# *Drift Tube Quality Control*
# *CMS week – CERN – 2nd Dec 2002*

**Overview of the QC Test Results**

**QC at Production Sites:**

- **Aachen**
- **Madrid**
- **Padova**

**Glue QC Rupture Tests**

**Production Data Base at Madrid** **Pablo**

**AoB**

# *Procedures and Conditions for Quality Tests and Data Format*

**http://www.to.infn.it/activities/experiments/QUALITY/QCDB/Conditions.html**

**http://www.to.infn.it/activities/experiments/QUALITY/QCDB/Update3s.html**

**http://www.to.infn.it/activities/experiments/QUALITY/QCDB/Update3db.html**

# Approved Format for QC Tests

## Data Base Ascii File(s)

Data Source: Production Sites on a Local Web Page

Format:

**http://www.to.infn.it/activities/experiments/cms/QUALITY/QCDB/Update3db.txt**

**LayerWirePosTest ID_suplyr SL_Position ID_Layer SIDE NM pos(1)...pos(NM)**

**LayerWireTensTest ID_suplyr SL_Position ID_Layer NM tens(1)...tens(NM) DATE**

**SuperlayerRefBlock ID_suplyr SL_Position Nref Nmeas pos(1)....pos(Nmeas)**

**SuperlayerGasTight ID_suplyr SL_Position Nmeas TimeConstant(1)...TimeConstant(Nmeas) DATE**

**LayerNoise ID_suplyr SL_position ID_Layer HVSetup Ncell Noise(1)...Noise(Ncell) DATE**

**LayerEffi ID_suplyr SL_position ID_Layer Ncell Effi(1)...Effi(Ncell) DATE**

**SuperLayerMT1 ID_suplyr SL_Position NumColumn Nmeas AverageMT1(1) ... AverageMT1(NumColumn) WidthMT1(1) ...WidthMT1(NumColumn) ErrorMT1(1) ... ErrorMT1(NumColumn) DATE**

**SuperLayerMT2 ID_suplyr SL_Position NumColumn Nmeas AverageMT1(1) ... AverageMT1(NumColumn) WidthMT1(1) ...WidthMT1(NumColumn) ErrorMT1(1) ... ErrorMT1(NumColumn) DATE**

**LayerDiscCells ID_suplyr SL_Position ID_Layer ID_Channel CAUSE DATE**

# Approved Format for QC Tests

## Data Base Ascii File(s)

Data Source: Production Sites on a Local Web Page

**http://www.to.infn.it/activities/experiments/cms/QUALITY/QCDB/Update3db.txt**

**OPTIONAL CARDS:**

**LayerNoiseStat ID_Suplyr SL_Position ID_Layer AVERAGE SIGMA N<THR1 CELLS(1) ...CELLS(N<THR1) N>THR2 CELLS(1) ... CELLS(N>THR2)**

**LayerEffiStat ID_Suplyr SL_position ID_Layer AVERAGE SIGMA N<THR1 CELLS(1) ... CELLS(N<THR1)**

**----- AVERAGE and SIGMA are calculated for the good cells. (e.g. THR1 < noise < THR2)**

**LayerAfterP ID_suplyr SL_Position ID_Layer Ncell Prob(1)...Prob(Ncell) DATE**

# *Approved Format for QC Tests*

## Summary QC Test Results

### Ascii File(s)

Data Source: Production Sites Output of the QC Test Analysis on a Local Web Page

**http://www.to.infn.it/activities/experiments/cms/QUALITY/QCDB/Update3s.txt**

**WirePosition ID_Layer SIDE AveragePos AverageSigma**

**WireTension ID_Layer AverageT AverageSigma**

**RefBlockPos ResidualPos1 ResidualPos2 ResidualPos3 ResidualPos4**

**GasTigthness TimeConstant**

**Noise ID_Layer HVSetup AverageNoise AvarageSigma Nover Nout NoutCell(1) ... NoutCell(Nout)**

**CosmEffi ID_Layer AverageEffi AverageSigma Nunder Nout NumCell(1) ... NumCell(Nout)**

**SuperLayerMT1 ID_suplyr SL_Position NumColumn Nmeas AverageMT1(1) ... AverageMT1(NumColumn) WidthMT1(1) ...WidthMT1(NumColumn) ErrorMT1(1) ... ErrorMT1(NumColumn) DATE**

**SuperLayerMT2 ID_suplyr SL_Position NumColumn Nmeas AverageMT1(1) ... AverageMT1(NumColumn) WidthMT1(1) ...WidthMT1(NumColumn) ErrorMT1(1) ... ErrorMT1(NumColumn) DATE**

**DiscCells ID_Layer NCause Ndisc NumCell(1) ... NumCell(Ndisc)**

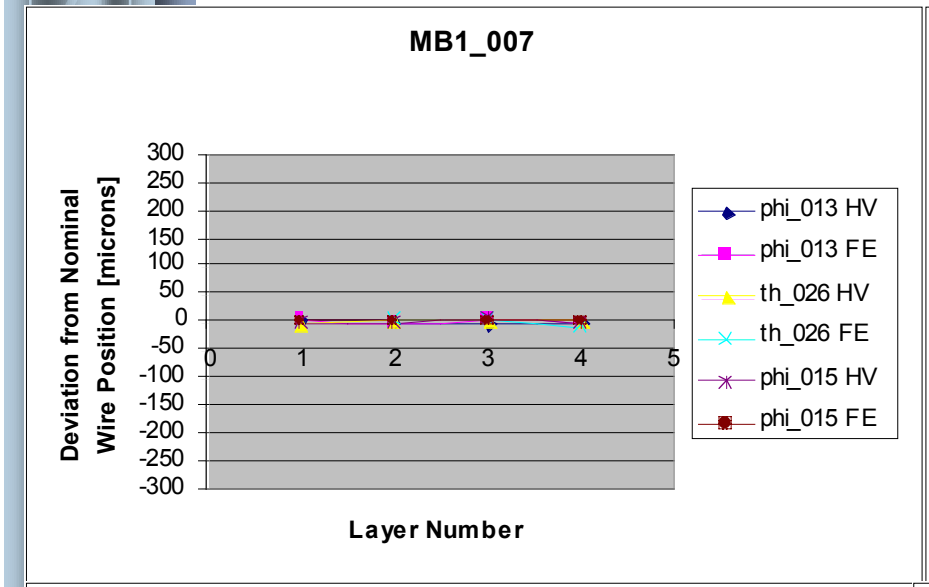
# *Summary QC Test Results*

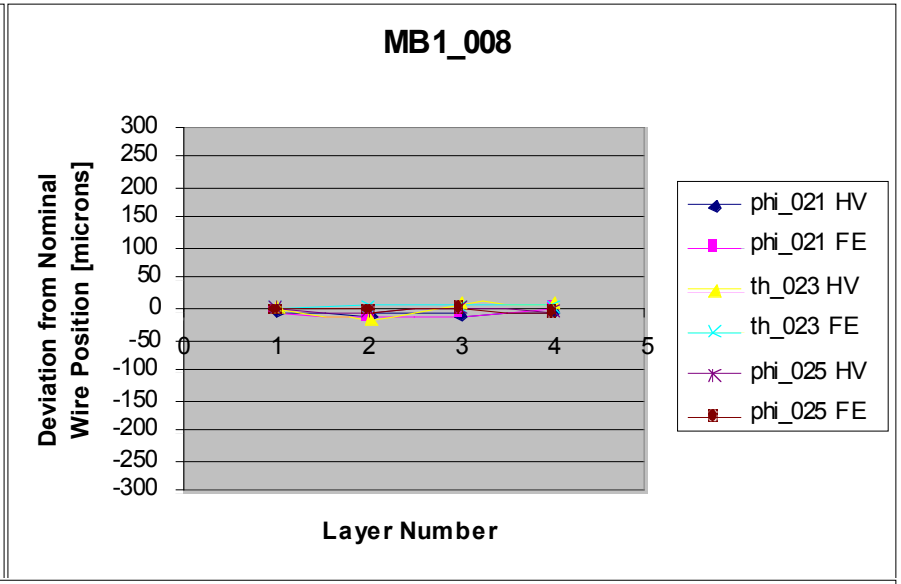
# *an Update*

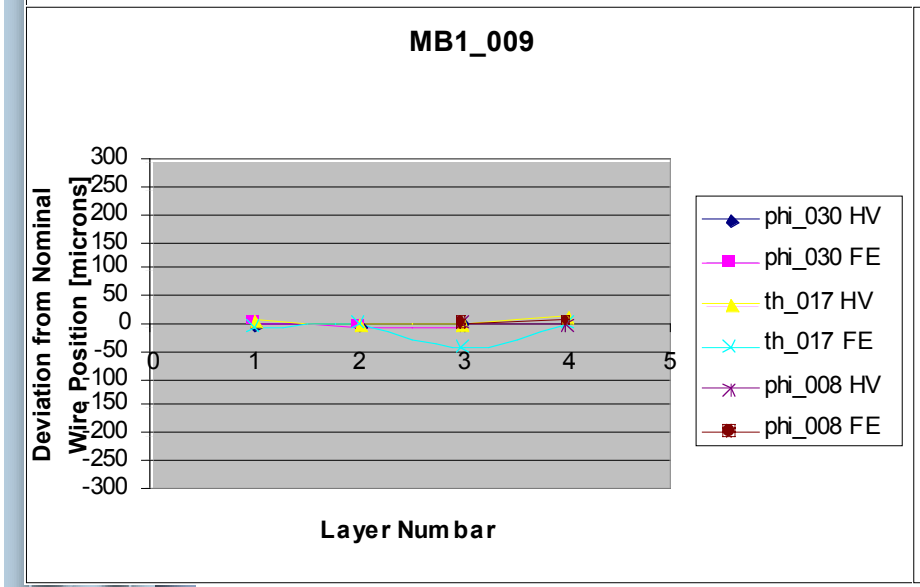
**http://www.to.infn.it/activities/experiments/cms/QUALITY/QCDB/SLQC.html**

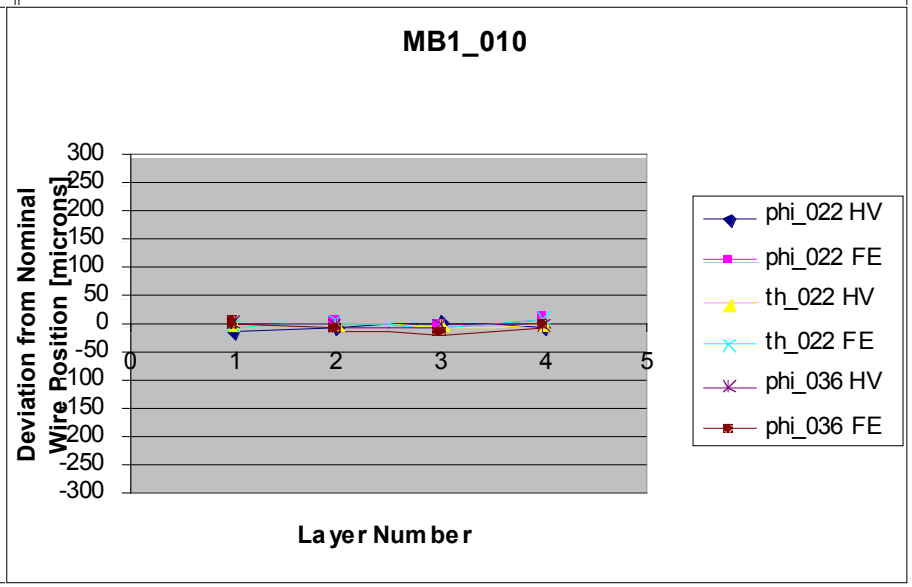
(Chamber Planarity data not yet included)

# MB1 Wire Position

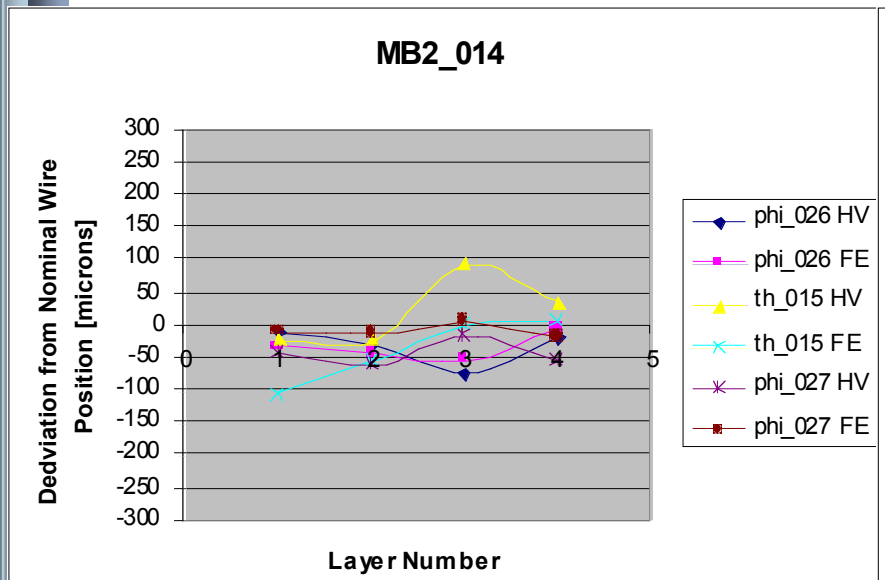


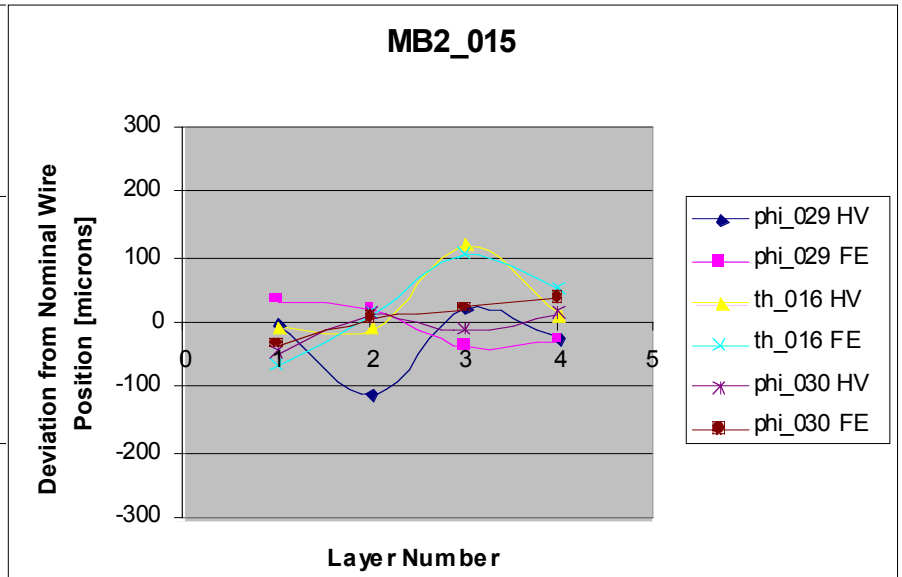



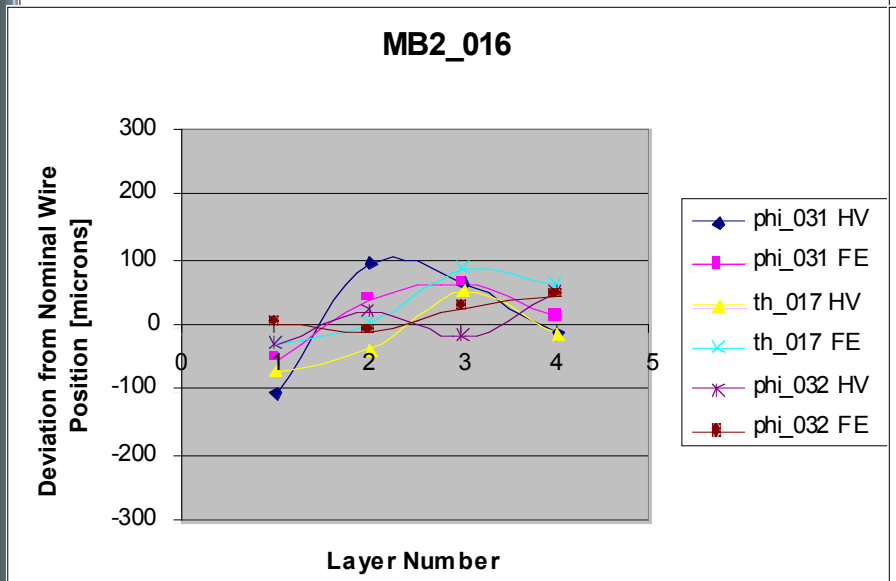



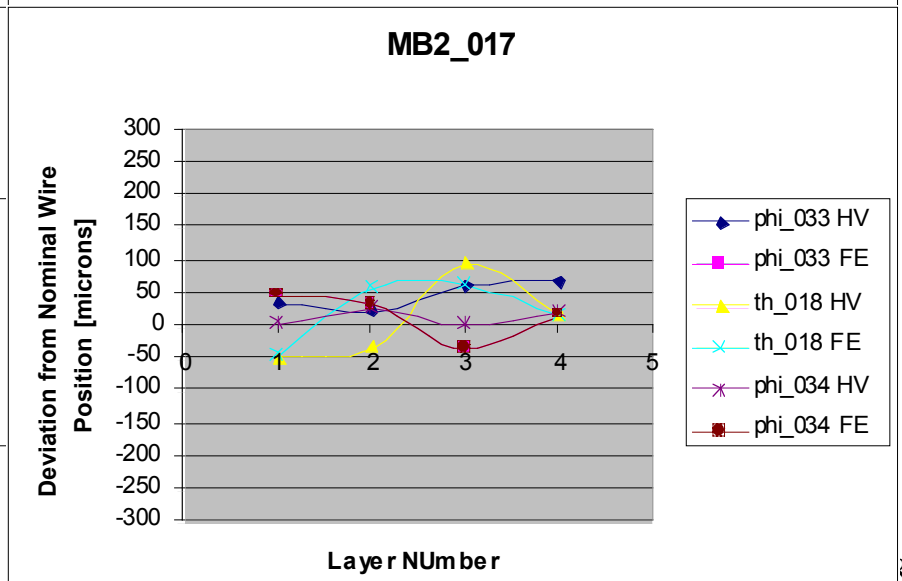



# MB2 Wire Position

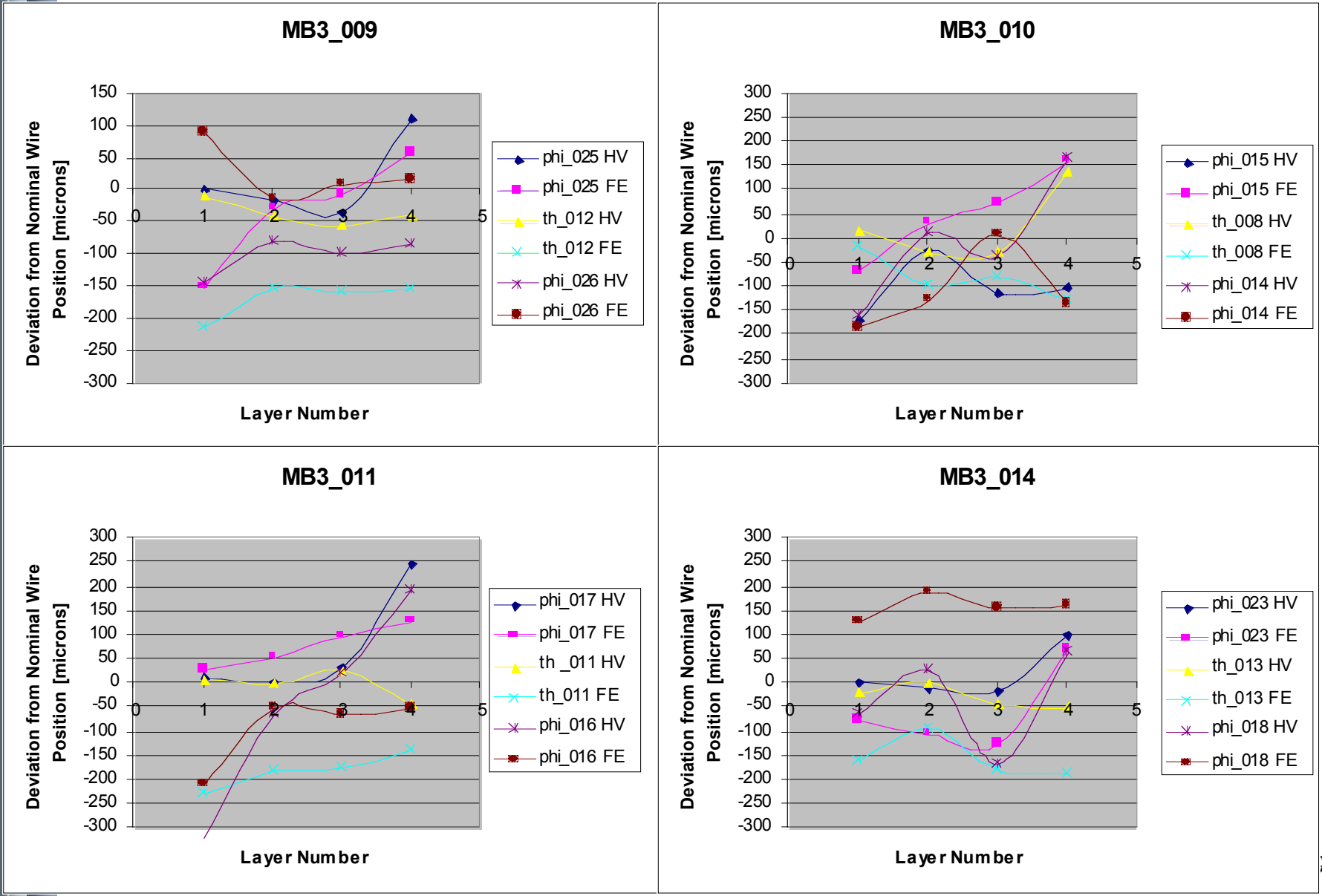


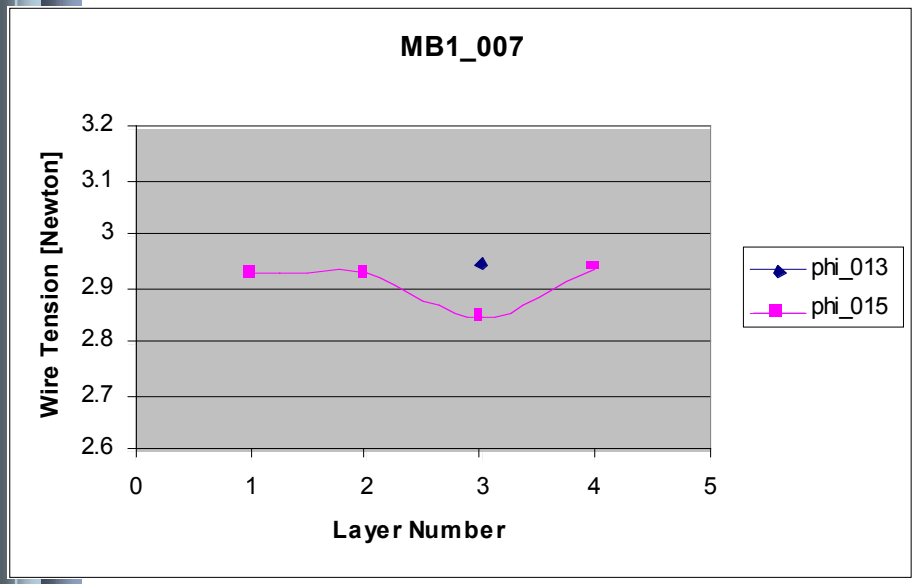



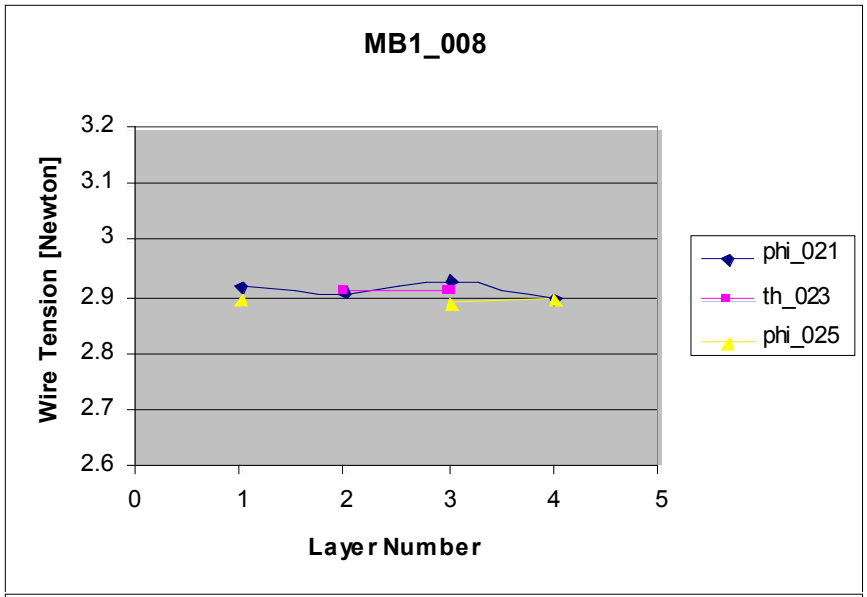



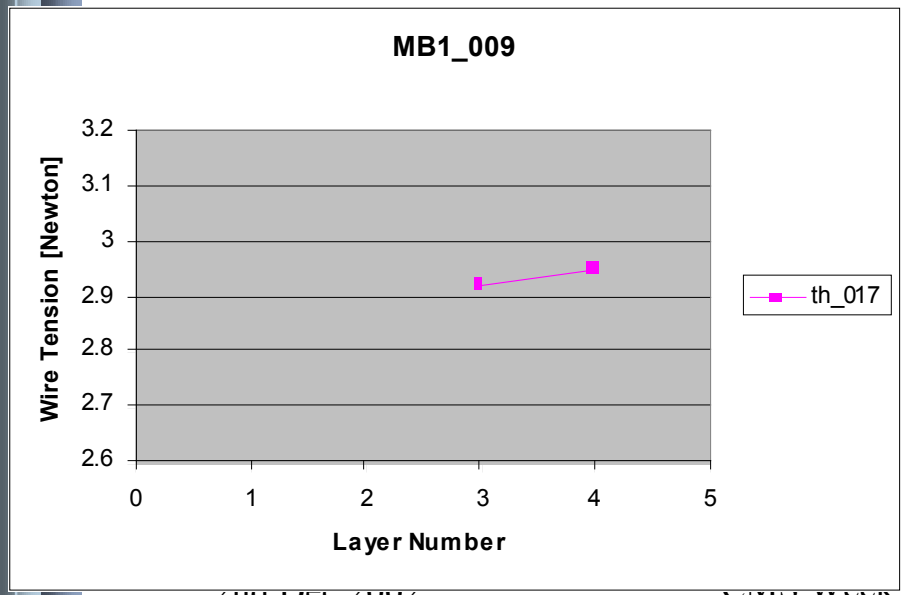
# MB3 Wire Position

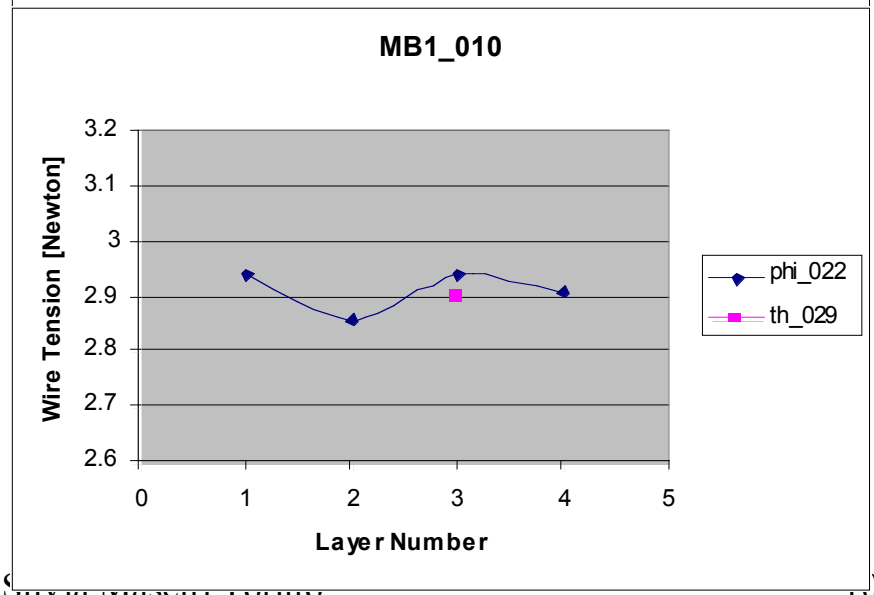


# MB1 Wire Tension

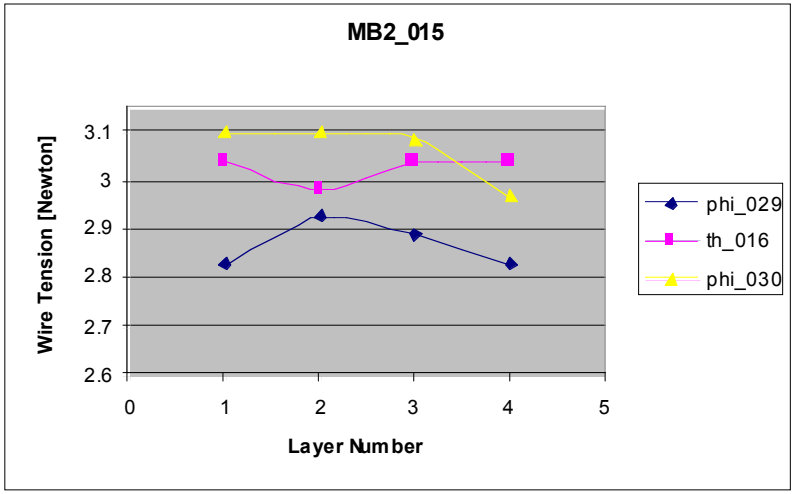


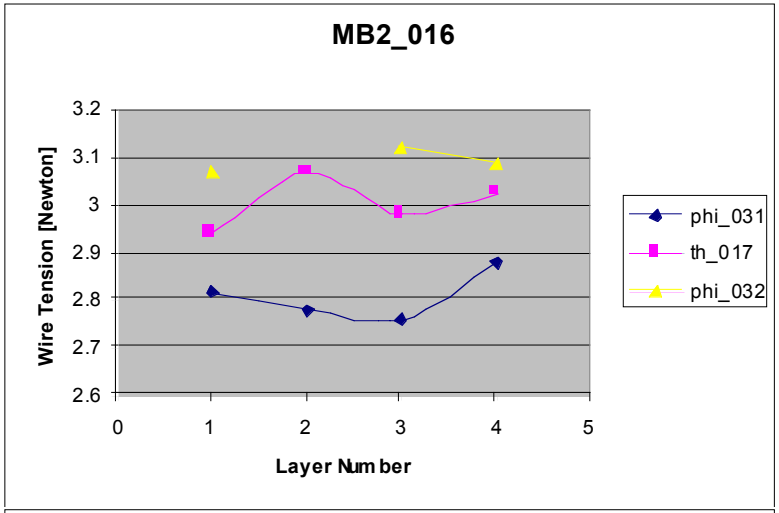



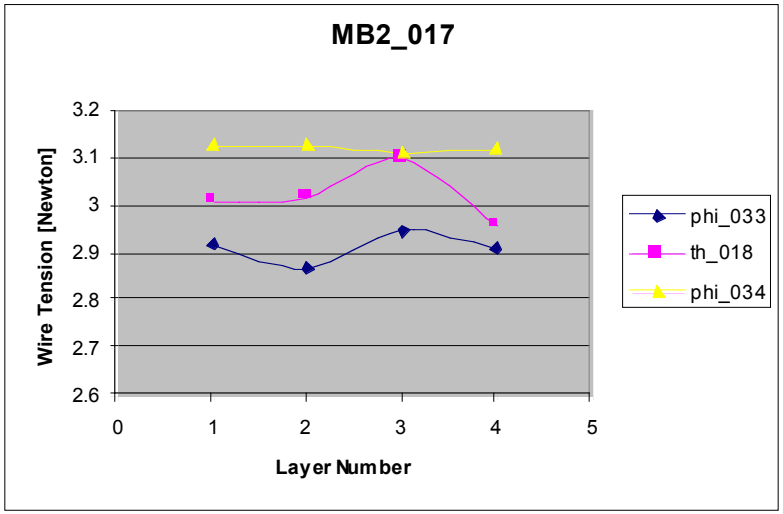



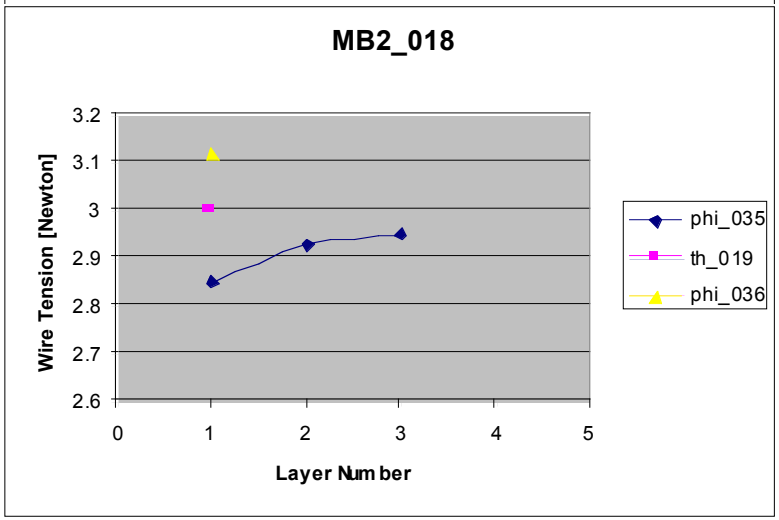



# MB2 Wire Tension

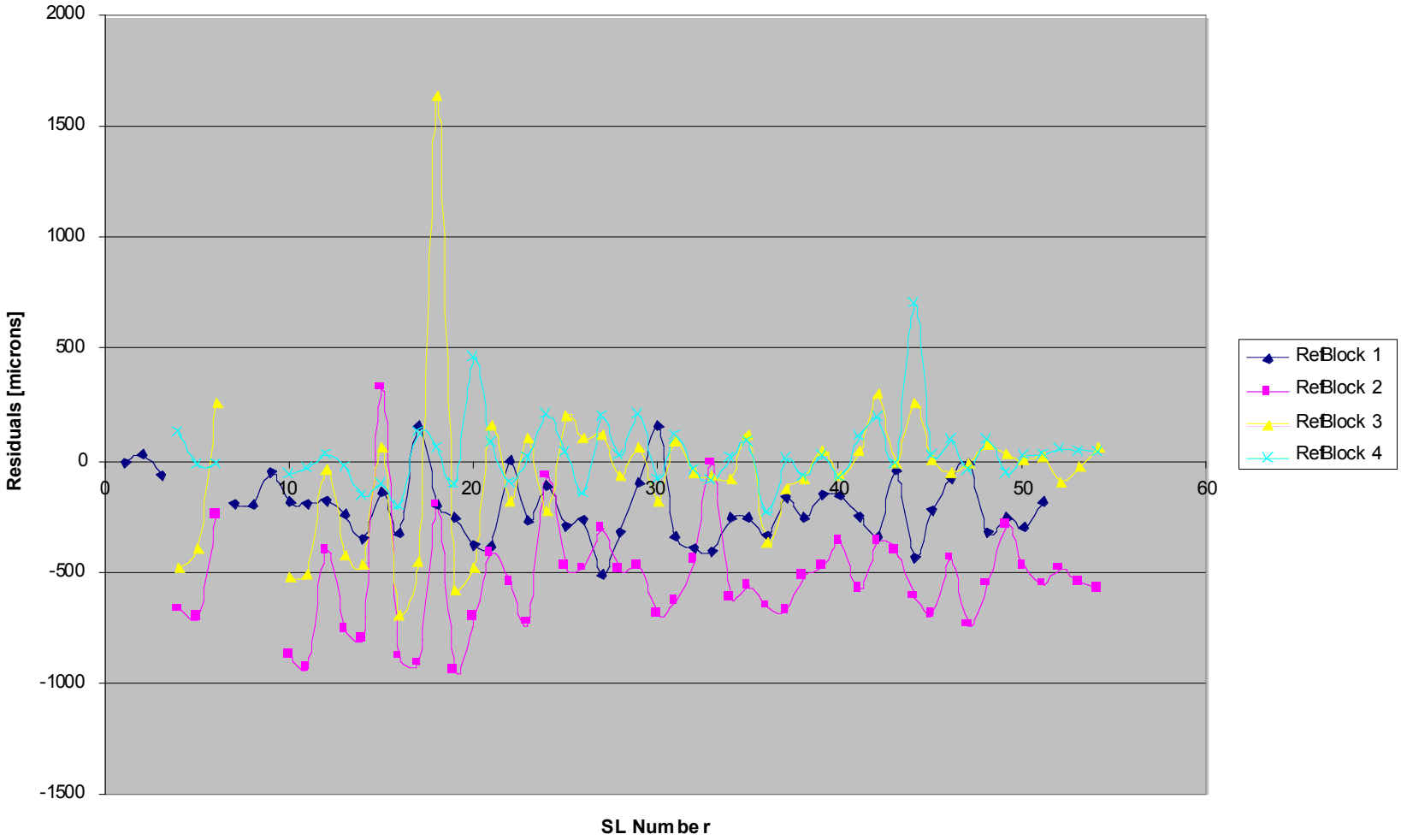


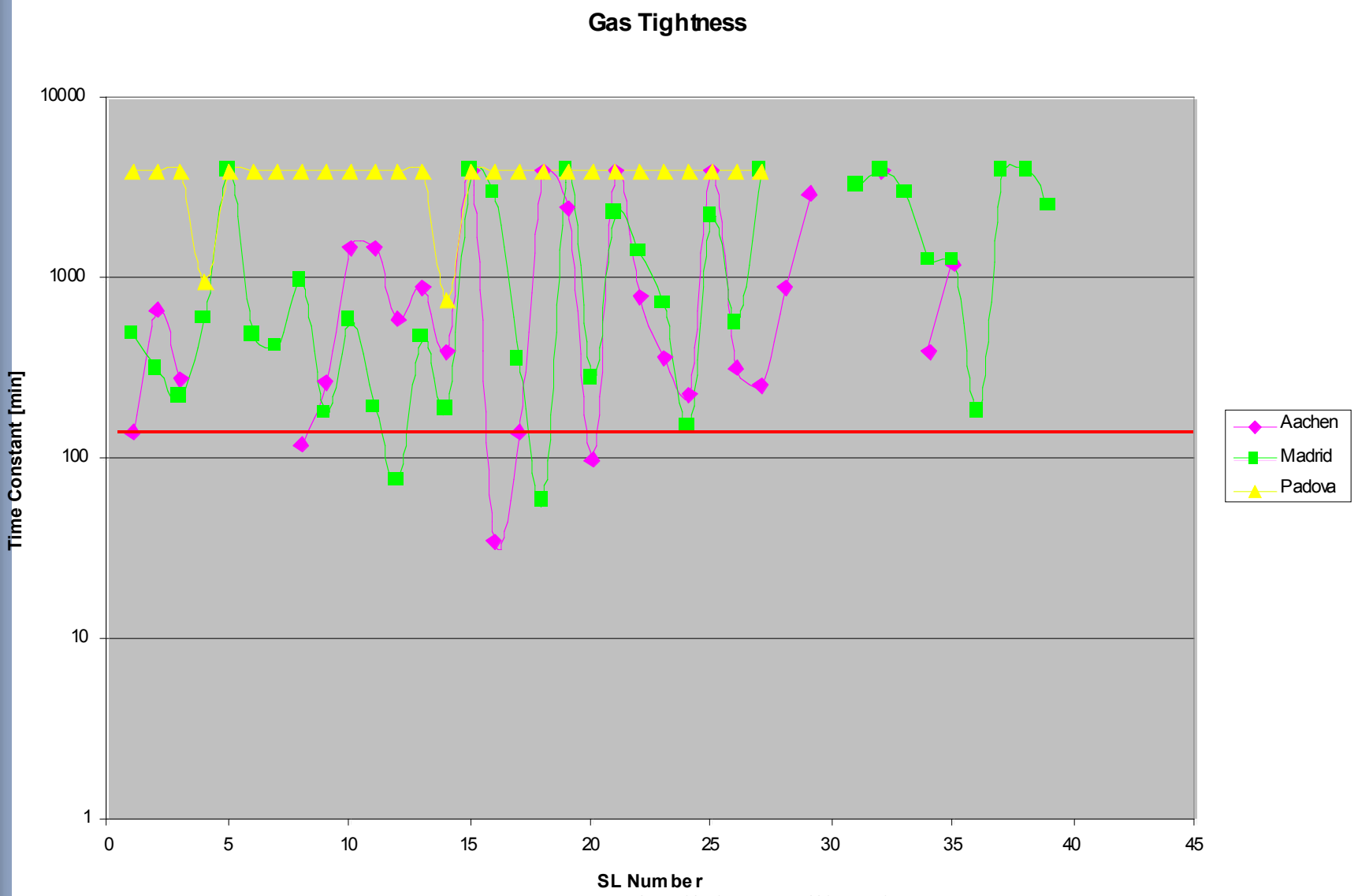



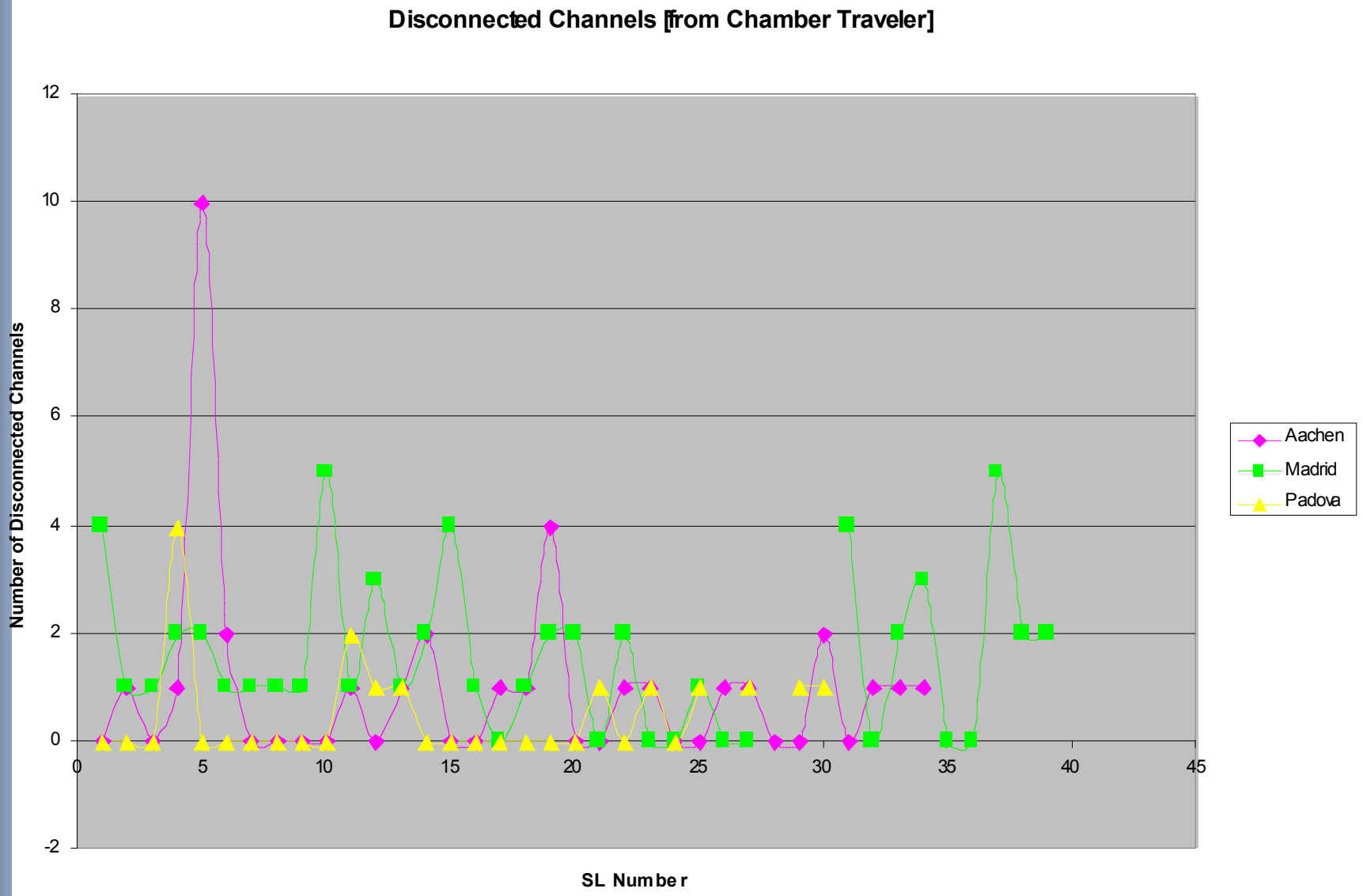
# MB2 Reference Blocks Position



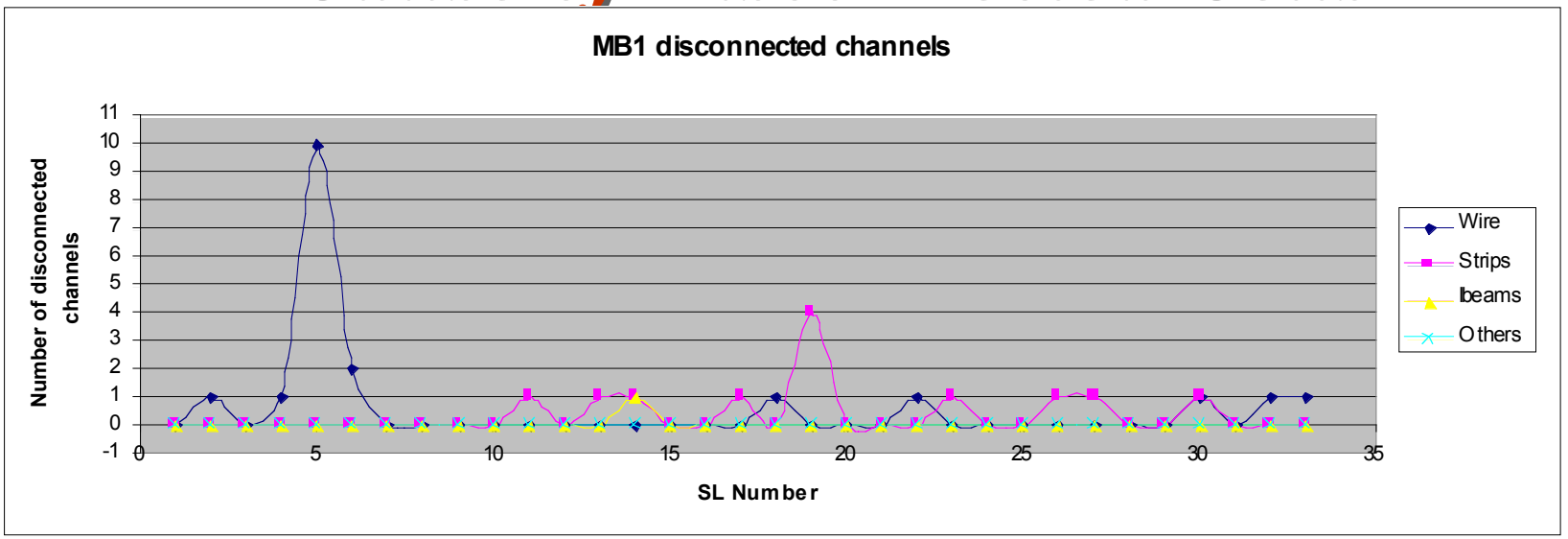
# Gas Tightness

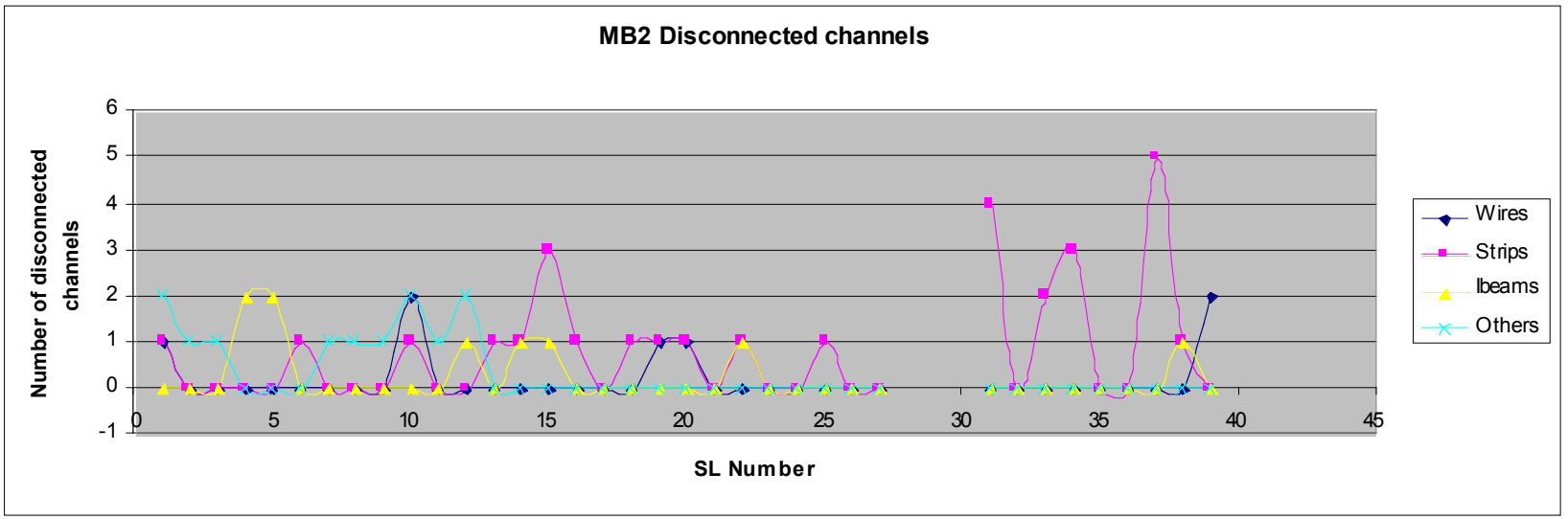


# Disconnected Cells

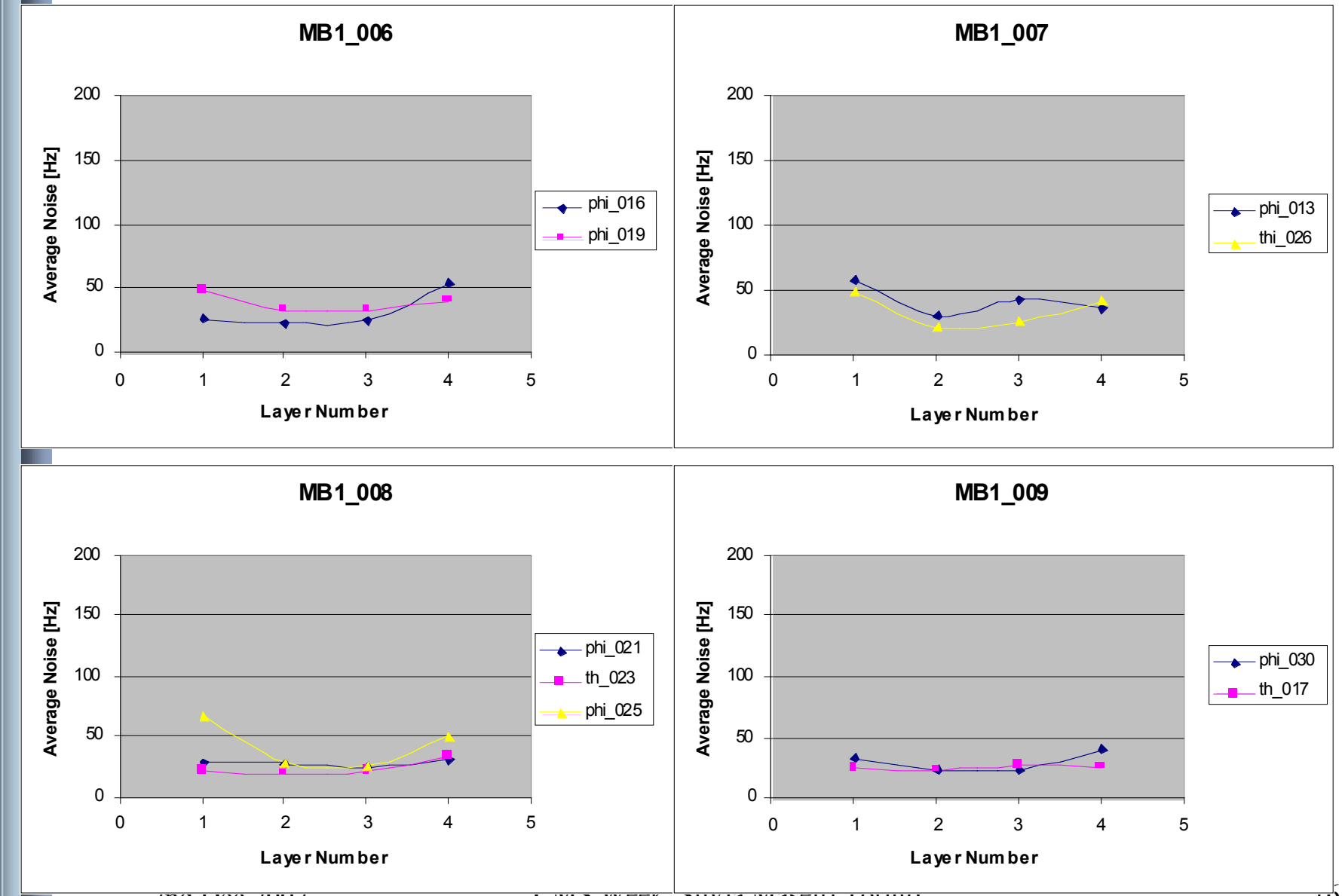


# Cause of Disconnected Cells

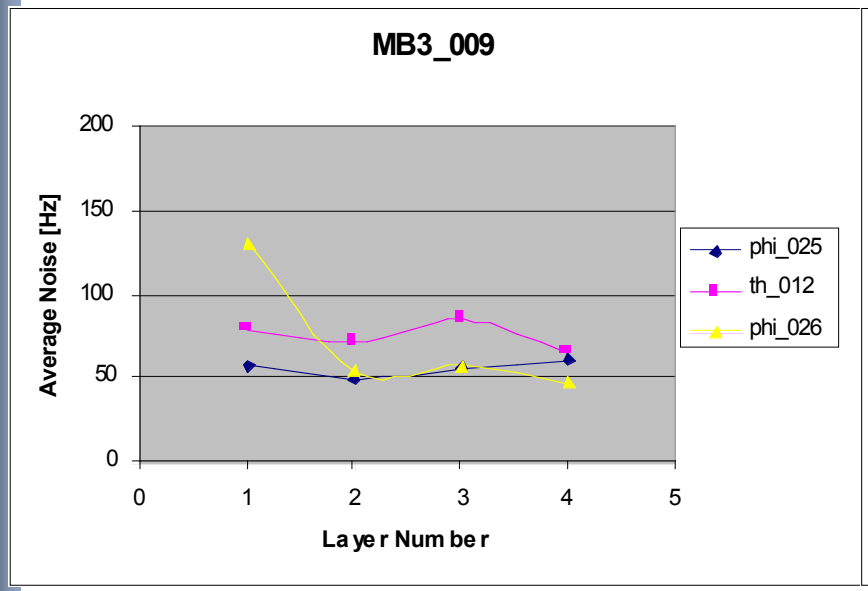


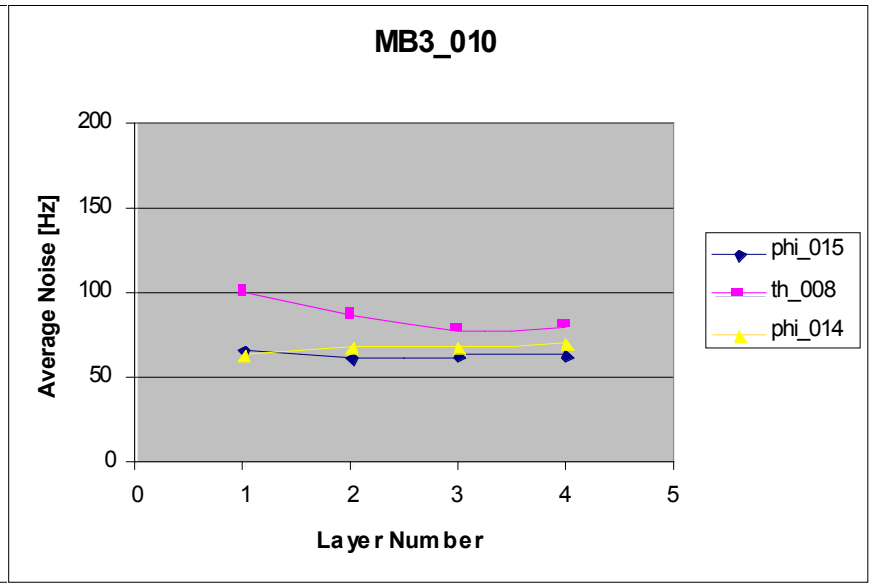



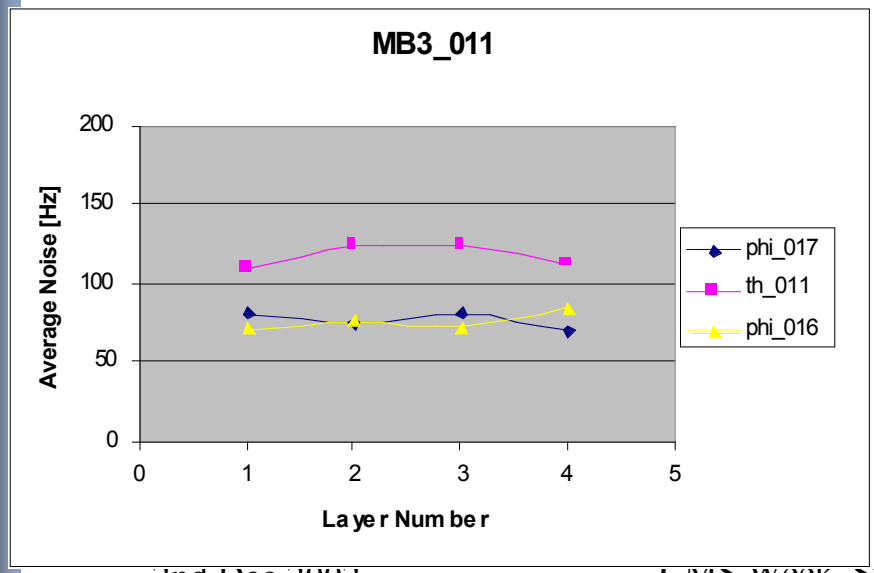
# MB1 Noise


MB1_006
Average Noise [Hz]
200
150
100
50
0
0
1
2
3
4
5
Layer Number
phi_016
phi_019
MB1_007
Average Noise [Hz]
Layer Number
phi_013
thi_026
MB1_008
Average Noise [Hz]
Layer Number
phi_021
th_023
phi_025
MB1_009
Average Noise [Hz]
Layer Number
phi_030
th_017

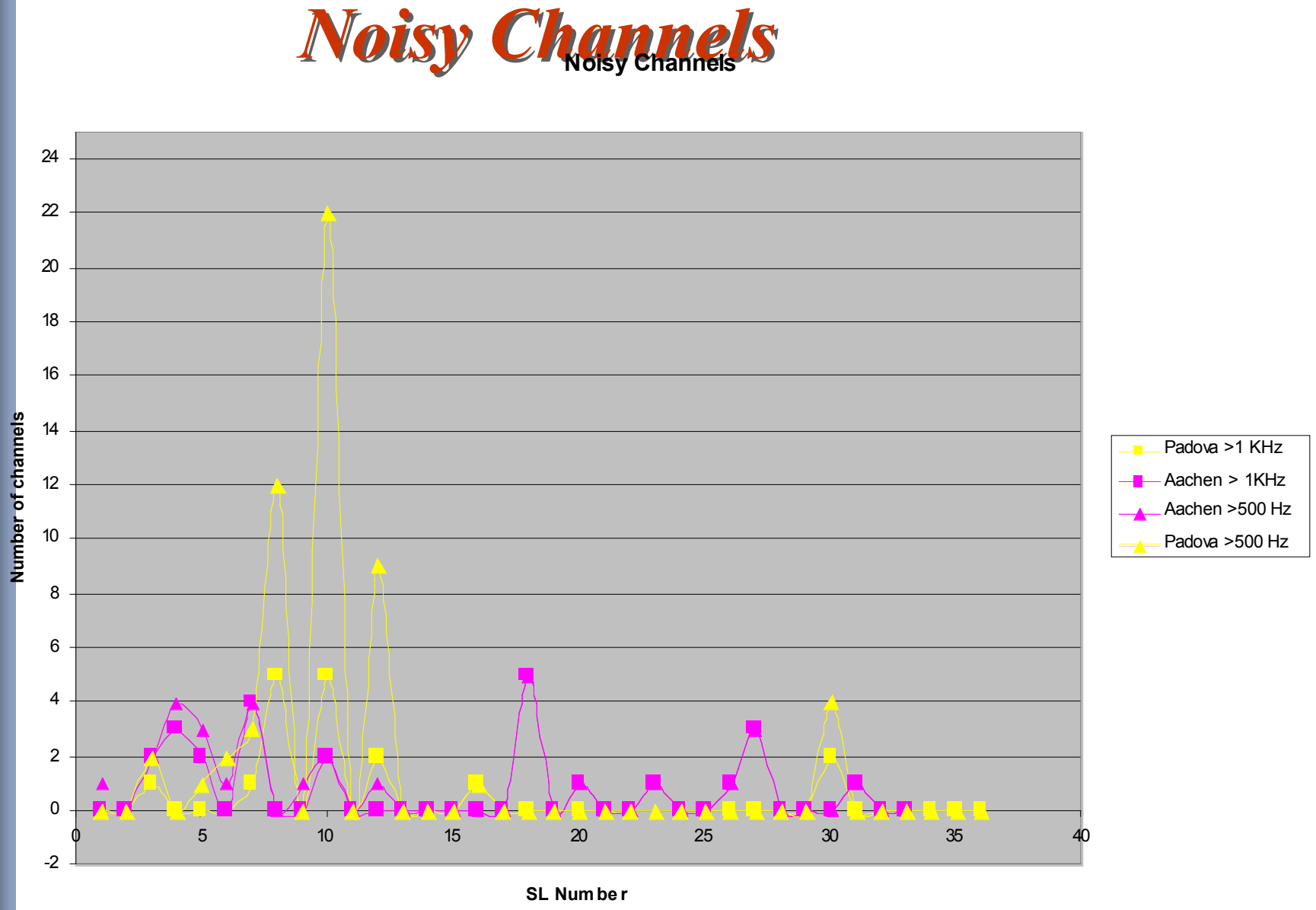
# MB3 Noise


MB3_009
Average Noise [Hz]
200
150
100
50
0
0
1
2
3
4
5
Layer Number
phi_025
th_012
phi_026

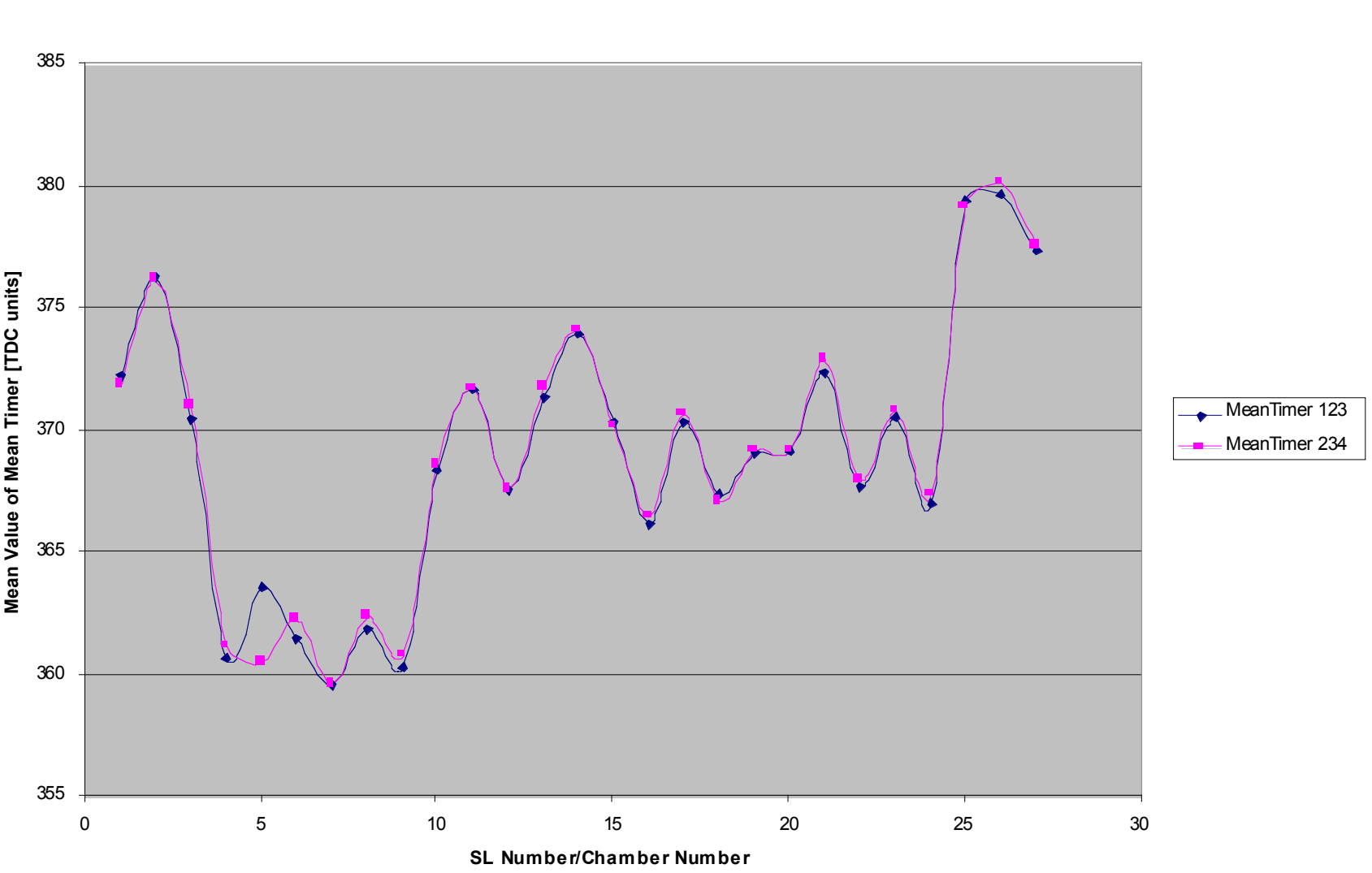

MB3_010
Average Noise [Hz]
200
150
100
50
0
0
1
2
3
4
5
Layer Number
phi_015
th_008
phi_014


MB3_011
Average Noise [Hz]
200
150
100
50
0
0
1
2
3
4
5
Layer Number
phi_017
th_011
phi_016

# Noisy Channels



# MB3 Average Mean Timer



# *What is it stored at the Production Site Repository ?*

| Chamber | Wire Pos | WireT | RefB | Gas | DisCell | Cause | Noise | Effi | MT |
|---|---|---|---|---|---|---|---|---|---|
| **MB1** | ○ ● | ○ ○ | ○ | ○ ● | ○ ● | ○ ● | ○ ● | ○ | ● |
| **MB2** | ● ○ ● | ● ○ ● | ● ● | ○ ● | ○ ● | ○ ● | ○ | ○ | ● |
| **MB3** | ● ○ ● | ○ | ○ | ○ ● | ○ ● | ● | ● ● | ● ○ ● | ○ ● |

- ● No Data in the Repository yet
- ○ Data in Local Format
- ● Data in Standard Ascii Format
- ○ Summary Plots
- ● Summary Data

# Glue Rupture Tests

Info from Hans:

20 EUR per rupture test

A sample corresponds:

180 mm width, to be cut into 7 small samples
and use the 5 inner samples for rupture tests.

Immediate test (~ 2 weeks)

Later test (1 every several years)

In one year/Production Site external glue rupture tests cost 20EUR x 5 rupture x 2 times/year = 200 EUR

# Minutes of the Meeting (1/4)

021211 Silvia Maselli:
1) Presentation of Summary QC test Results.
These are in
http://www.to.infn.it/activities/experiments/cms/QUALITY/QCDB/SLQC.html.
The slides are included in the usual meeting web page:
http://www.to.infn.it/activities/experiments/cms/QUALITY/MEETINGS/meet21202.html

The following topics raised during discussion:
- Ascii file definition for Data Base:
In the effort of Pablo to insert all Site data into the Oracle Data Base
http://oraweb03.cern.ch:9000/pls/cms_mb_prod/chambers.main
all Production Sites should provide him the Standard Ascii file.
About this file Begona (in a mail from her which was
discussed during the QC session) commented that
not all the cards which are usefull to store data of chambers are
included
in the file
http://www.to.infn.it/activities/experiments/cms/QUALITY/QCDB/Standardformat.txt
She mentioned for examples that it would be important to have some of the
old Ascii cards
(http://www.to.infn.it/activities/experiments/cms/QUALITY/QCDB/oldascii.txt)
defining Al plate numbers, HV Boards, FE Boards.
On the other side it is probably not so necessary to add
all construction details which were included in the old Ascii file.
The question is then to enrich the Standardformat.txt file
with the necessary cards so that all data can be
"confortably" inserted in the Oracle DB.

# Minutes of the Meeting (2/4)

Therefore please send me your opinion about which of the old Ascii file cards could be inserted into the Standard Ascii file.

You find a proposal in http://www.to.infn.it/activities/experiments/cms/QUALITY/QCDB/NewStandardformat.txt

where the first 10 data cards have been added to the Standardformat.txt. These cards have the aim to keep track of the main objects forming the Chambers.

- SuperLayer Thickness ascii data card a proposal:

For the Data Base:

SuperLayerThickness ID_super SL_Position Nmeas Thick(1)....Thick(Nmeas)

where ID_super Super Layer BarCode Number
SL_Position Super Layer Position inside the Chamber
(1,2,3 SL_Position=1 for the lower SL,
SL_Position=0 if SL not yet in Chamber,
SL_Position=4 if HoneyComb)
Nmeas number of measured points
Thick(1)...Thick(Nmeas) Thickness measures

For the Summary Results:

Thickness ID_super SL_Position AverageThickness SigmaThickness

# Minutes of the Meeting (3/4)

- Some comments were raised from Anna about the Efficiency definition.
We have discussed some time ago on how to define efficiency for our comparison results, and agreement was reached so to select out the Ibeam region because it is clearly highly inefficient inside the cell.
It is also clear however that this is not the physical cell efficiency which would keep inside the Ibeam region.
Please comment about that.

- Some comments were also raised about MeanTimer with respect to which are the quantities which are crucial to compare MT results.

Concerning these two last topics
I think some more discussion is needed
and I will add these in the next agenda, however if you have suggestions we can begin the discussion via mail.

- Chamber Traveler:
Concerning the information to insert in the Chamber Traveler the original traveler file can be found at http://www.to.infn.it/activities/experiments/cms/QUALITY/QCMANUAL/traveler.html however I have noticed that some production Sites have enriched this original file.
In particular I refer to the Madrid Chamber Travelers and also Aachen Travelers which have added more information wrt the foreseen ones.

# Minutes of the Meeting (4/4)

Once more, in order to have uniformity on the info on produced chambers and to have the best informations I think we need to rerun the Travelers content.

The meeting continued:

2) The status of QC at Production Sites has been presented, see talks of MaryCruz and Paolo.

3) QC Glue Test: some tests have been performed by an external firm.
The cost is 20 EUR /test.
This means 20 EUR x 5 samples x 2 times/year = 200 EUR /year/production site
Please react to Hans if you are interested.

4) Data Base: The production sites have to provide to Pablo the data in the Standard Ascii Format so that he can write a unique set of scripts to insert data into the DB.

I wish all of you a Merry Christmas and Happy New Year

Silvia