



# Status of documentation of D1 magnet

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# Outline

- Which magnets are recorded today in MTF
- What is the situation for the drawings - are they in CDD?
- What is the situation for the Quality Production Documents (MIP, Procedures...)?
- Example of a real NC already circulated
- Conclusions

# Which magnets are recorded today in MTF

## HCMBXFM001-KJ000001

KEK



Single Aperture (150mm) Separation Dipole (D1)  
2m Model

MBXFS01 (a&b) D1

## HCMBXFM002-KJ000001

KEK



Magnet (D1) 2m Model MBXFM

### Assembly Tree

- HCMBXFM001-KJ000001 - Cold Mass for Single Aperture (150mm) SC Separat...
- HCMBXFE001-KJ000001 - Splice box Separation Dipole (D1) 2m Model LMBXF
- HCMBXFC006-KJ000001 - Half shells
- HCMBXFC006-KJ000002 - Half shells
- HCMBXFC008-KJ000001 - Yoke-stacks
- HCMBXFC008-KJ000001 - Keys
- HCMBXFM001-KJ000001 - Single Aperture (150mm) Separation Dipole (D1) 2m
- HCMBXFC010-KJ000001 - SS Collars
- HCMBXFC011-KJ000001 - GFRP Lead Collars
- HCMBXFC012-KJ000001 - Quench heaters
- HCMBXFC013-KJ000001 - Ground Insulations
- HCMBXFC014-KJ000001 - Brass protection
- HCMBXFC015-KJ000001 - Upper Coil
- HCMBXFC021-KJ000001 - Lower Coil
- HCMBXFE002-KJ000001 - Wires Separation Dipole (D1) 2m Model LMBXFE

**Other Identifier: MBXFS01 (a&b) D1 (LMBXFM)**

**Description: Cold Mass for Single Aperture (150mm) SC  
Separation Dipole (D1) 2m Model**

Main Made of Equipment data Manufacturing Operation Documents History Map						
Actions: Add extra step						
Workflow Diagram						
No workflow diagram is defined for this equipment						
Workflow Steps						
Step ID	R/E	Other name	Description	Status	Result	Last Repeated
10	0		Collared Coil (*)	Cancelled		
15	0		Collaring	Done	Ok	
20	0		Dimensional Measurement	Done	Ok	
25	0		Electrical Integrity Test	Done	Ok	
50	0		Yoke Assembly	Done	Ok	
55	0		Perform Yoking	Done	Ok	
60	0		Removal of Mandrel	Done	Ok	
65	0		Dimensional Measurement	Done	Ok	
70	0		Electrical Integrity Test	Done	Ok	
100	0		Shell Welding	Done	Ok	
105	0		Shell Welding	Done	Ok	
110	0		Inspection of Welding	Cancelled		
115	0		End-ring Welding	Done	Ok	
120	0		Inspection of Welding	Done	Ok	
125	0		Applying Axial Force to the Coil (*)	Done	Ok	
130	0		Dimensional Measurement	Done	Ok	
135	0		Alignment, Marking	Cancelled		
140	0		Holes Welding	Cancelled		
145	0		Dimensional Measurement	Cancelled		
150	0		Electrical Integrity Test	Done	Ok	
155	0		Documents for Pressure Codes	Cancelled		
200	0		Splice Work	Done	Ok	
205	0		Splice Box Assembly	Done	Ok	
210	0		SC Leads Soldering	Done	Ok	
215	0		V -tap Wires Soldering	Done	Ok	
220	0		Dimensional Measurement	Done	Ok	
225	0		Electrical Integrity Test	Done	Ok	
270	0		Alignment, Marking	Cancelled		
275	0		Electrical Integrity Test	Cancelled		
280	0		Pressure Test	Cancelled		
285	0		Documents for Pressure Codes	Cancelled		
300	0		Mechanical assembly	Done	Ok	
310	0		Electrical test	Done	Ok	
320	0		Cold test	Done	Ok	
320.1	R		Cold test	Done	Ok	
330	0		Magnetic measurements	Done	Ok	
330.1	R		Magnetic measurements	Done	Ok	
340	0		Shipping to CERN	Cancelled	Ok	

All data are in MTF  
for Magnet #1 and  
are being uploaded  
for magnet #2

[Link to Model 1](#)

[Link to Model 2](#)

# Who is filling the data?

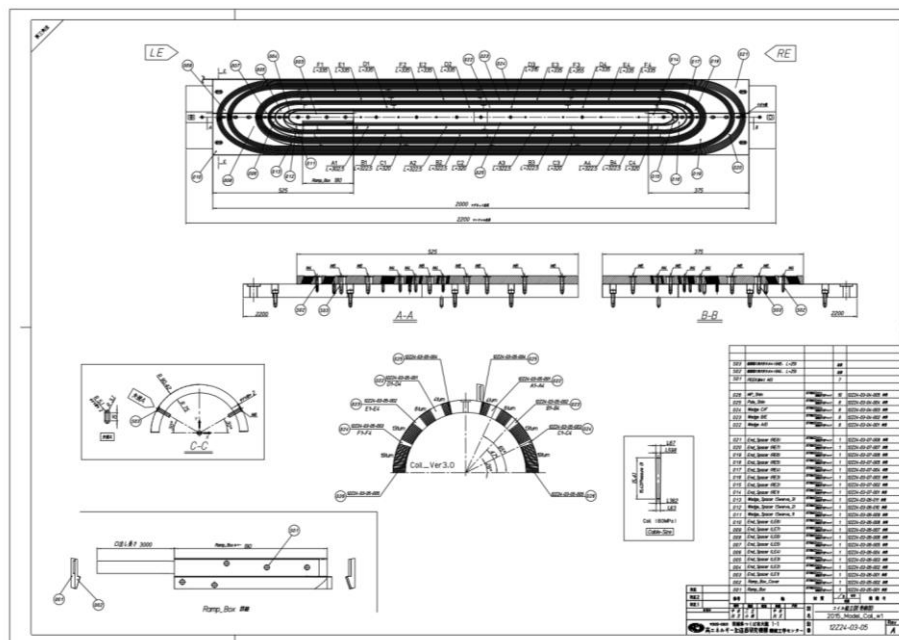
Together with CERN help all the data are uploaded - at latest - before the magnet is shipped to CERN.

More in particular:

- Short model magnets data are uploaded by KEK
- Prototype and series magnets will be uploaded by the manufacturer

# What is the situation for the drawings - are they in CDD?

* LHCMBXFC0012	lst	ISSUED	A3	K.F.	-	ext. ref. 12724-03-06-005 2015 MODEL COIL - LE 5
* LHCMBXFC0013	lst	ISSUED	A3	K.F.	-	ext. ref. 12724-03-06-006 2015 MODEL COIL - LE 6
* LHCMBXFC0014	lst	ISSUED	A3	K.F.	-	ext. ref. 12724-03-06-007 2015 MODEL COIL - LE 7
* LHCMBXFC0015	lst	ISSUED	A3	K.F.	-	ext. ref. 12724-03-06-008 2015 MODEL COIL - LE 8
* LHCMBXFC0016	lst	ISSUED	A3	K.F.	-	ext. ref. 12724-03-06-009 2015 MODEL COIL - SWERVE 1
* LHCMBXFC0017	lst	ISSUED	A3	K.F.	-	ext. ref. 12724-03-06-010 2015 MODEL COIL - SWERVE 2
* LHCMBXFC0018	lst	ISSUED	A3	K.F.	-	ext. ref. 12724-03-06-011 2015 MODEL COIL - SWERVE 3
* LHCMBXFC0019	lst	ISSUED	A3	K.F.	-	ext. ref. 12724-03-07-001 2015 MODEL COIL - RE 1
* LHCMBXFC0020	lst	ISSUED	A3	K.F.	-	ext. ref. 12724-03-07-002 2015 MODEL COIL - RE 2
* LHCMBXFC0021	lst	ISSUED	A3	K.F.	-	ext. ref. 12724-03-07-003 2015 MODEL COIL - RE 3
* LHCMBXFC0022	lst	ISSUED	A3	K.F.	-	ext. ref. 12724-03-07-004 2015 MODEL COIL - RE 4
* LHCMBXFC0023	lst	ISSUED	A3	K.F.	-	ext. ref. 12724-03-07-005 2015 MODEL COIL - RE 5
* LHCMBXFC0024	lst	ISSUED	A3	K.F.	-	ext. ref. 12724-03-07-006 2015 MODEL COIL - RE 6
* LHCMBXFC0025	lst	ISSUED	A3	K.F.	-	ext. ref. 12724-03-07-007 2015 MODEL COIL - RE 7
* LHCMBXFC0026	lst	ISSUED	A3	K.F.	-	ext. ref. 12724-03-07-008 2015 MODEL COIL - RE 8
* LHCMBXFC0027	lst	ISSUED	A3	K.F.	-	ext. ref. 12724-03-08-012 2015 MODEL COIL - LE 8
* LHCMBXFC0028	lst	ISSUED	A3	K.F.	-	ext. ref. 12724-03-07-009 2015 MODEL COIL - RE 8
* LHCMBXFC0029	lst	ISSUED	A3	K.F.	-	ext. ref. 12724-03-09 INSULATION_ASSY
* LHCMBXFC0030	lst	ISSUED	A3	K.F.	-	ext. ref. 12724-03-09A INSULATION_LE (LEAD BOX)
* LHCMBXFC0031	lst	ISSUED	A3	K.F.	-	ext. ref. 12724-03-09B INSULATION_RAMP
* LHCMBXFC0032	lst	ISSUED	A3	K.F.	-	ext. ref. 12724-03-09C INSULATION



- All the DWG's about Model Magnet #1 are in CDD
- DWG's about Model Magnet #2 will be uploaded as soon as they are available

# What is the situation for the Quality Production Documents (MIP, Procedures...)?

MIP's and Procedures are being discussed but were not available for the models #1 and #2

All documentation will be prepared together with the manufacturer of prototype and series:  
Contract to be assigned by spring 2019

# Did we have already NC and were they circulated?

Unfortunately yes, and it has been circulated...

1967119 v.1.0 | LHC-MBXFC-QN-0001 v.1.0 Closed Restricted access

**Electric discharge during test** by Andrea MUSSO

Info

Description: Electric discharge during test

External reference:

Keywords:

**Special Properties**

Main cause: People

Class: Electrical

Disposition / Action: Use-as-is / Concession

Importance / Criticality: Non critical

**Details**

Local administrators: List of Administrators

Context: HL-LHC-WP3-D1-KEK-MTF

Context for the manufacturing of Separation Dipoles in KEK Japan

Associated Links:

**This page** <https://edms.cern.ch/document/1967119/1.0>

**Files**

Name	Size	Last modified date	Last modified by
HL-Q-T.NON-CONFORMITY_20180520V5.docx	9.7 MB	2018-05-23 11:04:04	Andrea MUSSO

Font Paragraph

EDMS NO. 1967119 REV. 1.0 VALIDITY

REFERENCE :

**HL-LHC:**

**Non Conformity Report**

**NCR Description**

Contract No.	KEK collaboration	Date of Issue	2018-04-18
Work Package	WP3	Equipment	HCMBXFC050-KJ000003
Supplier	KEK	Drawing No.	Drawing/s related to the equipment
Inspector	KEK controller	Test/Activity	Insulation test after instrumentation

One of the coils for MBXF52 named "coil S2-3" was under instrumentation work. After soldering voltage leads at certain positions of the coil, the leads were fixed by epoxy resin with an interval of 20 - 30 mm. Insulation soundness of the voltage leads were inspected with a probe made of Nb-Ti filaments by a worker from an outsource. First, one end of a multimeter was connected to the probe, and the other end was connected to the coil. The worker gently touched the voltage leads along the length by the probe of Nb-Ti filament and checked the electrical resistance as shown in Fig. 1. It is true that this procedure can also check soundness of the SC cable insulation adjacent to the voltage leads since the probe can be touched the coil surface at the same time. We confirmed that this was an ordinary procedure for the

Styles

EDMS NO. 1967119 REV. 1.0 VALIDITY

REFERENCE :



Fig.2. Blackened coil surface.

Inspector's Signature	Supplier's Signature

**WPE Decision**

Non Conformity Critical ☐ Non Conformity Non-Critical ☒

Repair ☒ Regrade ☐ Scrap ☐ Return ☐ Concession ☐

**Corrective Action/Plan**

The incident occurred due to lack of communication between KEK personnels and the worker from the outside company. To avoid recurrence of this kind of issue, KEK will make a list of inspection items and have workers keep the procedures which are authorized by KEK.

Electrical test results after the incident were shown in Table 1 and Fig. 3. No noticeable change was found in coil resistance and inductance. The waveform obtained by surge test was normal and frequency shows no change before and after the incident up to 1 kV.

Table 1 Electrical test results before and after the incident

	Before incident	After incident
Coil resistance at 20°C ( $\Omega$ )	0.226	0.226
Coil inductance at 100 Hz (mH)	2.07	2.06

On documentation point of view, this was an useful exercise



# Conclusions

- **Thanks** to the collaboration of KEK's colleagues and CERN Quality Team, traceability of the D1 equipment in MTF is guaranteed since the very early stage
- All Drawings are in CDD for model #1 and will be uploaded for the next magnets as soon as they are available
- Documentation related to MIP's and Procedures is being prepared and will be ready before to start the manufacturing of the full-scale prototype



## Thank you...