

# Minutes of 3rd FAIR-BINP coordination meeting HEBT Magnets Batch 2-3 session

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## **Participants:**

**BINP:** I.Morozov (IM), I.Okunev (IO), T.Bedareva, V.Vostrikov, A.Dolgov, Yevgeni Shtarklyov, A.Krasnov

**GSI/FAIR:** M.Eibach (ME), C.Mühle (CM), P.M.Suherman, F.Hagenbuck, C.Will, S.Menke, S.Lucic, K.Istomin, L.Heyl (LH), L.Urban, N.Oepen, H.Reich-Sprenger (HRS)

## **Agenda:**

- Rotating device
- Design status HEBT magnets batch2&3
- Required documentation for FAT / before shipment
- Assembly of vacuum chambers into combined horizontal/vertical pairs of 100 steerers
- Critical designs w.r.t. installation for quad11 and s18 steerers
- Status of dip15\_0, problems with coils & connection boxes.
- Handling and transportation of magnets

### **1. Rotating device**

Rotating device's weight is 15 tons. In very rare cases it might be necessary to move the rotating device along with the magnet. GSI has no crane for such case, it will be too heavy. At BINP it is possible to use an auto crane for such purposes.

For the magnets it is necessary to have a crane up to 26 tons. A 30t crane is available in Testinghalle. GSI owns a 4 strand chain suspension for 32 tons. HRS will provide details to BINP.

### **2. Design status HEBT magnets batch2&3**

Presentation shown by ME.

Totally there are 99 different 3D-models provided for CDR, 77 of them are already approved.

Not received yet: items from the latest amendment and s13 steerers.

2D-drawings for dip10 and dip19 will be prepared next weeks by V.Kobets. GSI can look on it after the Christmas break.

As a result of welding issues during manufacturing some drawings of dip10\_0 und dip15\_0 are to be redone for as-built documentation.

Some remarks received for the 3d-models of s18 steerers and BINP corrected them. LH will check them again.

### 3. Required documentation for FAT / before shipment

Slides with required documentation is shown by ME.

BINP is aware of the requirements, think it its feasible.

Sometimes magnetic measurements are done at the very last step at BINP. It should not be a show-stopper for FAT.

During serial production all necessary documents will be provided.

All open items will be listed in the general certificate.

Production rate of BINP is fast but the space is limited in the workshop for storage. BINP is interested in prompt FAT and fast delivery to GSI. GSI points out, that complete documentation is prerequisite for delivery.

### 4. Assembly of vacuum chambers into combined horizontal/vertical pairs of s100 steerers

Installation of vacuum chambers is not a problem for horizontal steerers.

For vertical steerers it is a little bit more complicated.

For combined horizontal/vertical steerers it is very complicated.

It should be described how to do it by BINP as part of installation instructions.

There is already a preliminary instruction, however it will be finalised only after the first vacuum chamber is produced, installed and tested at the BINP workshop in approximately 2-3 month.

BINP has already some ideas. The key point is to have one flange welded and some fixation of vacuum chamber with the magnets. Normally the vacuum chamber is “free-flying”, has no fixation points to the magnet.

It is not allowed to hold the chamber manually during turning of the magnets. GSI will make a proposal how to fix it.

### 5. Critical designs w.r.t. installation for quad11 and s18 steerers

Slides (“Zuordnungsliste BINP-s18-Modelle zu GSI-Baugruppen”) shown by LH.

Some issues were found. An email will be sent with information on space. Geometrical interface should be considered.

Examples of assembly drawings are shown by LH.

Such assembly drawings incl. part list will be provided by AK.

### 6. Status of dip15\_0, problems with coils & connection boxes

Slides shown by CM.

Some issues occur with the gap height.

Torque has been increased to 400 Nm.

Movements of yokes during powering is now 50 µm. Previously it was 0.1-0.2 mm.

Magnetic measurements were continued. The field increased by 1‰.

For absolute values there is almost 1% difference between GSI and BINP measurements. Probably the current measurement at BINP is the reason. Reproducibility is required during opening/closing of the magnets.

Inclination of coil is visible, it even touches the yoke at one point.

It should be investigated, how to center the coils. Limited adjustability of the connection box might be problematic. It must be proven if it is necessary to increase the required torque up to 400 Nm.

7. Handling and transportation of magnets, repair of delivered magnets

BINP should indicate the fixation points to the palettes.

In future, connection boxes for s100 steerers may be sent separately to avoid damage.

A power test on steerers has been done. The repair is thus finished.