

Cathode Production
Status Report

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Cathode Production in Bologna

In Bologna we have the following I-beams:

2440 Φ , 2100 MB3 and 2040 MB2.

The production of the Φ cathode is finished.

The HV test (**S. Arcelli, C. Montanari, T. Rovelli**) consists in keeping the cathodes at 4600 V for about 6 hours. The cathodes are classified on the basis of the current drawn in the last hour:

Good: $I\text{-avg} < 8\text{nA}$ and $I\text{-max} < 70\text{ nA}$

Clean: $I\text{-avg} > 8\text{nA}$ or $I\text{-max} > 70\text{ nA}$

Reject: $I\text{-avg} > 25\text{ nA}$ or failed to reach 4600 V

The test gave the following results:

90.3% **Good**, 8.8% **Clean**, 0.9% **Reject**

95.7% of the **Clean** category passed the HV test after cleaning with ethyl alcohol \Rightarrow 98.7% **Good**.

The failure rate from visual inspection during the cathode assembly is still rather large:

8% for the mylar and 12% for the aluminum and is caused by dirt in the tapes and /or from the tape distribution head and the I-beams.

A decision on the splitting of the Φ cathodes is needed in order to complete the packing.

Our proposal is to split the cathodes between CIEMAT and Legnaro where there is the largest number of Θ cathodes:

1120 for CIEMAT (already packed) and the remaining 1320 for Legnaro.

This allows for 5 **MB2** and 3 **MB3**.

Cathode production will resume at the end of this week after the XY plotter is configured for MB2 Θ .

Cathode Production in Protvino

The goal of the last trip to IHEP Protvino (18/03 to 03/03) was to commission the cathode production procedure:

- Precision cutting of the I-beams
- De-burring
- Ultrasound wash
- Drying
- Cathode assembly
- HV test

and the corresponding QC procedures.

One I-beam box (855 I-beams) was precision cut and about 70% went through the de-burring.

The ultrasound wash was completed with water recycling tank and vapor removal system by 02/03. It was not tested due to a problem (collapsed hose) in the recycling system. This will be fixed in the next week.

The drying area is ready with de-humidifier and vapor removal system but was not tested.

Cathode production started on February 22nd after alignment of all the tape distribution heads.

250 cathodes were produced by February 24th.

The cathodes were HV tested using the same program as used in Bologna. The rejection rate was higher than expected and was due mostly to dirty environment.

Cathode production resumed on February 26th. Visual inspection showed alignment problems on a large fraction of cathodes.

The problem was traced back to a malfunction of the XY-plotter, i.e. the positioning of the head on the X-axis was off by $\sim 700\mu\text{m}$ at the last I-beam.

We had many phone consultations with the firm that constructed the plotter but could not identify the source of the problem.

We have brought back to Bologna the optic bar used for the X-position measurements and the electronic boards for the encoders. We are now waiting for the results of the tests to be done by the manufacturer.

We will go back to Protvino with replacement parts as soon as the problem is identified or, if this is not possible with an expert from the manufacturing firm.

Contingency Plans

This accident is going to introduce delays in the cathode production in Protvino and in Bologna.

On the critical path are the MB1 Θ cathodes, which can be done only in Protvino, and the Φ cathodes which are in short supply.

We can produce additional Φ cathodes in Bologna provided we get them precision cut and de-burred. As a temporary solution we could ask Protvino to prepare two full boxes of I-beams and ship them back to Bologna. This would give us an additional buffer of 2 MB2 and 2 MB3.

Parts Production

Erbsloeh has already extruded 10 tons of I-beams as follows:

3640 MB1 Θ , 3612 MB2 Θ , 3612 MB3 Θ , 26187 Φ
for a total of 41 boxes and 12 ton gross weight.

The paperwork for shipping this material to Protvino is under way.

H-old has manufactured 1200 rolls of mylar and 1200 rolls of aluminum tapes for cathode production although the contract was not signed yet.

We have requested 400 rolls for Bologna and 800 for Protvino.

To avoid problems with temporary exports we are investigating to pay these 400 rolls directly from Bologna.

