

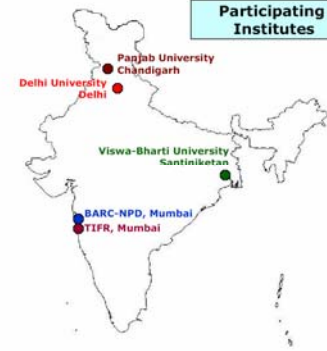
RPCs for CMS – Phase I Status report

L. M. Pant
BARC-NPD

RPCs for RE2A in CMS : Indian hardware contribution



Participating Institutes



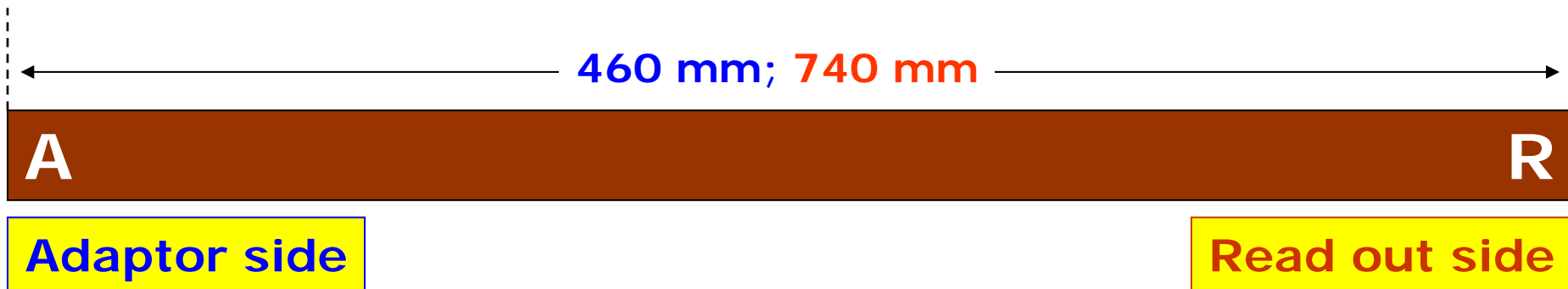
Indents Status (12 sets) : Three RE*/3 & Nine RE*/2)

SN	Item Description	Quantity	Order placed with	Amount	Expected date of delivery	
1	HCP	12	Beijing BAMTRI Tech. & Devp. Co. 05 th Jan 2007	USD 6,922	May 2007 Adv. Payment gone	
2	Cu + Mylar sheets for Faraday Cage	12	Beijing GaoNengKedi Science & Tech. Co. Ltd. 06 th Feb. 2007	USD 7,469	May 2007 Adv. Payment being processed	
3	Read out strips	12	same as above			
4	Ferrules for signal cables (all 80 RPCs)	16,667	same as above			
5	FEBS (for 12 chambers)	36	M/s Matrix, Italy 5 Jan 2007	USD 7,758	May 2007 Adv. Payment gone	
6	Bakelite gaps (3 x RE*/3)	9 gaps (RPC Box)	From CERN		Arrived in Mumbai on 15 th Feb. 2007	
7	Bakelite gaps (9 x RE*/2)	27 gaps	(?)		NO IDEA	

Signal cable preparation (Draka cable : ~ 3 mm OD) : RE*/2 & RE*/3

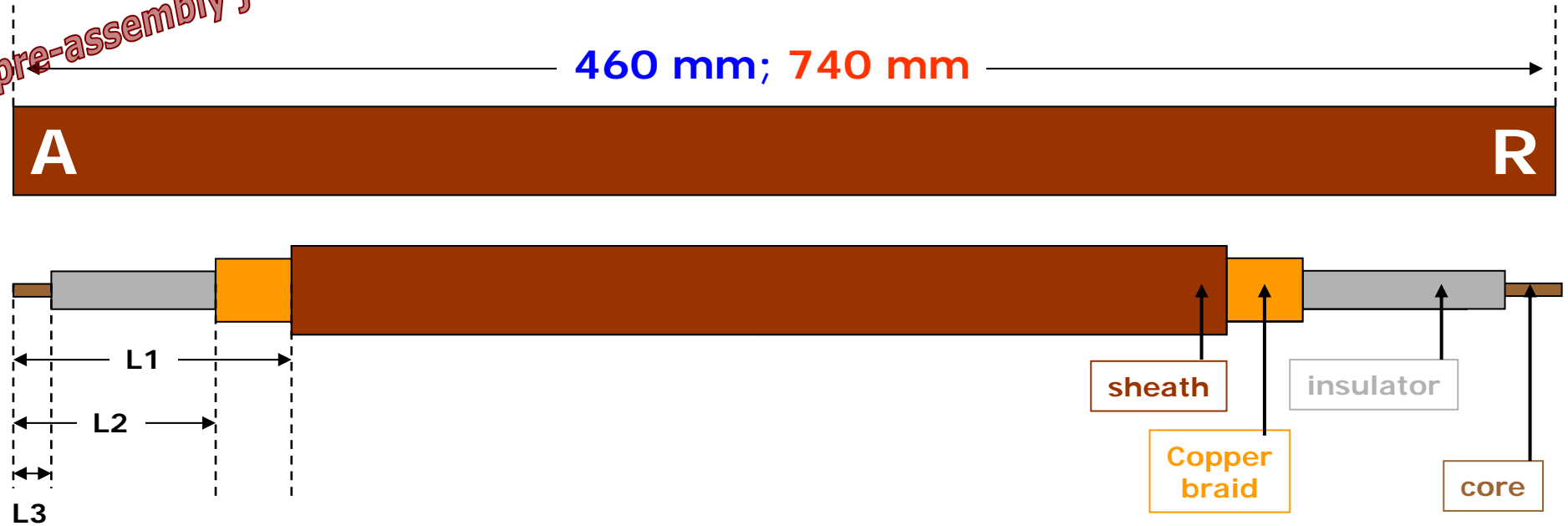
pre-assembly job # 1

RPC Type ↓	Total number of cables ~ with contingency (1300)	Total length (682 meters)
RE*/2	96 x 10 chambers = 960 ~ 1000	1000 x 460 = 460000 mm 460 metres
RE*/3	96 x 3 chambers = 288 ~ 300	300 x 740 = 222000 mm 222 metres

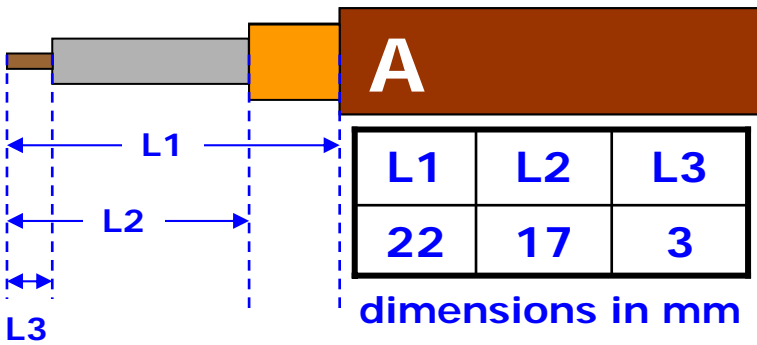


Signal cable preparation (Draka cable : ~ 3 mm OD) : $RE^*/2$ & $RE^*/3$

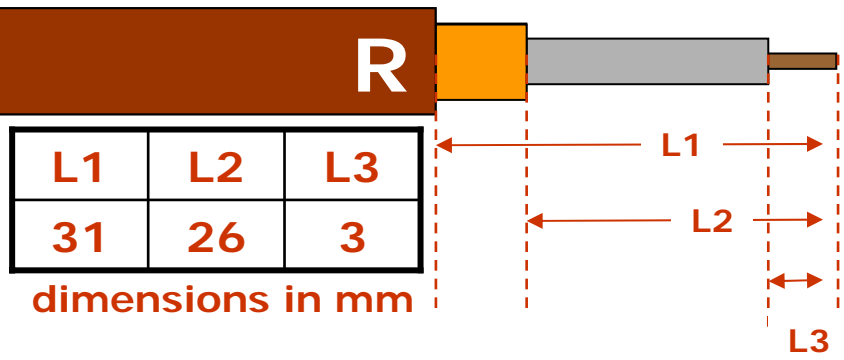
pre-assembly job # 1



Adaptor side



Read out side



pre-assembly job # 1

Signal cable preparation for RE* /2

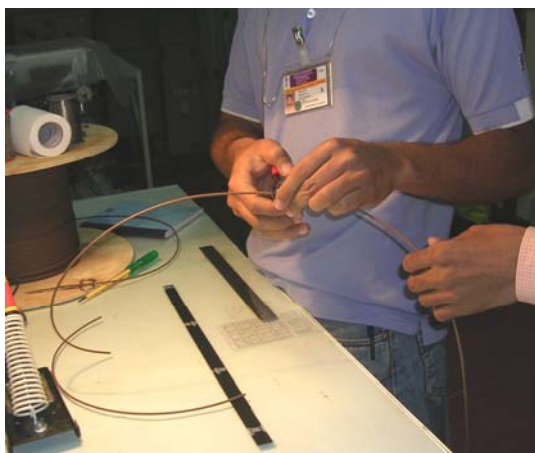
Supreet from PU

Abhinav from DU

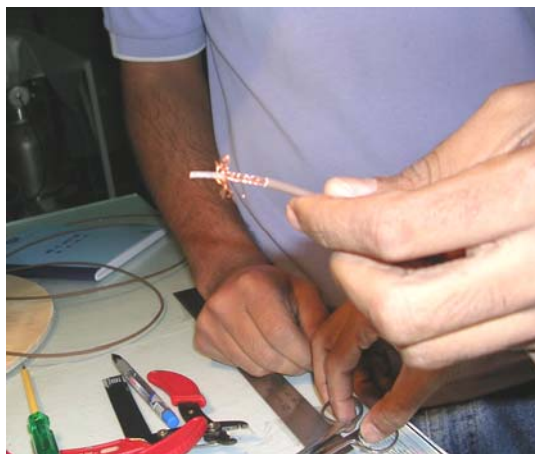
460 mm of signal cable
being marked



Signal cables being cut



Top sleeve removed



Cu braid being adjusted

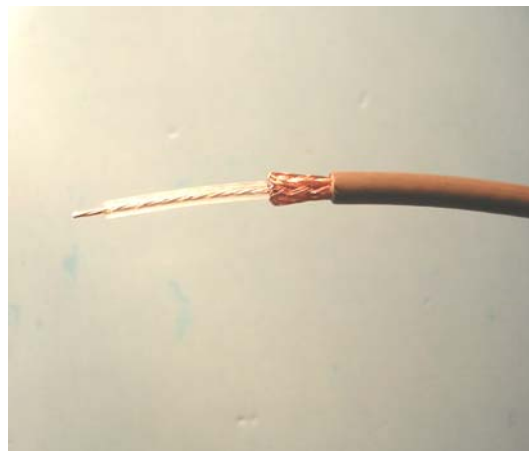
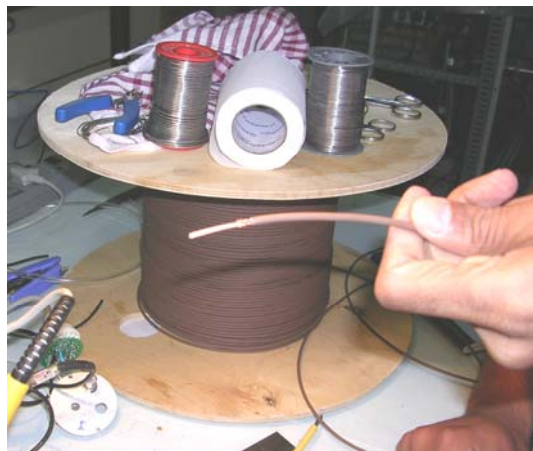


Cu braid being cut at 5 mm

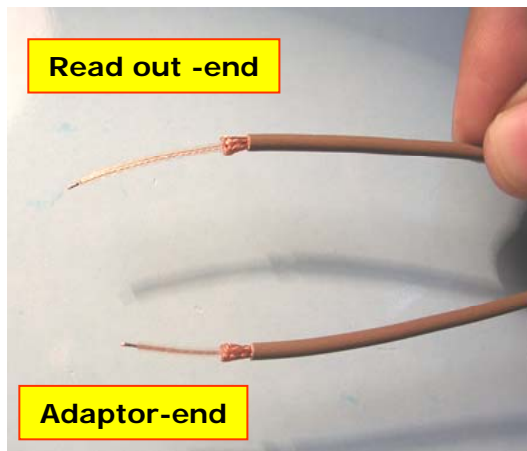
pre-assembly job # 1

Signal cable preparation for RE* /2

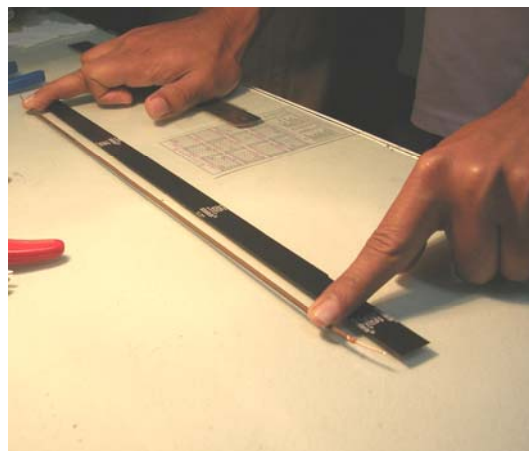
Soldering on the core wire



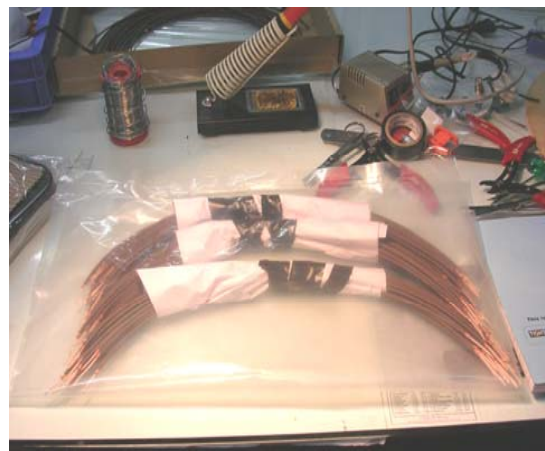
Read out -end



Adaptor-end



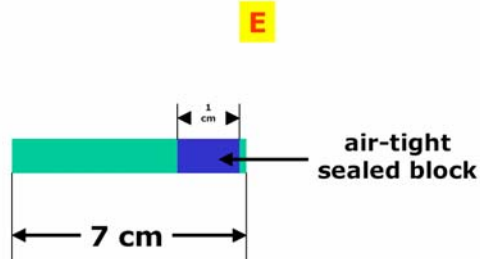
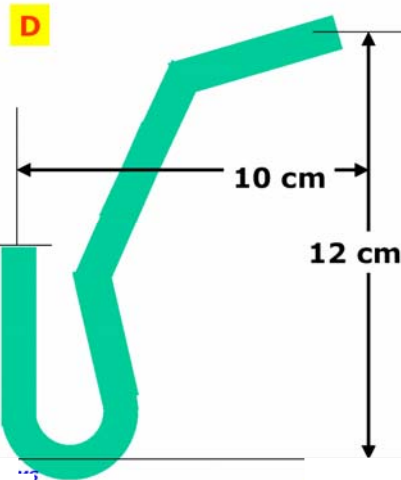
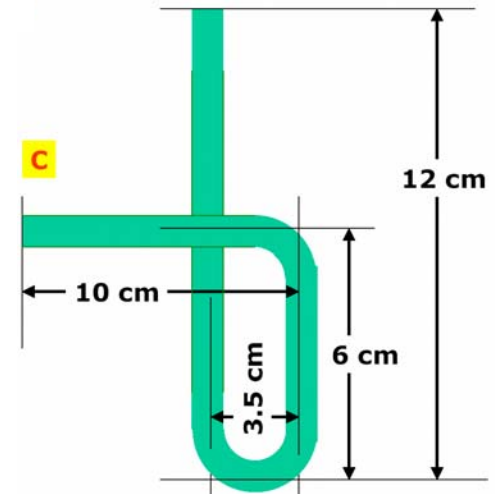
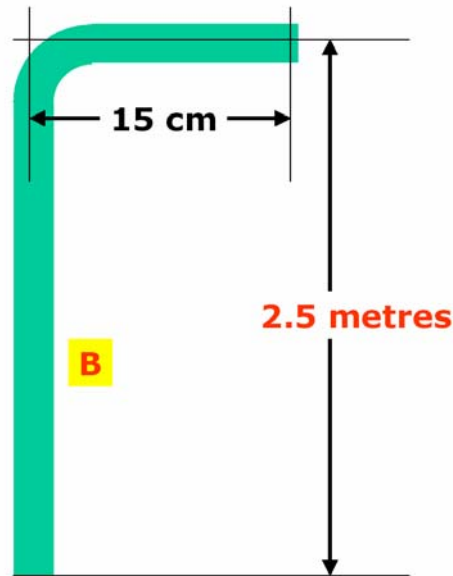
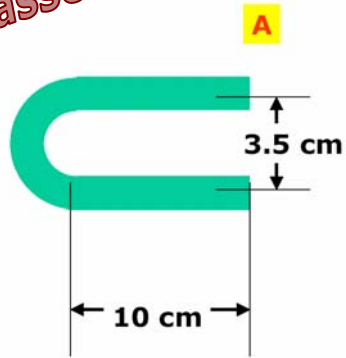
460 mm of signal cable



96 signal cables
(3 x 32) for one RPC ready

Teflon gas pipes : OD = 6 mm; Wall thickness = 1 mm

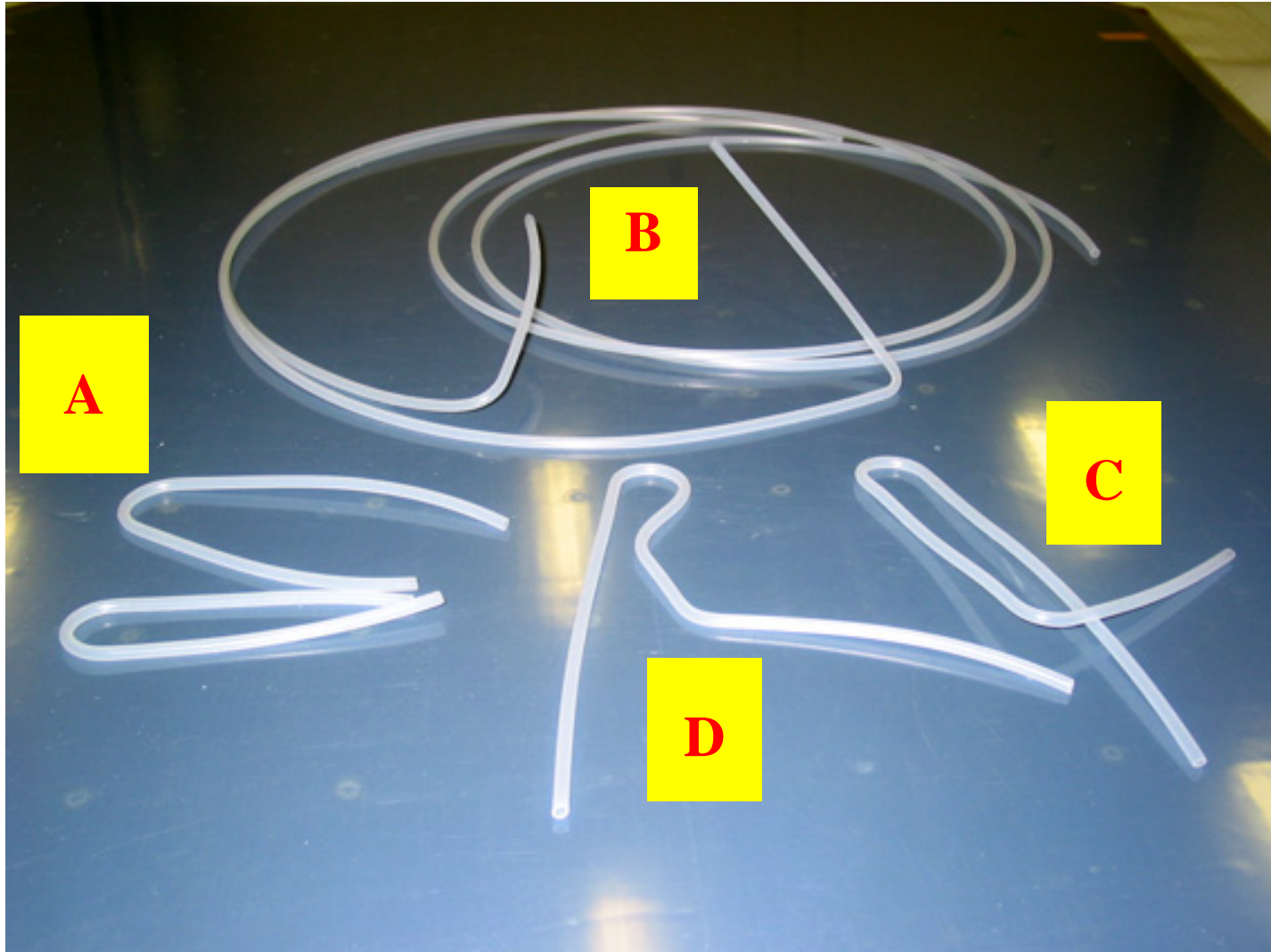
pre-assembly job # 2



Type of gas pipe	Quantity per set
A	2
B	2
C	1
D	1
E	4

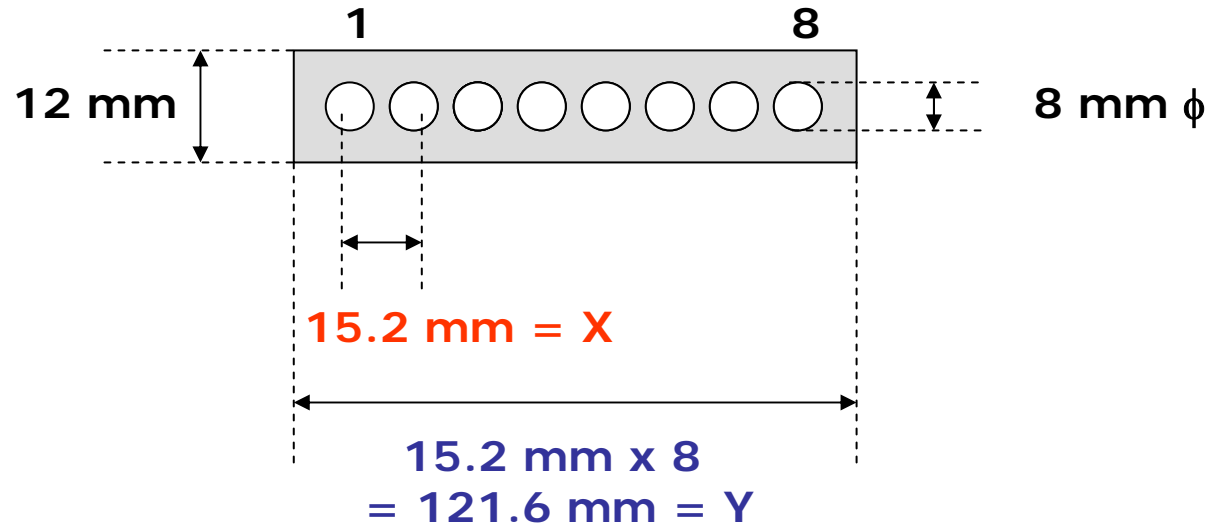
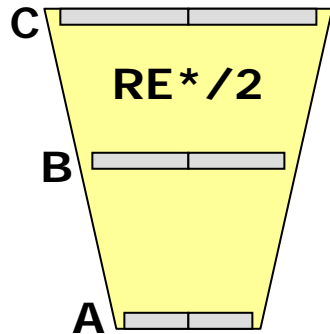
Teflon gas pipes : OD = 6 mm; Wall thickness = 1 mm

pre-assembly job # 2



Perspex spacers : 8 clear holes on 5 mm thick perspex

pre-assembly job # 3

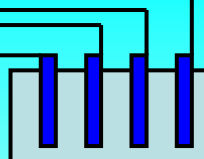


RE* /2	X (mm)	Y (mm)	Quantity
Type A	15.2	121.6	52
Type B	22.0	176.0	52
Type C	25.0	200.0	52

**Gas cylinders
inside the cabinet**



Gas Purifiers



**4 channel
gas mixing unit**

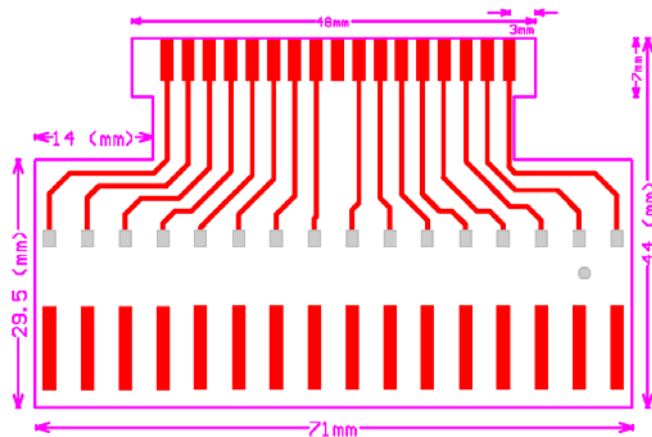


**Parallel sets of
MFCs being
attached for
large sized gaps
for CMS-RPCs**

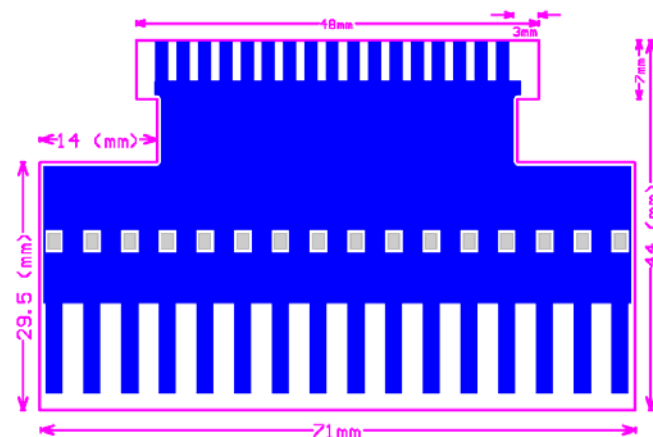
**Flow divider with
safety bubblers**



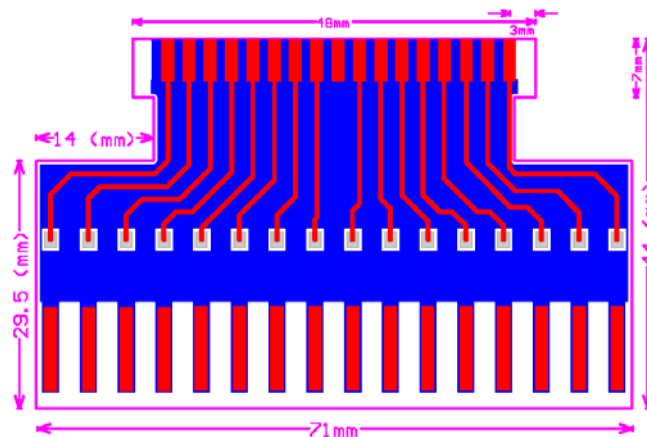
Adaptor card design : Prashant Patale, NPD-BARC



Top view



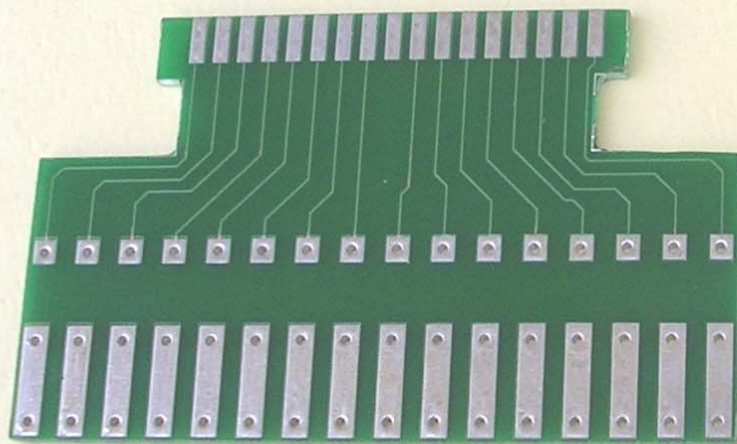
Bottom view



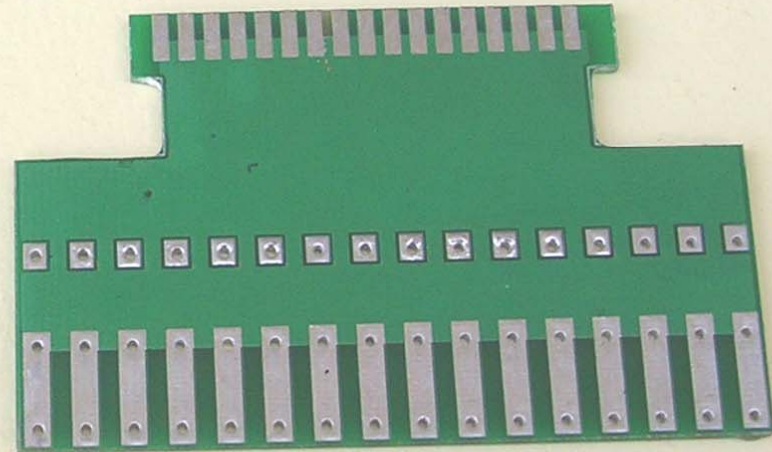
Top and bottom overlapped

Adaptor samples for FEBs

FRC connector

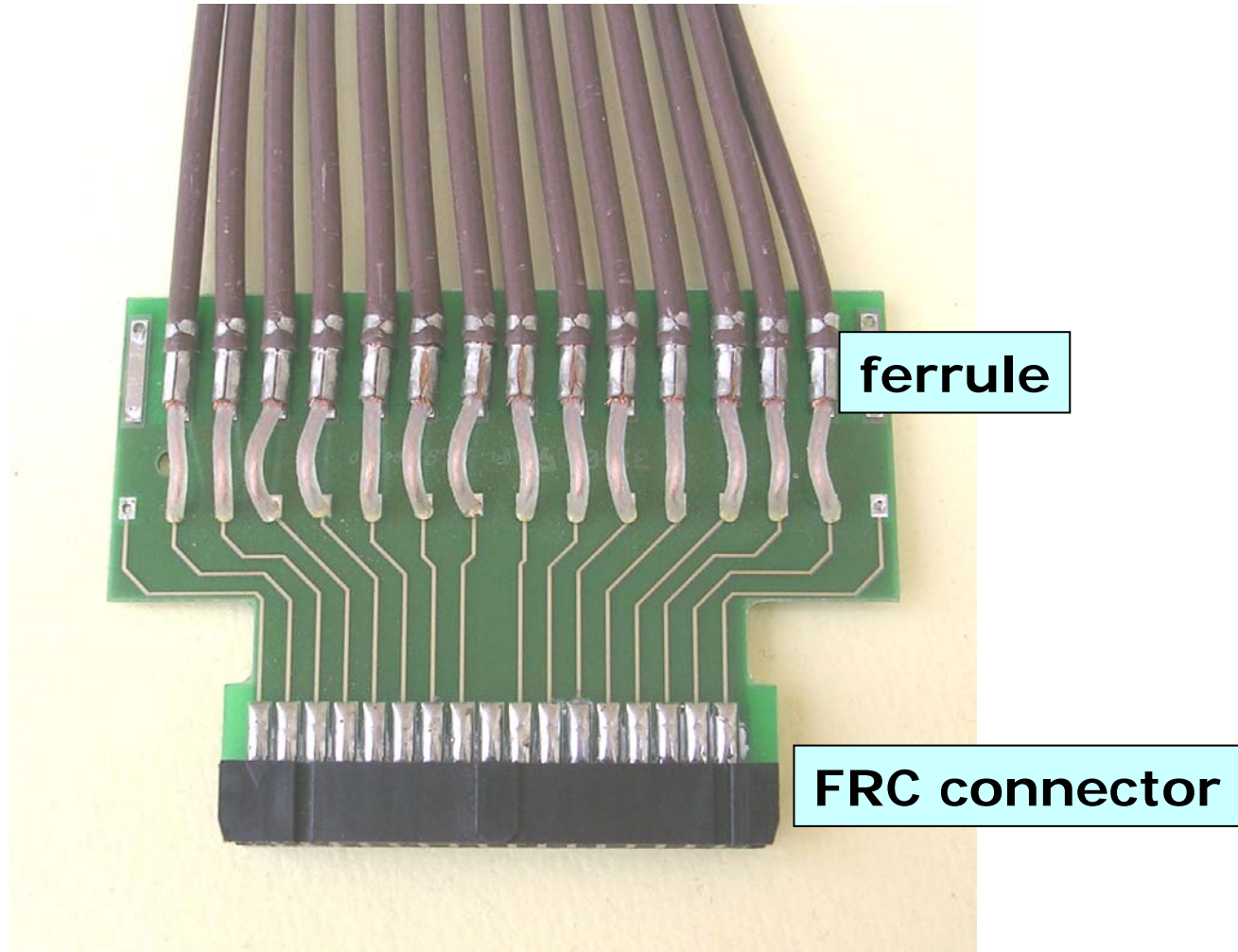


Top view



Bottom view

Signal cables soldered to Adaptors



16 Signal cables soldered to Adaptors

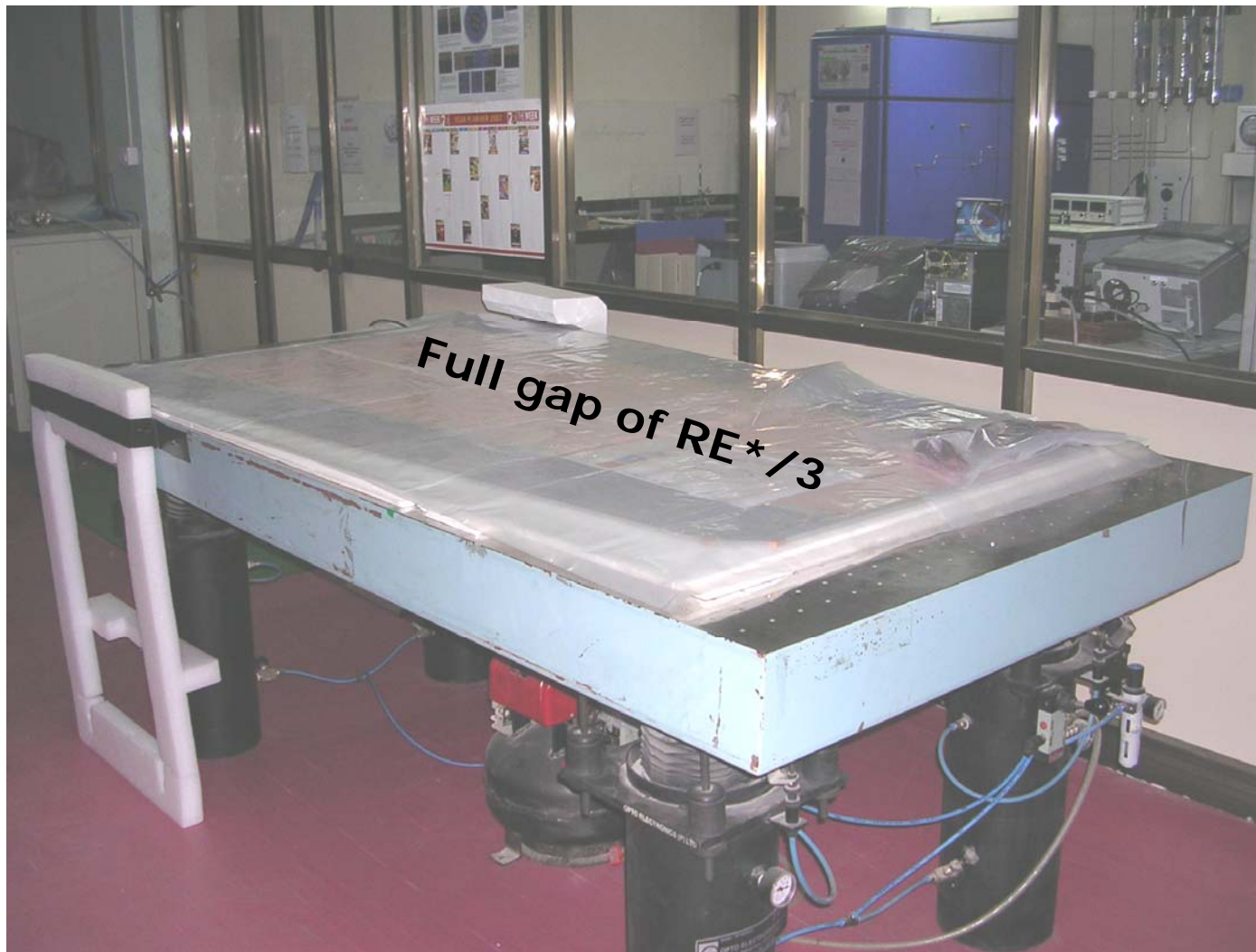


72 + sets required for 12 chambers

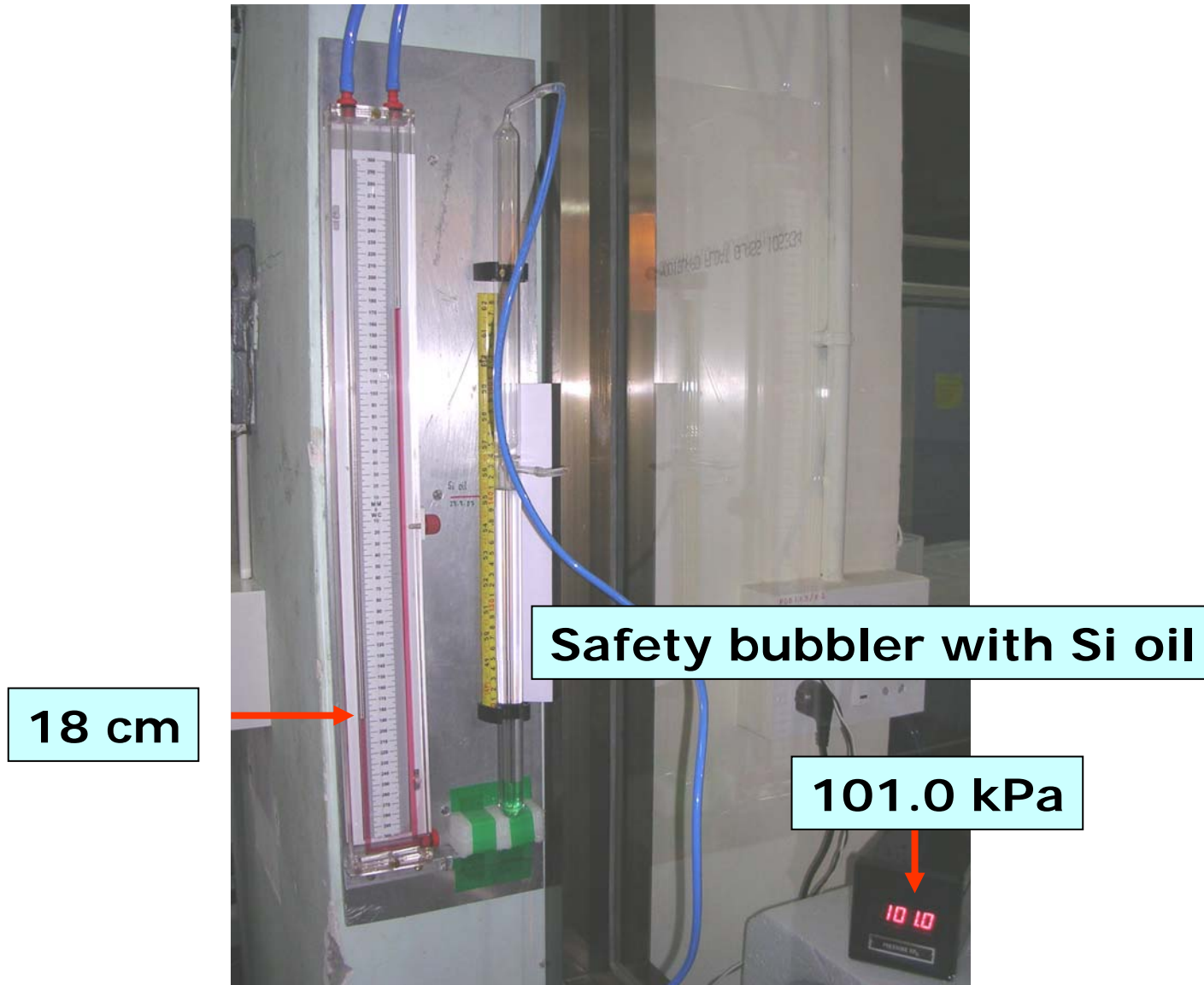
**Cosmic stand for CMS RPCs
2000 mm x 1600 mm**



Vibration free assembly table for RPCs



Manometer with safety bubbler for leak tests



Samples of following are urgently required in a second box

Items	Components	
1	Jigs for configuring the gas pipes	
2	gas pipe	100 metres
3	gas connector	
4	HV connector	12
5	Six L-fixation brackets	
6	Small bakelite piece stick to L-fixation bracket	
7	gas outlet block pipes	
8	Six soldering protection strips	
9	Six glass gap fixation	
10	Six 40 PIN flat cable and one 26 PIN flat cable	
11	patch panel	
12	Three FEB insulation bakelite (0.5 mm, 13 by 25 cm**2)	
13	cooling pipe	
14	cooling pipe connector	
15	distribution board	
16	screen box	
17	Four corner L-brackets Alu	
18	Plexi Glass support bar 10 cms (with two M6 holes)	
19	All Screws (Appendix-I)	
20	PCB strp(0.5mm)	



to be shipped to India,
immediately - 3rd Mar., 07

pin-drop silence

Outlook 1 (March – April 2007) the pre-assembly jobs

- Work schedule floated on 15 Feb. to collaborators
- First job is to prepare about 1200 signal cables (960 +)
- Procurement of materials from local market (gas pipes, Cu tubes, Cu plates for cooling etc.)
- Prepare the gas pipes according to the particular shape requirements in the jigs
- Fabrication of adaptor cards (100 cards by 15 April)
- Leak and HV tests of the 9 gaps being sent from CMS

Outlook 2 (June – August 2007) the final assembly

- The HCP, Cu Read outs, FEBs etc. expected by May 2007
- After the above equipments arrive – More hands are needed
- Assembly of ten chambers : June 2007
- Someone from CMS (Cai) could be around in August/Sept.
(invitation should go in time)
- Testing of ten chambers : August 2007
- Support for Cosmic tests from CMS (August 2007)
Scintillators, electronics etc. (to be DISCUSSED)
- The ten chambers can be despatched by Sept., 2007
AS SCHEDULED

Acknowledgements

**Mechanical Design &
Prototype Devp.
Section, BARC**

All the collaborators

**EHEP Group
TIFR**

**HECR Group
TIFR**

Nuclear Physics Division, BARC