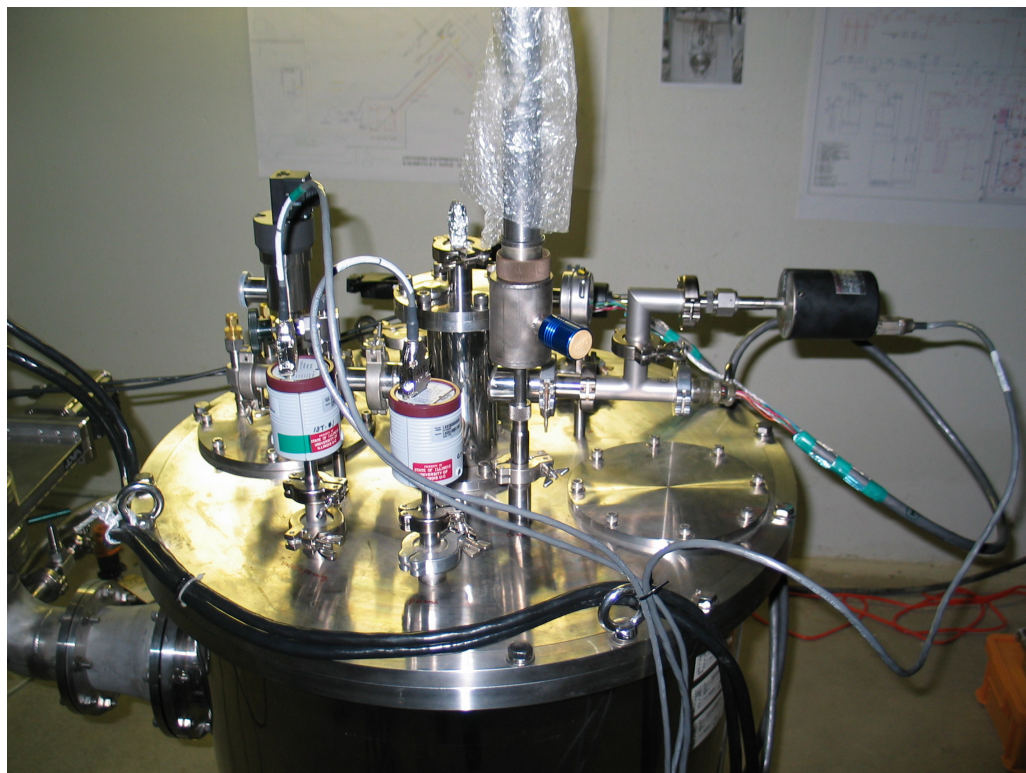


KEK

KEK Test Cryostat at MTA/FNAL

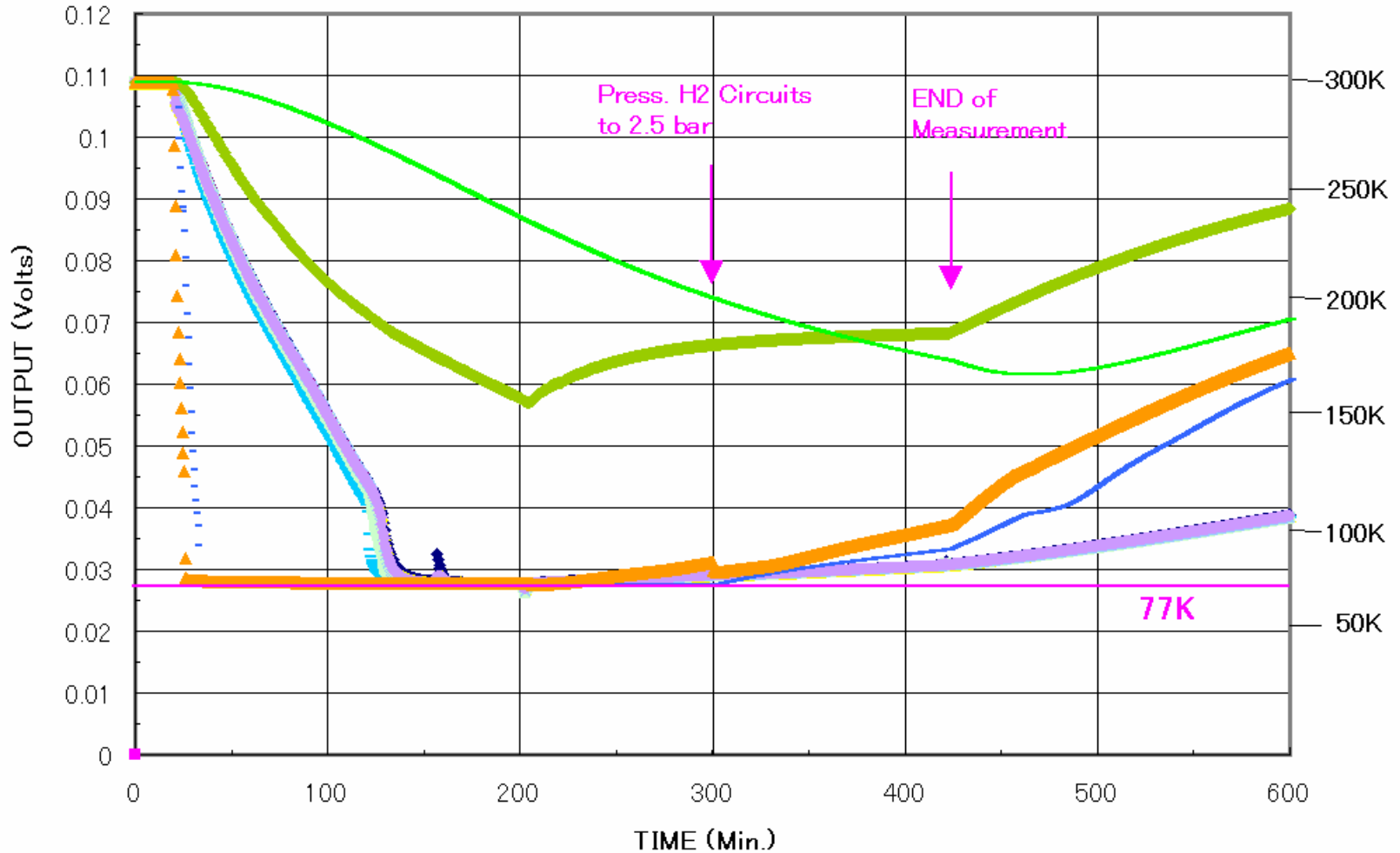


KEK Test Cryostat at MTA/FNAL



L-N₂ Test Results of Absorber II at MTA

L-N₂ COOLING TIME Sep. 22, 2003 at MW9



(1) L-Ne(28-30K) Test at KEK

Absorber & H2 Pipes; He leak test at R.T. and 80K; $< 1 \times 10^{-9}$ atm.cc/sec
Absorber & H2 Pipes; 13 hours at 1.0-2.0 bar, 28-30K -- OK ($0.9-1.2 \times 10^{-7}$ Torr)

(2) Pressure Test at Room Temperature (MAWP is 1.7 bar)

Absorber & H2 Pipes; 60min at 2.0 bar -- OK
He channel ; 60 min at 2.0 bar -- OK

(3) Helium Leak Test at Room Temperature

Absorber & H2 Pipes; $< 1 \times 10^{-9}$ atm.cc/sec *
He channel; $< 1 \times 10^{-9}$ atm.cc/sec *

(4) Pressure Test at 80K (LN2 flow in He Channel)

Absorber & H2 Pipes; 30 min at 2.5 bar -- OK

(5) Helium Leak Test at 80K

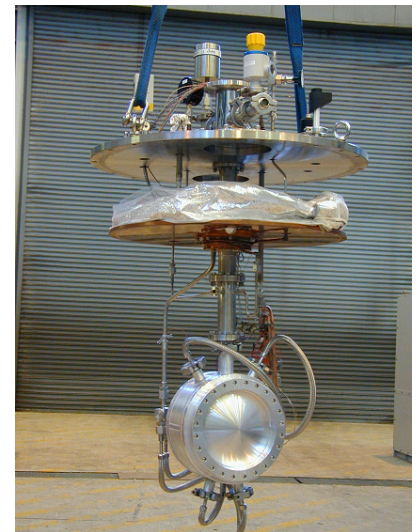
Absorber & H2 Pipes; $< 1 \times 10^{-9}$ atm.cc/sec *

(6) Vacuum Vessel Pressure Test at Room Temperature

Vacuum Vessel; 68 min at 2.5 bar -- OK

(2)-(6) were tested on FNAL/US safety regulations at FNAL.

* Calibrated sensitivity $< 10^{-9}$, B.G.= $1.3-4.4 \times 10^{-9}$ atm.cc/sec



Absorber II
KEK → FNAL

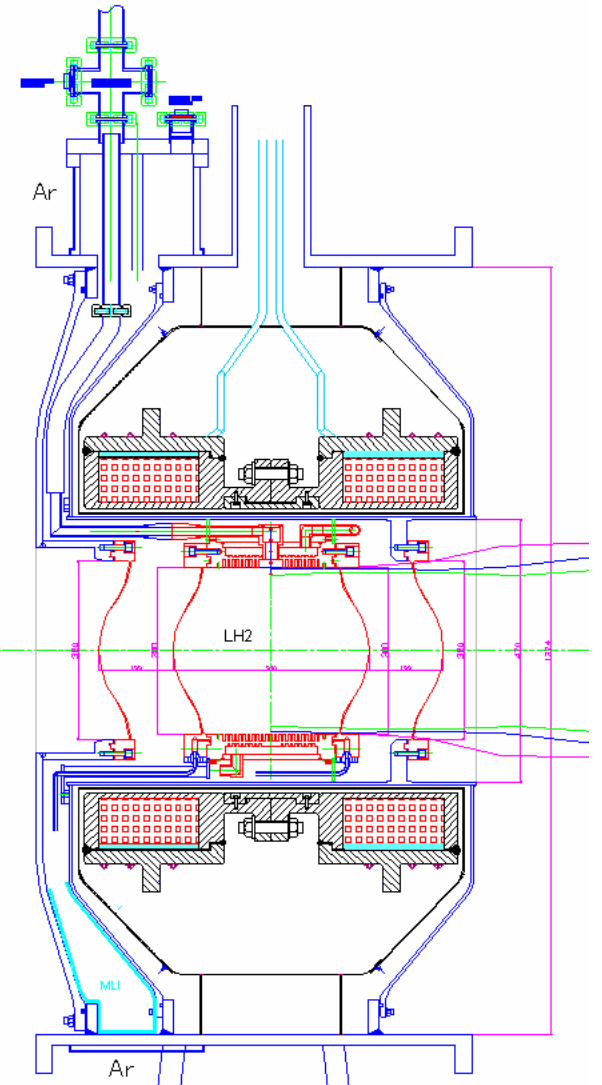
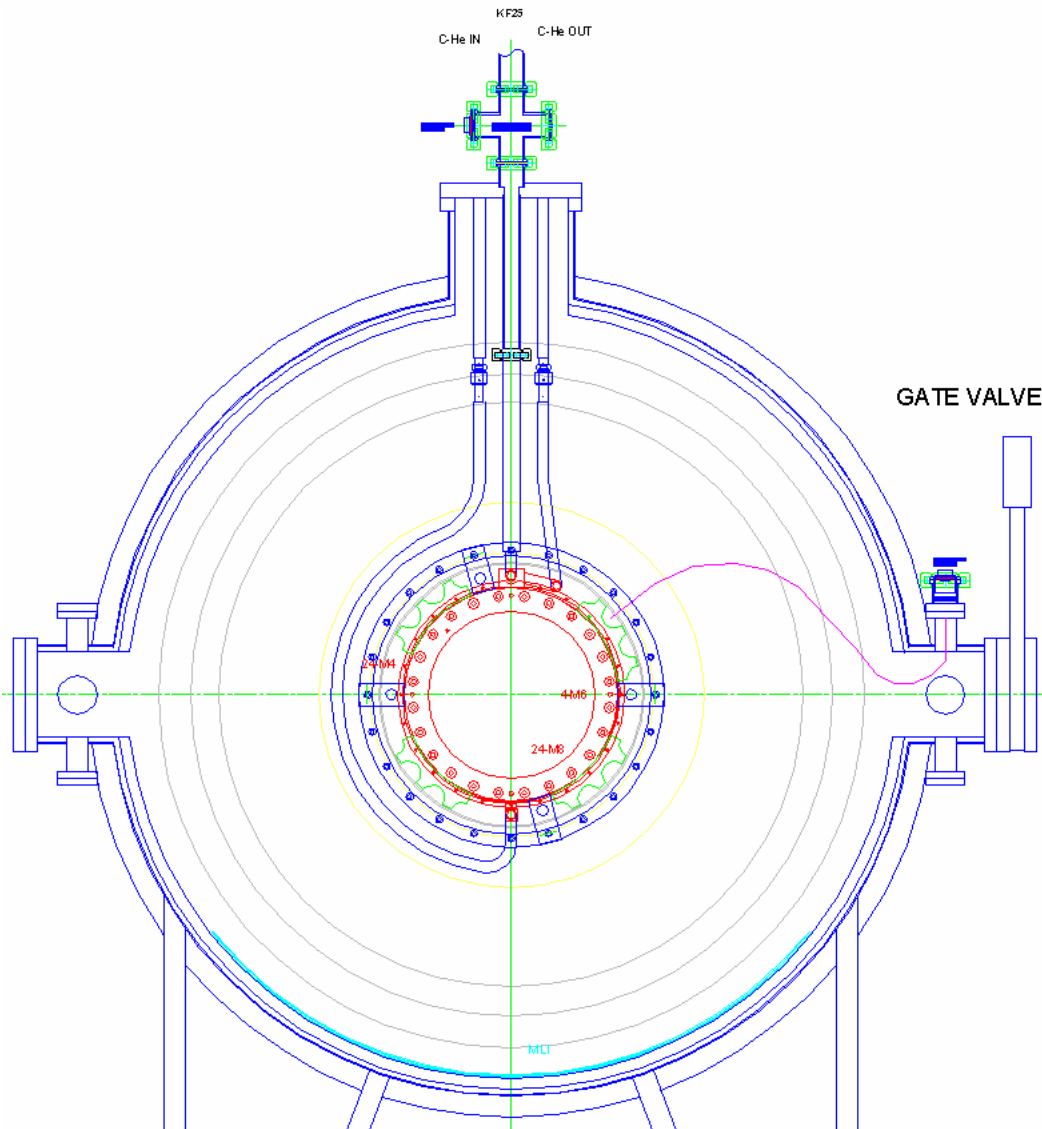
MICE Absorber Present Status

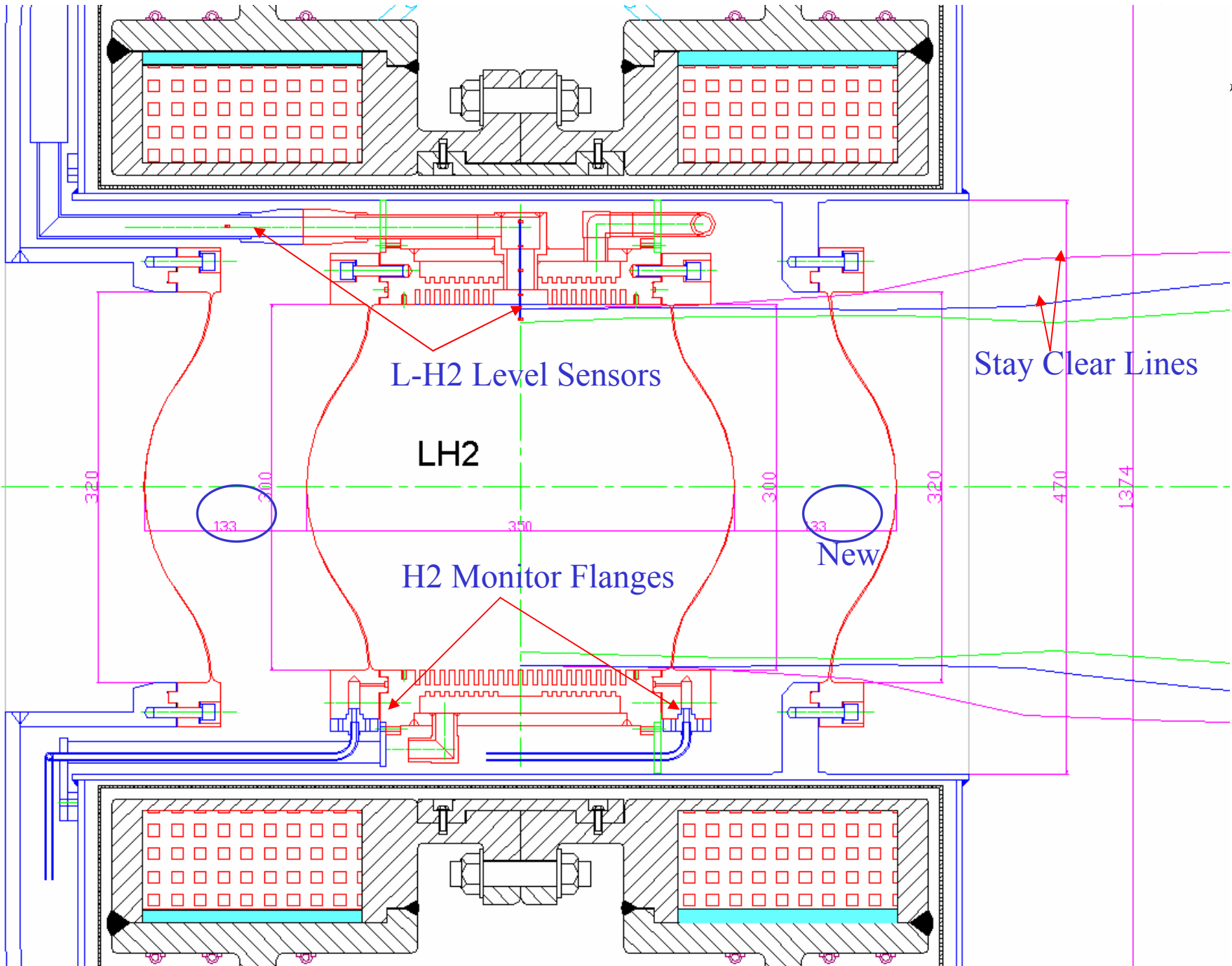
MICE Absorber (Absorber III)

Design Guide Line

1. Based on Absorber I and Absorber II developed at KEK.
2. D=300 mm, bolt-type flange
3. SS-bolt + Helisert (helical coil wire screw thread insert)
4. Double Indium-seal for absorber with H₂ gas leak monitoring port, and single seal for vacuum windows.
5. Key structure to prevent the slip due to thermal expansion.
6. Fit to vacuum space and KEK test cryostat.
7. Diameter of vacuum window is 320 mm (Stay off line)
8. Absorber body support units (vertical and horizontal).

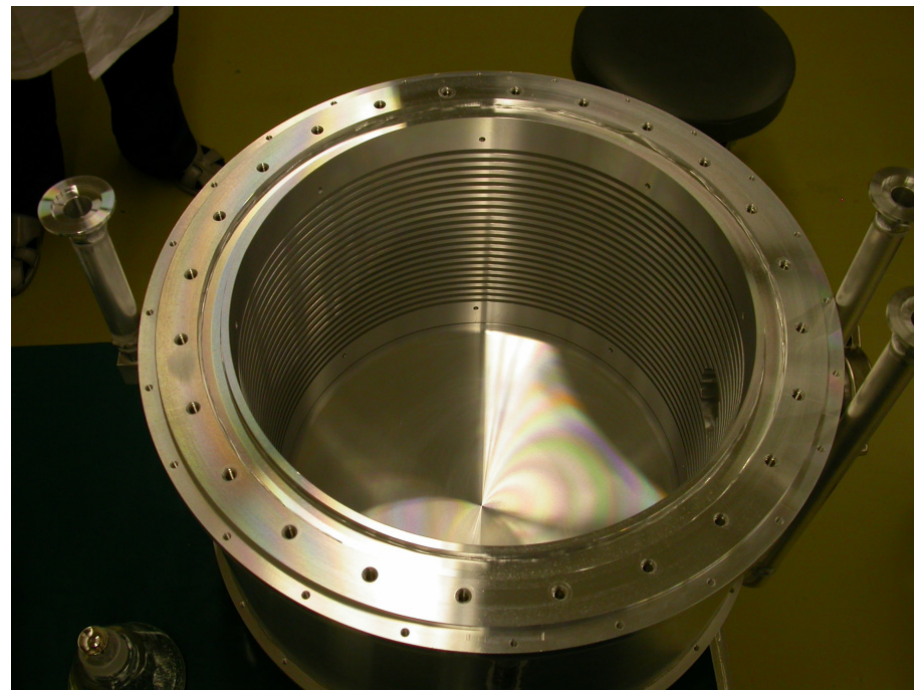
MICE Absorber





MICE Absorber

March-24, 2004



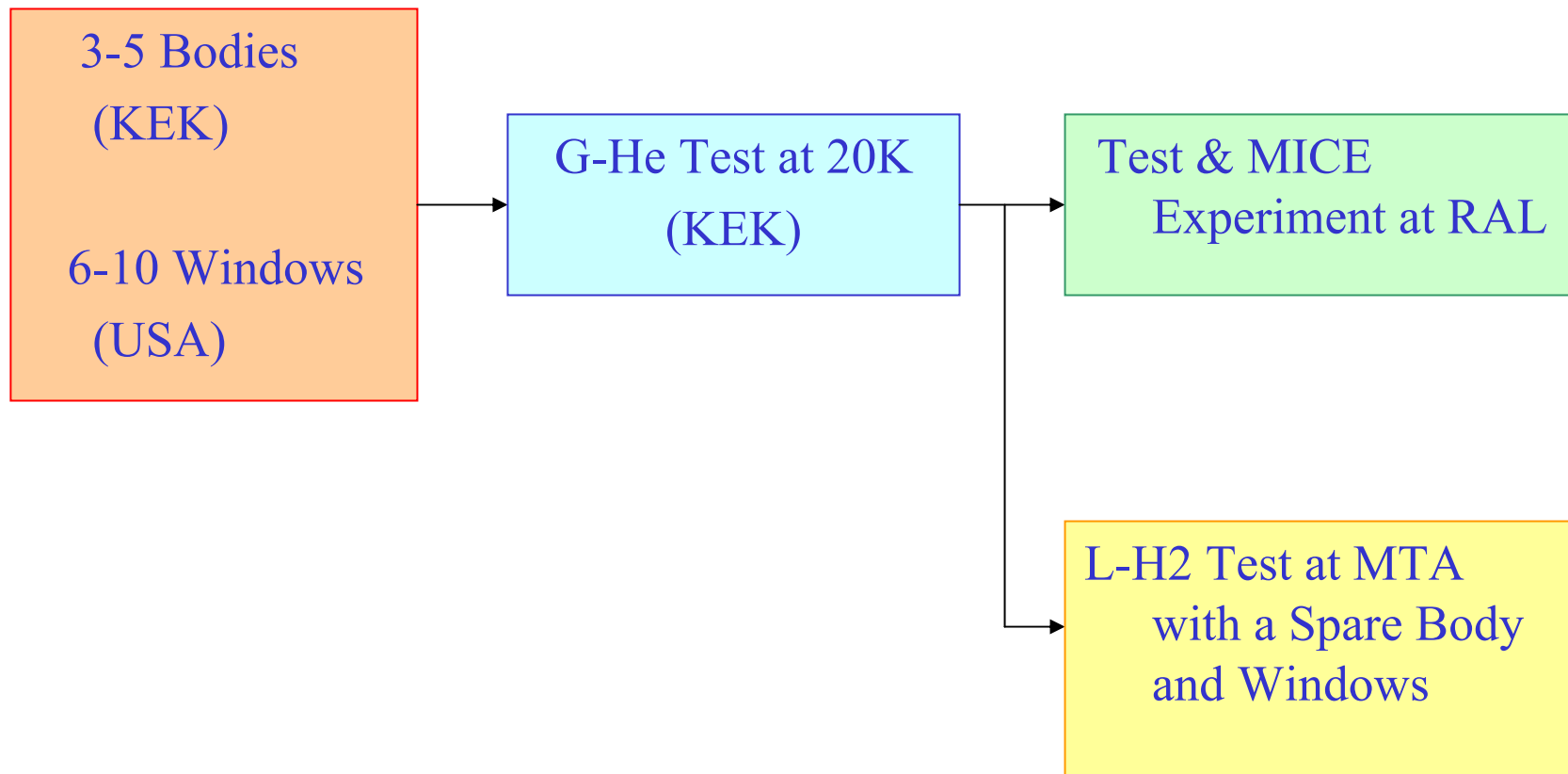
MICE absorber #01 with dummy windows

April-16, 2004



MICE Absorber Test Process and Test Cryostat

MICE Absorber Test Process



Helium leak test of MICE absorber #01

April-16, 2004



MICE Absorber #01 at Room Temperature

April-16th, 2004 at MIRAPRO

(1) Helium Leak Test

a) Leak detector was connected to the H2 Pot, **BG ~ 7.8×10^{-11} Pa*m³/sec**

H2 pipes; OK

Windows; OK

Indium seal; OK

Space between Indium seals; OK

b) Leak detector was connected to the He pipe, **BG ~ 1.4×10^{-10} Pa*m³/sec**

He pipe and covers; OK

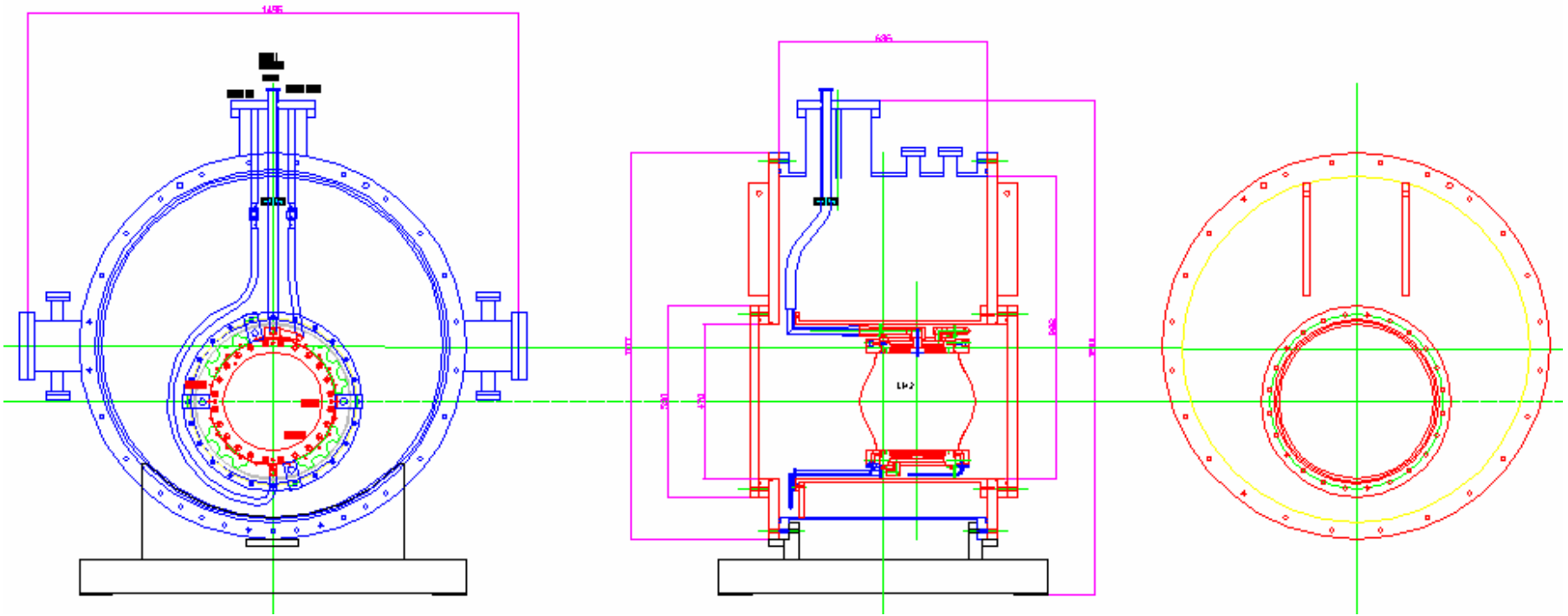
H2 pot to He pot; OK

(2) Pressure Test

a) He pot; +0.30 MPaG N2 gas in 15 min; OK

b) H2 pot; +0.27 MPaG N2 gas in 15 min; OK

MICE Absorber Test Cryostat (Plan)



Summary

- (1) MTA test will be done soon.
- (2) MICE absorber (#01) has arrived.
- (3) Horizontal test cryostat will be designed and fabricated at KEK.
- (4) MICE absorbers will be tested at KEK by cold G-He at 10-20K.
- (5) MICE absorbers will be shipped to RAL with sensors and real windows (ready to use). ← Planning
- (6) L-H2 test at FNAL/MTA by a spare MICE absorber. ← Planning