



Equipment production follow-up via MTF

EDMS: [1868591](https://cds.cern.ch/record/1868591)

Project Office – Configuration, Quality & Resources Office
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HL-LHC Collaboration meeting - Madrid (CIEMAT) November 2017

CERN Tools: EDMS-MTF

- High requirements in terms of documentation and traceability for HL-LHC project. All components/equipment to be well documented and traced
- MTF (Manufacturing and Testing Folder): Dedicated tool for the follow-up of Manufacturing /QC activities and the storage of documentation during the Production and installation phases (All the manufacturing data associated)
- MTF is an integral part of EDMS (Engineering Data Management System). Documents uploaded to MTF will become EDMS docs, docs in EDMS can be attached to MTF
- Handling and storage of all manufacturing and test data (including non conformities)

Access to MTF

From EDMS - <https://edms.cern.ch/ui/#!master/portal/tab?home>

The screenshot shows the EDMS portal interface. At the top, there is a navigation bar with 'EDMS Home' and a search bar. Below this, there are tabs for 'Home', 'Equipment', 'Buildings & Sites', 'Safety', and 'CAD'. A 'News' section is visible on the right. In the center, there are icons for 'Browse', 'Document search', and 'Register Import Request'. A large grey box highlights the 'Other applications' section, which lists 'CDD', 'MTF', and 'Infor EAM'. The 'MTF' link is highlighted with a blue box. At the bottom left, there is a small 'Other applications' menu with 'CDD', 'MTF', and 'Infor EAM' options.



MTF can only be used with a CERN Nice Account Externals to apply for one!

The screenshot shows the MTF login page. The header includes 'MTF Equipment Management Folder' and navigation links for 'Home', 'Help', 'EDMS Portal', 'News', and 'Login'. The user is identified as 'User: GUEST'. The main content area contains a login form with fields for 'Login:' and 'Password*', an 'OK' button, and a 'Clear' button. A note below the form states: '*If your EDMS and NICE logins are the same, you can use your NICE password. Reminder: you have agreed to comply with the CERN Computing Rules'. The footer includes 'CERN - European Organization for Nuclear Research' and a copyright notice: '© CERN - 2016-11-22 11:30:43'.

Directly From MTF - <https://edms5.cern.ch/asbuilt/plsql/mtf.home?cookie=15935572>

Search for items/assets

MTF
Equipment Management Folder

Home | Help | EDMS Portal | News | Login

User: HGACIAG

Search : Equipment | Location | Slot | System

Welcome to the MTF Application Homepage

- EQUIPMENT**
 - Access Equipment Data
 - Register New Equipment
 - Generate Properties Report
 - Generate Slots Properties Report
 - Generate Steps Report (by part number)
 - Generate Steps Report (eqp. + structure)
 - Generate NCR Overview (by profile)
 - Delete Object
- INSTALLATION**
 - Find an LHC Location
 - LINAC4 Locations
 - Access Location Data
 - QRL Installation Dashboard
 - Magnet Installation Dashboard
 - LHC Circular Dashboard
- MY MTF**
 - My search and report criteria
 - My custom reports
- NEWS**
 - 2008-04-01**
Version 4.0
New functionalities... [more](#)
 - 2007-08-23**
Version 3.9.6
New functionalities... [more](#)
 - 2007-03-20**
Version 3.9.5
New functionalities... [more](#)
- PRODUCTION SITES**
 - Access Production Sites Data
- MANAGEMENT**
 - Access Profiles Data
 - Create import request document

CERN - European Organization for Nuclear Research

Identifier: Type:

Range from: to: Status:

Description: Usage:

Location:

Resp. Technique:

Part Number: Click for Part Numbers list

Manufacturer: Click for Manufacturer's list

Page 1 : Results 1 ... 20 of 27

Type	Part Identifier	Manufacturer	Status
Used	Description	Other Identifier	Location
	HCACFCA001-NO000001	NIOW	Manufacturing
	UK-4Rod - Bare PoP Crab Cavity		
	HCACFCA002-NO000001	NIOW	Manufacturing
	DQW - Bare PoP Crab Cavity		
	HCACFCA003-NO000001	NIOW	Manufacturing
	RFD - Bare PoP Crab Cavity		
	HCACFCA004-CR000001	CERN	Manufacturing
✓	DQW Bare Cavity (variant #1)	CERN-DQW-ACFCA001	Manufacturing
	HCACFCA004-CR000002	CERN	Manufacturing
✓	DQW Bare Cavity (variant #1)	CERN-DQW-ACFCA002	Manufacturing
	HCACFCM001-S9000001	STFC	Manufacturing
✓	DQW Cold Magnetic Shield (Variant #1)		
	HCACFCM001-S9000002	STFC	Manufacturing
✓	DQW Cold Magnetic Shield (Variant #1)		
	HCACFCM002-S9000001	STFC	Manufacturing
	RFD Cold Magnetic Shield (Variant #2)		

1. Access Equipment Data
2. Identifier: HCXXXXXXXXX%
3. All assets from the items with this equipment code will be showed (from 1 item we shall have 1 or more assets)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
MACHINE CODE	EQUIPMENT CODE									SEQ. NUMBER	SEPARA TOR	PRODUCTIO N SITE	SERIAL SEQUENTIAL NUMBER									
PREFIX CONTROLLED BY CERN											CONTROLLED BY SUPPLIER OR CERN	-	CONTROLLE D BY CERN	CONTROLLED BY SUPPLIER								
PART NUMBER													-	SERIAL NUMBER								

How to build MTF - From MIP to MTF

HL-LHC: Quality Manufacturing and Inspection Plan

Project No. HL-2015-001
 Inspector: J. Garcia
 Date: 2015-07-26

IN	ACTIVITY / OPERATION	APPL. EQUIPMENT / TOOLS	APPLICABLE DOCUMENTS / PROCEDURES	DEL. DEL.	SUPPLIER / CONTRACT	QUEST / VERIFICATION	APPROVED / APPROVED	REVISION / REVISION	NOTE / COMMENTS
1.1	Inspection of the cavity	Visual	HL-LHC-QM-001	HL-2015-001	HL-2015-001	HL-2015-001	HL-2015-001	HL-2015-001	
1.2	Inspection of the cavity	Visual	HL-LHC-QM-001	HL-2015-001	HL-2015-001	HL-2015-001	HL-2015-001	HL-2015-001	
1.3	Inspection of the cavity	Visual	HL-LHC-QM-001	HL-2015-001	HL-2015-001	HL-2015-001	HL-2015-001	HL-2015-001	
1.4	Inspection of the cavity	Visual	HL-LHC-QM-001	HL-2015-001	HL-2015-001	HL-2015-001	HL-2015-001	HL-2015-001	
1.5	Inspection of the cavity	Visual	HL-LHC-QM-001	HL-2015-001	HL-2015-001	HL-2015-001	HL-2015-001	HL-2015-001	
1.6	Inspection of the cavity	Visual	HL-LHC-QM-001	HL-2015-001	HL-2015-001	HL-2015-001	HL-2015-001	HL-2015-001	
1.7	Inspection of the cavity	Visual	HL-LHC-QM-001	HL-2015-001	HL-2015-001	HL-2015-001	HL-2015-001	HL-2015-001	
1.8	Inspection of the cavity	Visual	HL-LHC-QM-001	HL-2015-001	HL-2015-001	HL-2015-001	HL-2015-001	HL-2015-001	
1.9	Inspection of the cavity	Visual	HL-LHC-QM-001	HL-2015-001	HL-2015-001	HL-2015-001	HL-2015-001	HL-2015-001	
1.10	Inspection of the cavity	Visual	HL-LHC-QM-001	HL-2015-001	HL-2015-001	HL-2015-001	HL-2015-001	HL-2015-001	



Equipment Identifier: HCACFCA004-CR000001
Other Identifier: CERN-DQW-ACFCA001
Description: DQW Bare Cavity (variant #1)

Main | Made of | Equipment data | Manufacturing | Operation | Non-conformities | Documents | History | Map

Actions: Edit | View summary

Physical
 Manufacturer: CERN
 Resp. Technique: Manufacturing
 Status: CERN-DQW-ACFCA001
 Other Identifier:
 Parent Equipment:
 Parent Slot:
 Location:
 State: Good

Safety
 RP Classification:

Comments
 Item in ABS: DQW Bare Cavity (variant #1) (ver.0)

Design
 Item in ABS: DQW Bare Cavity (variant #1) (ver.0)

Audit
 Created on: 2015-07-26 by: [Name]
 Last modified on: 2016-07-26 by: EDMS group
 EDMS owner: HGACIAG

Main | Made of | Equipment data | Manufacturing | Operation | Non-conformities | Documents | History | Map

Workflow Diagram: No workflow diagram is defined for this equipment.

Workflow Steps

Step ID	R/E (Other name)	Description	Status	Result	INC
1	0	Traceability of materials - Main Body	Accepted	OK	
2	0	Cutting and bending - Main Body	Accepted	OK	
3	0	E-beam Welding longitudinal W01A/B	Accepted	OK	
3.1	0	Visual Inspection W01A/B (*)	Accepted	OK	
3.2	0	Radiographic examination W01A/B (*)	Accepted	OK	
3.3	0	Dimensional check before forming (*)	Accepted	OK	
4	0	Forming - Main Body	Accepted	OK	
5	0	Visual inspection after forming	Accepted	OK	
5.1	0	Metrology control after forming (*)	Accepted	OK	
5.2	0	Machining holes plus extrusion steps plus machining	Accepted	OK	
6	0	Metrology control final - Main Body (*)	Accepted	OK	
7	0	Forming - Bowl	Accepted	OK	
8	0	Visual inspection	Accepted	OK	
8.1	0	Metrology control (*)	Accepted	OK	
8.2	0	Machining - Bowl	Accepted	OK	
9	0	Metrology control (*)	Accepted	OK	
9.1	0	Cutting and machining - Harlots & Pin	Accepted	OK	
10	0	E-beam Welding longitudinal W02A/B/C & W29 - Lunette (*)	Accepted	OK	
11	0	Visual Inspection W29A/B/C & W29 (*)	Accepted	OK	
11.1	0	Radiographic examination W29A/B/C & W29 (*)	Accepted	OK	
11.2	0	Forming - Lunette (*)	Accepted	OK	
12	0	Metrology Control (*)	Accepted	OK	
12.1	0	Metrology Control (*)	Accepted	OK	
13	0	E-beam Welding circumferential W30A/B/C & W31 - Lunette (*)	Accepted	OK	
13.1	0	Visual Inspection W30A/B/C & W31 (*)	Accepted	OK	
13.2	0	Radiographic examination W30A/B/C & W31 (*)	Accepted	OK	
14	0	Deep drawing & Calibration Extrusion - Lunette	Accepted	OK	
14.1	0	Metrology Control (*)	Accepted	OK	
15	0	Visual inspection after machining of lunette (*)	Accepted	OK	
16	0	E-beam Welding circumferential W04A/W04B - Diabolo Subassemblies (*)	Accepted	OK	
16.1	0	Visual Inspection W04A/W04B (*)	Accepted	OK	
16.2	0	Radiographic examination W04A/W04B (*)	Accepted	OK	
17	0	E-beam Welding circumferential W07A - Pin up (*)	Accepted	OK	
18	0	E-beam Welding circumferential W07A/W07B - Diabolo Subassemblies (*)	Accepted	OK	
18.1	0	Visual Inspection W07A & W07B (*)	Accepted	OK	
18.2	0	Radiographic examination W07A & W07B	Accepted	OK	
19	0	E-beam Welding W09A/B & W10A - Bowl Subassemblies (*)	Accepted	OK	
19.1	0	Visual Inspection W09A/B & W10A (*)	Accepted	OK	
19.2	0	Metrology Flatness and profile (*)	Accepted	OK	
20	0	E-beam Welding W05A/B/C & W24 - Extremities (*)	Accepted	OK	
20.1	0	Visual Inspection W05A/B/C & W24 (*)	Accepted	OK	
20.2	0	Radiographic examination W05A/B/C & W24 (*)	Accepted	OK	
20.3	0	Machining internal ring (*)	Done	Not OK	
21	0	Leak Test	Accepted	OK	
22	0	E-beam Welding W02A/B - Bowl	Accepted	OK	
22.1	0	Visual Inspection W02A/B (*)	Accepted	OK	
22.2	0	Radiographic examination W02A/B (*)	Accepted	OK	
22.3	0	Metrology Control (*)	Accepted	OK	
22.4	0	RF Trimming	Accepted	OK	
22.5	0	Metrology Control	Accepted	OK	
23	0	E-beam Welding W03A - Final Assembly	Accepted	OK	
23.1	0	Visual Inspection W03A	Accepted	OK	
23.2	0	Visual Inspection W03A Radiographic examination W03A	Accepted	OK	
23.3	0		Accepted	OK	
24	0		Accepted	OK	
24.1	0		Accepted	OK	
24.2	0		Accepted	OK	
24.3	0		Accepted	OK	
24.4	0		Accepted	OK	
25	0		Accepted	OK	
26	0		Accepted	OK	
27	0		Accepted	OK	
28	0		Accepted	OK	

Equipment Identifier: HCACFCA004-CR000001
Other Identifier: CERN-DQW-ACFCA002
Description: DQW Bare Cavity (variant #1)

Main | Made of | Equipment data | Manufacturing | Operation | Non-conformities

Actions: Edit | View summary

Physical
 Manufacturer: CERN
 Resp. Technique: Manufacturing
 Status: CERN-DQW-ACFCA002
 Other Identifier:
 Parent Equipment:
 Parent Slot:
 Location:
 State: Good

Safety
 RP Classification:

Comments
 Item in ABS: DQW Bare Cavity (variant #1) (ver.0)

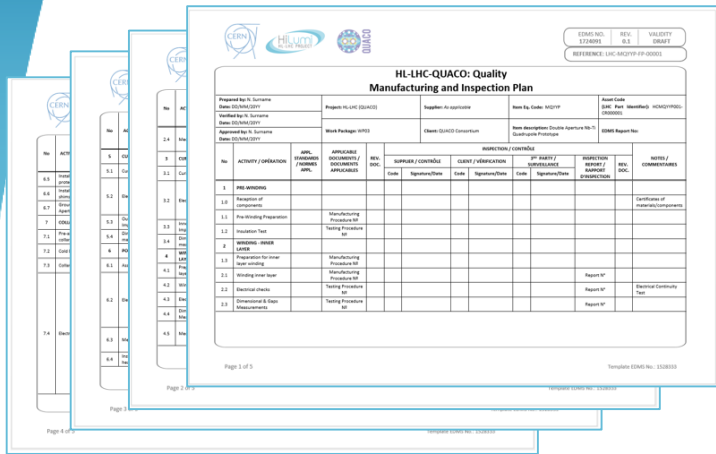
Design
 Item in ABS: DQW Bare Cavity (variant #1) (ver.0)

Audit
 Created on: 2015-07-26 by: [Name]
 Last modified on: 2016-07-26 by: EDMS group
 EDMS owner: HGACIAG

HL-LHC-ACFCA002



From MIP to MTF – How to proceed



1. MIP shall be issued by the manufacturer. Baseline document that details how an equipment shall be produced. It includes the quality controls intended to be performed during the production to ensure the equipment meets the requirements

2. The MIP is assessed and validated by the Technical Officers. Definition of points : H, W, N, R (to be respected during the production).

3. All those steps that are subject to an inspection (consequently an acceptance), which means the QC steps of the MIP, will be used to build the MTF (input file)

Equipment Identifier: HCMQYYP001-CR000001
Other Identifier: None
Description: Insertion Region Enlarged Aperture (90mm) Quadrupole - Prototype

Equipment Identifier: HCMQYYP001-CR000001
Other Identifier: None
Description: Insertion Region Enlarged Aperture (90mm) Quadrupole - Prototype

4. MTF to be fed during the production. All steps are subject to an approval and the report associated to the specific step to be uploaded (dimensional controls, electrical checks, magnetic measurements, welding controls, etc)

HL-LHC PROJECT

Equipment data | Manufacturing | Operation | Documents | History | Map

Actions: Edit | View summary

Physical

Manufacturer: CERN
 Resp. Technique: Manufacturing
 Status: Manufacturing
 Other Identifier: None
 Parent Equipment: None
 Parent Slot: None
 Location: Good
 State: MRC M01

Safety

RP Classification: None

Comments

Design

Item in ABS: Insertion Region Enlarged Aperture (90mm) Quadrupole - Prototype (ver.0)

Audit

Created on: 2015-10-12 by: HGARCIA G
 Last modified on: 2016-10-11 by: HGARCIA G
 EDMS owner: HGARCIA G
 EDMS group: HL-LHC-QUADRCORR-MTF

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	IR/E	Other name	Description	Status	Last Requested
1	0		Pre-winding	Pending	INC
1.1	0		Insulation Testing	Pending	
2	0		Winding inner layer	Pending	
2.1	0		Electrical checks	Pending	
2.2	0		Dimensional & Gaps Measurements	Pending	
2.3	0		Mechanical checks	Pending	
3	0		Curing inner layer	Pending	
3.1	0		Electrical checks	Pending	
3.2	0		Dimensional Measurements	Pending	
4	0		Winding outer layer	Pending	
4.1	0		Electrical checks	Pending	
4.2	0		Dimensional & Gaps Measurements	Pending	
4.3	0		Mechanical checks	Pending	
5	0		Curing outer layer	Pending	
5.1	0		Electrical checks	Pending	
5.2	0		Dimensional Measurements	Pending	
6	0		Pole Assembly	Pending	
6.1	0		Electrical checks	Pending	
6.2	0		Mechanical checks	Pending	
7	0		Collaring	Pending	
7.1	0		Electrical checks	Pending	
7.2	0		Mechanical checks	Pending	
7.3	0		Warm Magnetic Measurements	Pending	
7.4	0		Metrological control	Pending	
8	0		Shipping	Pending	

Input File - Workflow

- The input file shall contain the required information to allow MTF Support Team to set up the MTF of each asset

- Access Rights - Who can approve the steps? Who can edit the manufacturing workflow? Etc.
- Number of assets to be produced from the same item (same workflow and same manufacturer)
- Manufacturing Workflow (those steps of production that will be controlled)

			R/W	Read/Write
			A	Approve
Name, Surname/E-group	Affiliation	E-mail	R/W	A
HL-MTF-WP4-ACFDC	CERN		R/W	A

Item name	DQW Bare Cavity (Variant #1)
Item LHC Equipment Code	ACFCA004
Asset(s) quantity	2
LHC Part Identifier codes	ACFCA004-CR000001 ACFCA004-CR000002

Step ID	Step description
10	Traceability of materials
20	Cu-SS Brazing Procedure Qualification
30	Manufacturing of the brazed assemblies
31	Manufacturing copper piping
32	Brazing Cu-SS transitions
33	TIG welding
34	X-ray testing
36	Leak test on cooling pipe assemblies
37	Soldering cooling pipes to copper panels
38	Pressure test on sub-assemblies (23 bar)
39	Leak test on sub-assemblies
40	Manufacturing and pre-assembly of stiffeners, panels, covers, lateral windows, interfaces
50	Brushing and light cleaning of sub-assemblies
60	Cleaning and pickling of stiffeners, panels, covers, lateral windows, interfaces

Main information of the asset

Equipment Identifier: HCACF_A001-CR000001

Other Identifier: None

Description: DQW Cryomodule Assembly

Main			
Made of			
Equipment data			
Manufacturing			
Operation			
Documents			
History			
Map			
Actions : Edit View summary			
Physical			
Manufacturer	CERN		
Resp. Technique			
Status	Manufacturing		
Other Identifier			
Parent Equipment			
Parent Slot			
Location	SM18		
State	Good	MRC	AC01
Safety			
RP Classification			
Comments			
Design			
Item in ABS	▶ DQW Cryomodule Assembly (ver.0)		
Audit			
Created on	2016-08-15	by	EDMSIMPORT
Last modified on	2017-10-20	by	HGARCIAG
EDMS owner	EDMSIMPORT	EDMS group	HL-MTF-WP4-ACFDC

Main information of the asset may be found in this tab:

- Manufacturer of the equipment
- Current Status
- Current Location
- State
- RP Classification
- Access rights
- Etc.



Assembly Breakdown Structure

Assembly Breakdown Structure (ABS)

ABS allows to keep traceability of the components that are used to build an equipment (these components to have their MTF as well)

We just have to attach the 'child' (component) that have been previously set up within the system

Equipment Folder : Made Of

Equipment Identifier: HCMQYYP001-CR000001
Other Identifier: None
Description: Insertion Region Enlarged Aperture (90mm) Quadrupole - Prototype

Main Made of Equipment data Manufacturing Operation Documents History Map
 Actions: **Attach child** ABS Comparison: Show

Order # | Type | Id/Missing Part Number | Other Id

Attach New Child to Equipment

1 Search child ... 2 Select child ... 3 Confirm data ... 4 Attach

Search child

Input a search criteria for the desired child

Identifier:
 Description:
 Type: Any

Cancel Continue >

EDMS Home Favourites Inbox Caddie

Navigator

- Manufacturing procedures
- Inspection & test procedures
- Qualifications
- Manufacturing records
 - HCLMBXF001-KJ000001 - Cold Mass for Single Aperture (150mm) SC Separation Dipole (D1) 2m Model
 - HCMCBXF004-KJ000001 - Splice box
 - HCMCBXF005-KJ000001 - Wires
 - HCMCBXF006-KJ000001 - Half shells

D1 - Separation Magnet						
Level	Eq. Code	Item Description	Category/Item	Own Class	Quantity	
	MBXFM	Separation Dipole				
	LMBXFM	Cold Mass				
	MBXFC	End covers	HCLMBXFM001		1	
	MBXFC	Nozzles	HCMBXFC001		2	
	MBXFC	Beam tube	HCMBXFC002		Batch	
	MBXFC	Splice box	HCMBXFC003		1	
	MBXFC	Wires	HCMBXFC004		Batch	
	MBXFC	Half shells	HCMBXFC005		Batch	
	MBXFC	End plates	HCMBXFC006		2	
	MBXFC	Yoke-stacks	HCMBXFC007		2	
	MBXFC	Keys	HCMBXFC008		Batch	
	MBXFC	SS Collars	HCMBXFC009		Batch	
	MBXFC	GFRP Lead Collars	HCMBXFC010		Batch	
	MBXFC	Quench heaters	HCMBXFC011		Batch	
	MBXFC	Ground Insulations	HCMBXFC012		Batch	
	MBXFC	Brass protection	HCMBXFC013		Batch	
	MBXFM	Magnet	HCMBXFM001		1	
	MBXFC	Upper Coil	HCMBXFC015		1	
	MBXFC	Cable	HCMBXFC016		1	
	MBXFC	Wedges	HCMBXFC017		Batch	
	MBXFC	End spacers	HCMBXFC018		Batch	
	MBXFC	Layer Ramp Box	HCMBXFC019		Batch	
	MBXFC	Lead Cover	HCMBXFC020		Batch	
	MBXFC	Lower Coil	HCMBXFC021		1	
	MBXFC	Cable	HCMBXFC022		1	
	MBXFC	Wedges	HCMBXFC023		Batch	
	MBXFC	End spacers	HCMBXFC024		Batch	
	MBXFC	Layer Ramp Box	HCMBXFC025		Batch	
	MBXFC	Lead Cover	HCMBXFC026		Batch	

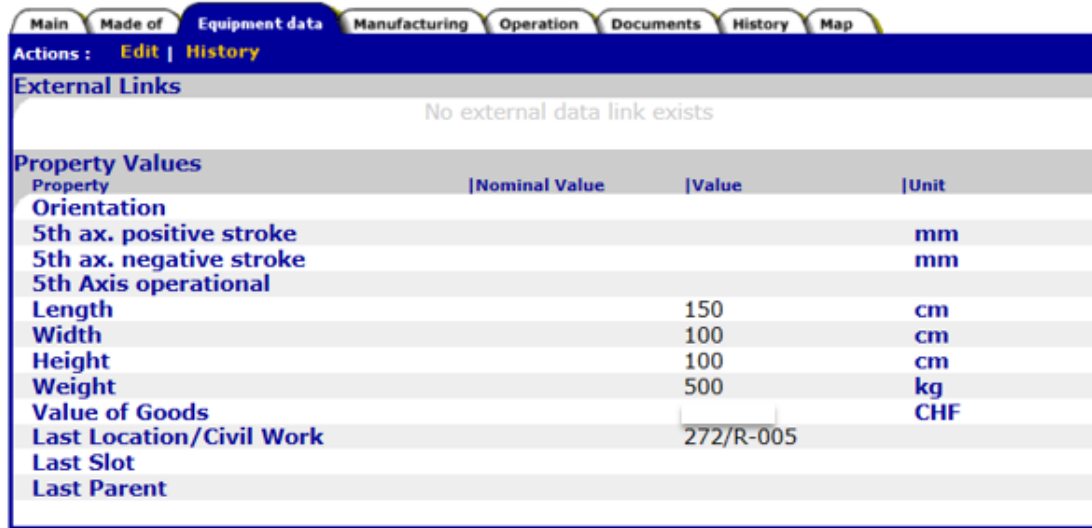
Main Made of Equipment data Manufacturing Operation Documents History Map
 Actions: **Attach child | Suffix child | Detach child** ABS Comparison: Show

Order #	Type	Id/Missing Part Number	Other Id
40	Batch	HCMCBXF004-KJ000001	
		Splice box	1 Unit(s)
50	Batch	HCMCBXF005-KJ000001	
		Wires	1 Unit(s)
60	Equipment	HCMCBXF006-KJ000001	
		Half shells	
60	Equipment	HCMCBXF006-KJ000002	
		Half shells	
70	Equipment	HCMCBXF007-KJ000001	
		End plates	
70	Equipment	HCMCBXF007-KJ000002	
		End plates	
80	Batch	HCMCBXF008-KJ000001	
		Yoke-stacks	1 Unit(s)
90	Batch	HCMCBXF009-KJ000001	
		Keys	1 Unit(s)
150	Equipment	HCMCBXFM001-KJ000001	MBXFS01 (a&b) D1
		Single Aperture (150mm) Separation Dipole (D1) 2m Model	

- ▶ HCMCBXF024-KJ000001 - End spacers
- ▶ HCMCBXF025-KJ000001 - Layer Ramp Box
- ▶ HCMCBXF026-KJ000001 - Lead Cover

Main information of the equipment

Equipment Identifier: HCTCSPM001-CR000001
Other Identifier: None
Description: Secondary Collimator with Pick-Up Metallic [TCSPM]



Property	Nominal Value	Value	Unit
Orientation			
5th ax. positive stroke			mm
5th ax. negative stroke			mm
5th Axis operational			
Length		150	cm
Width		100	cm
Height		100	cm
Weight		500	kg
Value of Goods			CHF
Last Location/Civil Work		272/R-005	
Last Slot			
Last Parent			

This option will allow us to set the main parameters (nominal values) that have to be checked during production (dimensions, mechanical properties, electrical values, magnetic checks, etc.) and during the inspection set the actual values.

Manufacturing Workflow

Equipment Identifier: HCLMBXF001-KJ000001
Other Identifier: MBXFS01 (a&b) D1 (LMBXFM)
Description: Cold Mass for Single Aperture (150mm) SC Separation Dipole (D1) 2m Model

The manufacturing workflow is set in the input file and contains all those operations (at least) subject to be controlled (checks)

Step ID	R/E	Other name	Description	Status	Last Repeated Result	INC
10			Collared Coil (*)	Cancelled		
15			Collaring	Done	Ok	
20			Dimensional Measurement	Done	Ok	
25			Electrical Integrity Test	Done	Ok	
50			Yoke Assembly	Done	Ok	
55			Perform Yoking	Done	Ok	
60			Removal of Mandrel	Done	Ok	
65			Dimensional Measurement	Done	Ok	
70			Electrical Integrity Test	Done	Ok	
100			Shell Welding	Done	Ok	
105			Shell Welding	Done	Ok	
110			Inspection of Welding	Cancelled		
115			End-ring Welding	Done	Ok	
120			Inspection of Welding	Done	Ok	
125			Applying Axial Force to the Coil	Done	Ok	
130			Dimensional Measurement	Done	Ok	
135			Alignment, Marking	Cancelled		
140			Holes Welding	Cancelled		
145			Dimensional Measurement	Cancelled		
150			Electrical Integrity Test	Done	Ok	
155			Documents for Pressure Codes	Cancelled		
200			Splice Work	Done	Ok	
205			Splice Box Assembly	Done	Ok	
210			SC Leads Soldering	Done	Ok	
215			V -tap Wires Soldering	Done	Ok	
220			Dimensional Measurement	Done	Ok	
225			Electrical Integrity Test	Done	Ok	
250			End Cover welding	Cancelled		
255			End Cover Welding	Cancelled		
260			Inspection of Welding	Cancelled		
265			Dimensional Measurement	Cancelled		
270			Alignment, Marking	Cancelled		
275			Electrical Integrity Test	Cancelled		
280			Pressure Test	Cancelled		
285			Documents for Pressure Codes	Cancelled		
300			Mechanical assembly	Done	Ok	
310			Electrical test	Done	Ok	
320			Cold test	Done	Ok	
330			Magnetic measurements	Done	Ok	
340			Shipping to CERN	Cancelled	Ok	

The workflow will allow us to follow up the manufacturing and upload the QC reports to the corresponding activity

Workflow is not rigid. Extra Steps may be added and the initial defined steps may be cancelled. Option to repeat any of the steps

Approval of fabrication steps

Each step to be approved upon completion. Click on the Workflow Step number and then EDIT to give the acceptance of the step if results **OK** (if the step would not have been accepted, then **Not OK** and a **NCR** may be issued)

1

Step Generic Data		
Step ID	2.1	Other name
Description	Electrical checks	
Status	Pending	Result
Completed on		
Provided by		Expected by
Responsible		Executed by
Comments		
Step Documents		
Applicable Standard		
Results		
Non Conformity		
Audit		
Created on	2015-10-12	
Last modified on	2016-10-11	by HGARCIAG

2

Step Generic data		
Step ID	2.1	Other name
Description	Electrical checks	
Status	Pending	Result
Completed on		
Provided by		Expected by
Responsible		Executed by
Step Comments		
Step Documents		
Applicable Standard		
Results		
Non Conformity		

3

Step Generic data		
Step ID	2.1	Other name
Description	Electrical checks	
Status	Pending	Result
Completed on		
Provided by		Expected by
Responsible		Executed by
Step Comments		
Step Documents		
Applicable Standard		
Results		
Non Conformity		

4

Step Generic data		
Step ID	2.1	Other name
Description	Electrical checks	
Status	Accepted	Result
Completed on		
Provided by		Expected by
Responsible		Executed by
Step Comments		
Step Documents		
Applicable Standard		
Results		
Non Conformity		

Handling of Non Conformities

If during an inspection a deviation is found, then a Non Conformity to be issued

<u>20</u>	()	E-Beam welding W06A/B/C & W24 - Extremities (*)	Accepted	Ok
<u>20.1</u>	()	Visual Inspection W06A/B/C & W24 (*)	Accepted	Ok
<u>20.2</u>	()	Radiographic examination W06A/B/C & W24 (*)	Accepted	Ok
<u>20.3</u>	(E)	Machining Internal Ring (*)	Done	Not Ok
<u>20.4</u>	(E)	Machining Internal Ring	Accepted	Ok
<u>21</u>	()	Leak Test	Cancelled	Cancelled
<u>22</u>	()	E-Beam Welding W02A/B - Bowl	Accepted	Ok
<u>22.1</u>	()	Visual Inspection W02A/B (*)	Accepted	Ok
<u>22.2</u>	()	Radiographic examination W02A/B (*)	Accepted	Ok
<u>22.3</u>	()	Metrology Control (*)	Done	Not Ok
<u>22.4</u>	()	RF Trimming	Done	Not Ok
<u>22.5</u>	(R)	Metrology Control	Accepted	Ok
<u>22.6</u>	(R)	RF Trimming	Accepted	Ok
<u>23</u>	()	E-Beam Welding W03A - Final Assembly	Accepted	Ok
<u>23.1</u>	()	Visual Inspection W03A	Accepted	Ok
<u>23.2</u>	()	Visual Inspection W03A Radiographic examination W03A	Accepted	Ok

1 Select Document ... 2 Confirm data

Select the existing EDMS Document

Input the Document Number (in case you know it)
or click on the first blue arrow to jump to the EDMS Search page
or click on the second blue arrow to jump to EDMS create document wizard

EDMS Document Number

or

[▶ Click to search for documents in EDMS](#)

or

[▶ Click to create a new document in EDMS](#)

The step subjected to a Non Conformity shall be repeated (unless we accept the non-conformity as it is) and a new extra step is set in the manufacturing workflow.

1 Repeat Step? ... 2 Attach Non-Conformity?

Chose if the step is to be repeated

Do you wish this step to be repeated?

Equipment HCACFCA004-CR000001
DQW Bare Cavity (variant #1)

Step 22.4
RF Trimming

Yes, create a new repeated step!

No, thanks.

Non-conformities that have an non-negligible impact on budget and/or schedule or on other WPs will be presented at HL TCC (Technical Coordination Committee)

Handling of Non Conformities

Non-Conformity Report (NCR) EDMS 1501109

HL-LHC Quality Non Conformity Report	
EDMS NO. 1501109	REV. 0.0
VALIDITY VALID	REFERENCE: N/A
NCR Description	
Contract No. N/A	Date of Issue 2016-12-12
Work Package WFE	Equipment HCAF7CAB00
Supplier EN-AW62	Drawing No. HCAF7CAB00-LHCACFAS075-LHCACFAS075
Inspector PASCAL MERLETTI Control	Inspection Activity Check the interface with the medium tank
Description of the NC:	
The extremities HCAF A/B/C and F/G of the Bars cavity (code HCAF7CAB00-CR00000) have between 1.6mm extra length each one with regard to the theoretical dimension.	
HOM A/B/C:	F/G:
Theoretical Dimension = 75.760mm	Theoretical Dimension = 76.760mm
The NCR has been detected during the metrology control (Report EDMS 1703933 attached) of the subassembly LHCMBB-Bowl-Extremities Top and Bottom.	
Inspector's Signature: Pascal Merletti	Supplier's Signature: Olyvia Capotone
WFE Decision	
Non Conformity Critical <input type="checkbox"/> Non Conformity Non-Critical <input checked="" type="checkbox"/>	
Repair <input type="checkbox"/> Upgrade <input type="checkbox"/> Scrap <input type="checkbox"/> Return <input type="checkbox"/> Concession <input type="checkbox"/>	
Corrective Action(s)	
The action taken has been to machine these grooves on the 0.0027 flange of the HOM's jaws in slots = 2 (slots) manufactured in the new machines according to the drawing LHCACFAS075 (attached to the NCR), which will be connected directly on the cavity.	
Inspector's Signature: Pascal Merletti	Supplier's Signature: Olyvia Capotone

HL-LHC Quality Non Conformity Report	
EDMS NO. 1501109	REV. 0.0
VALIDITY VALID	REFERENCE: N/A
NCR Description	
Contract No. N/A	Date of Issue 2017-02-07
Work Package WFE	Equipment HCAF7CAB00
Supplier EN-AW62	Drawing No. HCAF7CAB00-LHCACFAS075
Inspector Pascal Merletti	Inspection Activity Risk/Activity
Description of the NC:	
The flange of the extremities HCAF A/B/C of the Bars cavity (code HCAF7CAB00-CR00000) is CR000000 are machined before the assembly according to the drawing LHCACFAS075, additional horizontal grooves to facilitate the engaging, had been included later on due to the possible fatigue resistance during the assembly of the metal piece. Design change has been implemented at a later stage in U production. This change has been detected just because a new drawing had been given, in fact the NCR design with the additional grooves had not been assigned to the workshop by the design office and this is why the grooves had not been done.	
Drawing LHCACFAS075	HOM Extremity without horizontal groove
Inspector's Signature: Pascal Merletti	Supplier's Signature: Olyvia Capotone
WFE Decision	
Non Conformity Critical <input type="checkbox"/> Non Conformity Non-Critical <input checked="" type="checkbox"/>	
Repair <input type="checkbox"/> Upgrade <input type="checkbox"/> Scrap <input type="checkbox"/> Return <input type="checkbox"/> Concession <input type="checkbox"/>	
Corrective Action(s)	
The action taken has been to machine these grooves on the 0.0027 flange of the HOM's jaws in slots = 2 (slots) manufactured in the new machines according to the drawing LHCACFAS075 (attached to the NCR), which will be connected directly on the cavity.	
Inspector's Signature: Pascal Merletti	Supplier's Signature: Olyvia Capotone

Non-Conformity via MTF

Actions: Notify Edit and Add Files in EDMS	
Description	Un surplus de résine laissant entouvir un reflet métallique (cable?), ainsi qu'une série de petites impacts ont été observés sur la bobine HCFMBB_C005-CR000005. Les défauts sur la résine se situent sur la base de la bobine, à la limite du plan médian, à environ 4200mm des connexions. Ces "defaults" sont déjà visibles après démontage du carcan d'imprégnation, pas de trace visible sur les toles d'étanchéité.
External Reference	
Keywords	
Special Properties	
Class	Electrical / Instrumentation
Disposition	Repair
Importance	Non critical
Files of the Document	<ul style="list-style-type: none"> Surplus_resine_2.JPG (8 KB) apres_reparation_1.JPG (8 KB) apres_reparation_2.JPG (8 KB) Surplus_resine_1.JPG (8 KB) Contrôle-apres-imprégnation.JPG (1 KB) tole-etancheite.JPG (8 KB)
Sub-Documents	
Associated URL (CDD Drawing Folder, Library...)	
Context	
What's next ?	List of Local Administrators for any questions regarding this document (access rights, lifecycle...)
Context	11T-WP11-HL-LHC: Context for LargeMagnetFacility with HL-LHC Coordination Access
Release Procedure	Release procedure for LHC NCRs (LHC-NCR)
Equipment Code	LHCMBB_C - Magnet Bending High Field - Collared Coil Assembly
EDMS Hyperlinks	
This page	https://edms.cern.ch/document/1501109/1 https://edms.cern.ch/file/1814270/1/Surplus_resine_2.JPG - Restricted access https://edms.cern.ch/file/1814270/1/apres_reparation_1.JPG - Restricted access https://edms.cern.ch/file/1814270/1/apres_reparation_2.JPG - Restricted access https://edms.cern.ch/file/1814270/1/Surplus_resine_1.JPG - Restricted access https://edms.cern.ch/file/1814270/1/Contrôle_apres_imprégnation.JPG - Restricted access https://edms.cern.ch/file/1814270/1/tole-etancheite.JPG - Restricted access
File(s)	

A Non Conformity Report is attached to the step and the decision about the NC is provided in the document

The NC is fully managed via MTF. The decision about the NC is provided in the system

Decision about Non Conformity

Repair <input type="checkbox"/>	Regrade <input type="checkbox"/>	Scrap <input type="checkbox"/>	Return <input type="checkbox"/>	Concession <input type="checkbox"/>
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Terminology according to ISO 9000

Attachment of assets to EDMS structure

In order to facilitate the search of the assets, we can attach them to the EDMS structure of the Work Package (within the WP Workspace)

IR Magnets (WP3)

- Parameters
- Hardware Baseline
- WP Management
 - Minutes and presentations
 - Publications WP3
 - Reports
 - HL-LHC AUP
 - Access to MSC documentation folders
 - Access to QUACO folders
 - Equipment Management
 - Short Model
 - Q1/Q3 Short Model
 - Q2 Short Model
 - D1 Short Model
 - Engineering Drafts & Notes
 - Fabrication & Assembly Drafts & Notes
 - Manufacturing drawings
 - Manufacturing procedures
 - Inspection & test procedures
 - Qualifications
 - Manufacturing records
 - HCLMBXFD01-KJ000001 - Cold Mass for Single Aperture (150mm) SC Separ...
 - HCMBXFC004-KJ000001 - Splice box
 - HCMBXFC005-KJ000001 - Wires
 - HCMBXFC006-KJ000001 - Half shells
 - HCMBXFC006-KJ000002 - Half shells
 - HCMBXFC007-KJ000001 - End plates
 - HCMBXFC007-KJ000002 - End plates
 - HCMBXFC008-KJ000001 - Yoke-stacks
 - HCMBXFC009-KJ000001 - Keys
 - HCMBXFM001-KJ000001 - Single Aperture (150mm) Separation Dipole (G

Crab Cavities & RF (WP4)

- Deliverables
- Milestones
- Activity Reports
- Other
- Internal doc (temp)
- Minutes
- Presentations
- Administration
- LHC Crab Cavities Cryomodule
- SPS Crab Cavities Cryomodule
 - Engineering drafts & notes
 - Fabrication, Assembly and Verification drafts & notes
 - DQW Crab Cavities Cryomodule (SPS)
 - DQW Cryomodule Assembly
 - Assembly drawings
 - Assembly procedures
 - Inspection & test procedures
 - Qualifications
 - Assembly records
 - HCACF_A001-CR000001 - DQW Cryomodule Assembly
 - HCACFDC001-CR000001 - DQW Dressed Cavity
 - HCACFDC001-CR000002 - DQW Dressed Cavity
 - HCACFWM001-CR000001 - DQW Warm Magnetic Shield
 - HCACFTS001-CR000001 - DQW Thermal Shield
 - HCACFQC001-CR000001 - DQW Upper Cryoline
 - HCACFVT001-AQ000001 - DQW Vacuum Vessel
 - RF Measurements and Results
 - DQW Cryomodule Components
 - DQW Dressed Cavities
 - DQW Instrumentation

Collimation (WP5)

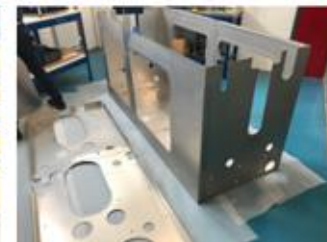
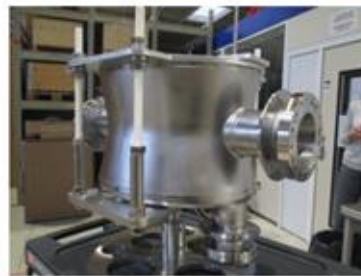
- Minutes
- Presentations
- Administration
- Engineering drafts & notes
- Fabrication, Assembly and Verification drafts & notes
 - Collimation - IR Cleaning
 - Collimation - DS Collimation
 - Collimation - Halo cleaning
 - Target Secondary Collimator Pick-up Metallic [TCSM]
 - Manufacturing drawings
 - Manufacturing procedures
 - Inspection & test procedures
 - Qualifications
 - Manufacturing records
 - HCTCSPM001-CR000001 - Secondary Collimator with Pick-Up Metallic [TCSM]
 - 1765197 (v.1) SU Targets Alignment - CERN - HCTCSPM001-CR000001
 - 1767496 (v.1) ??? - HCTCSPM 0001-CR000001
 - 1810025 (v.1) Acceptance - CERN - HCTCSPM001-CR000001
 - 1810026 (v.1) 3D measurements - HCTCSPM001-CR000001
 - 1810032 (v.1) Data for operation - HCTCSPM001-CR000001
 - 1810033 (v.1) LVDT Calibration & Motors - HCTCSPM001-CR000001
 - 1810035 (v.1) Pre-Installation CERN - Vacuum Test - HCTCSPM001-CR000001
 - 1810037 (v.1) Reception EN-STI - Electronic Test - HCTCSPM001-CR000001

All the documents attached to the MTF of each asset will appear in the EDMS structure under the asset

Examples – Crab Cavities

SPS DQW Crab Cavities Cryomodule – All equipment installed in the cryomodule is in MTF (Same will be done for LHC CC Cryomodules, contractor will be in charge of feeding MTF)

- Assembly records
 - HCACF_A001-CR000001 - DQW Cryomodule Assembly
 - HCACFDC001-CR000001 - DQW Dressed Cavity
 - HCACFHT001-CR000001 - DQW He Tank
 - HCACFCA004-CR000001 - DQW Bare Cavity (variant #1)
 - 1685099 (v.1) WELDING BOOK DQW CRAB CAVITY HCACFCA004.
 - 1768382 (v.1) TEST REPORTS
 - 1761834 (v.1) HL-LHC Heavy BCP CRAB DQW1_SPS
 - 1762445 (v.1) 20170125- CRAB CAVITY DQW#1
 - 1761831 (v.1) HL-LHC Light BCP CRAB DQW1_SPS
 - 1759685 (v.1) NCR: DAMAGE HOM PORT
 - 1759686 (v.1) NCR: EXTRA LENGHT HOM-FPC PORTS
 - 1759687 (v.1) NCR: GROOVE FLANGES HOM
 - 1759327 (v.1) METROLOGY REPORTS CAVITY HCACFCA004-CR000001
 - 1760607 (v.1) Mesures d'épaisseurs -par ultrasons - Cavité CRAB n°1
 - 1758810 (v.1) WELDING CRAB CAVITY DQW DOCUMENT
 - 1802482 (v.1) Visual Testing Report - HL-LHC / Crab Cavity WP4
 - 1707210 (v.1) Manufacturing Inspection Plan (MIP) for the DQW Crab
 - 1865638 (v.1) HPWR - CR000001
 - 1865629 (v.1) CLEAN ROOM ASSEMBLY - CR000001
 - 1865631 (v.1) DEGREASING REPORT - CR000001
 - 1865630 (v.1) STIFFENING FRAME ASSEMBLY - CR000001
 - 1865633 (v.1) WARM ANTENNA ASSEMBLY - CR000001
 - 1865651 (v.1) VERTICAL TEST RESULTS
 - HCACFCM001-S9000001 - DQW Cold Magnetic Shield (Variant #1)
 - 1810920 (v.1) Manufacturing and Inspection Plan He Tank
 - 1749211 (v.1) WELDING BOOK FOR THE HELIUM VESSEL_CRAB CAV
 - 1831143 (v.1) EVOLUTION OF CAVITY FREQUENCY DURING WELDIN
 - 1807498 (v.1) J3023573-SPS CRAB CAVITY DQW HE TANK 1 METROL
 - 1737767 (v.1) MATERIAL CERTIFICATES HELIUM TANK
 - 1790094 (v.1) J3023573-SPS CRAB CAVITY DQW HE TANK 1 METROL
 - 1830428 (v.1) Ultrasonic Testing by immersion / CRAB CAVITIES / Three
 - 1762125 (v.1) J3023573 - CRAB CAVITY - Helium tank - Part 1 - Step 1
 - 1833997 (v.1) TEST REPORTS
 - HCACFHC001-CR000002 - DQW HOM Couplers (Variant #1)
 - HCACFHC002-CR000005 - DQW HOM Couplers (Variant #2)
 - HCACFHC002-CR000002 - DQW HOM Couplers (Variant #2)
 - HCACFPU001-CR000001 - DQW Pick-up
 - 1865651 (v.1) VERTICAL TEST RESULTS
 - 1865663 (v.1) TRANSPORT TO VERTICAL TEST AREA



Examples - Collimators

- ▲ 📁 Target Secondary Collimator Pick-up Metallic [TCSPM]
 - 📁 Manufacturing drawings
 - ▶ 📁 Manufacturing procedures
 - ▶ 📁 Inspection & test procedures
 - 📁 Qualifications
 - ▲ 📁 Manufacturing records
 - ⚙️ HCTCSPM001-CR000001 - Secondary Collimator with Pick-Up Metallic [TCSPM]
 - 📄 1765197 (v.1) SU Targets Alignment - CERN - HCTCSPM001-CR000001
 - 📄 1767496 (v.1) ??? - HCTCSPM 0001-CR000001
 - 📄 1810025 (v.1) Acceptance - CERN - HCTCSPM001-CR000001
 - 📄 1810026 (v.1) 3D measurements - HCTCSPM001-CR000001
 - 📄 1810032 (v.1) Data for operation - HCTCSPM001-CR000001
 - 📄 1810033 (v.1) LVDT Calibration & Motors - HCTCSPM001-CR000001
 - 📄 1810035 (v.1) Pre-Installation CERN - Vacuum Test - HCTCSPM001-CR000001
 - 📄 1810037 (v.1) Reception EN-STI - Electronic Test - HCTCSPM001-CR000001



Courtesy of Inigo Lamas Garcia

Collimators prototypes manufactured at CERN – For the industrialization of the production of the LS2 & LS3 collimators, the contractor will be in charge of feeding MTF

Examples - Magnets

11T Dipole short models and prototype
(manufactured at LMF-CERN – WP11)

Courtesy of Olivier Housiaux

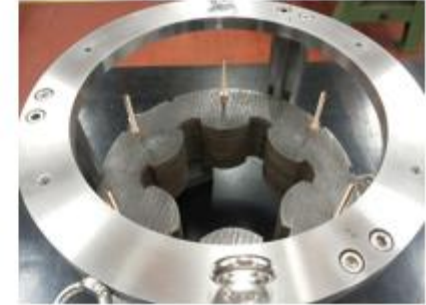
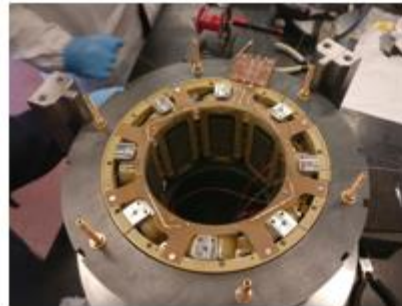


- ▶ **HCMBH_C001-CR000003 - 11T DIPOLE COLLARED COIL**
 - ▶ **HCMBH_C005-CR000006 - 11T DIPOLE COIL**
 - ▶ HCMBH_C024-LV000001 - WEDGE 1 INNER
 - ▶ HCMBH_C024-LV000002 - WEDGE 1 INNER
 - ▶ HCMBH_C026-LV000001 - WEDGE 2 INNER
 - ▶ HCMBH_C026-LV000002 - WEDGE 2 INNER
 - ▶ HCMBH_C028-LV000001 - WEDGE 3 INNER
 - ▶ HCMBH_C030-LV000001 - WEDGE 4 OUTER
 - ▶ HCMBH_C030-LV000002 - WEDGE 4 OUTER
 - ▶ HCMBH_C032-LV000001 - WEDGE 5 OUTER
 - ▶ HCMBH_C032-LV000002 - WEDGE 5 OUTER
 - ▶ HCMBH_C035-VD000002 - COIL KEYS C4LI-K (internal connection side)
 - ▶ HCMBH_C036-VD000002 - COIL KEYS C4RI-K (internal non connection side)
 - ▶ HCMBH_C037-VD000002 - COIL KEYS C4RO-K (external non connection side)
 - ▶ HCMBH_C038-VD000002 - COIL KEYS C4LO-K (external connection side)
 - ▶ HCMBH_C047-JK000002 - Internal layer coil spacers
 - ▶ HCMBH_C048-JK000002 - External layer coil spacers
 - ▶ HCMBH_C040-BP000001 - Internal layer saddle connexion side
 - ▶ HCMBH_C042-BP000003 - Internal layer saddle non connexion side
 - ▶ HCMBH_C044-BP000003 - External layer saddle non connexion side
 - ▶ HCMBH_C046-BP000002 - External layer saddle connexion side
 - ▶ **HCMBH_C013-42000209 - INSULATED CABLE**
 - ▶ **HCMBH_C022-CR000209 - BARE CABLE**
 - ▶ 1724241 (v.1) Insulation braiding - HCMBH_C013-42000190
 - ▶ 1724533 (v.1) 10-stack insulation thickness - HCMBH_C013-42000209
 - ▶ 1770174 (v.1) Cable respooling - HCMBH_C013-42000209
 - ▶ **HCMBH_C049-NZ000003 - Loading plate**
- ▶ **HCLMBHE050-WS000001 - QUENCH HEATER EMBED. TRACE**
 - ▶ 1802408 (v.1) Delivery and Acceptance - HCLMBHE050-WS000001
 - ▶ 1716108 (v.1) Interlayer manufacturing - HCMBH_C005-CR000006
 - ▶ 1758721 (v.1) Inner layer winding - HCMBH_C005-CR000006
 - ▶ 1761646 (v.1) Inner layer curing - HCMBH_C005-CR000006
 - ▶ 1767425 (v.1) Outer layer winding - HCMBH_C005-CR000006
 - ▶ 1769207 (v.1) Outer layer curing - HCMBH_C005-CR000006
 - ▶ 1770043 (v.1) Electrical tests - HCMBH_C005-CR000006
 - ▶ 1770076 (v.1) Coil validation - HCMBH_C005-CR000006
 - ▶ 1801675 (v.1) Reaction - HCMBH_C005-CR000006
 - ▶ 1802762 (v.1) Splicing - HCMBH_C005-CR000006
 - ▶ 1806678 (v.1) Electrical test during reaction - HCMBH_C005-CR000006
 - ▶ 1811156 (v.1) Electrical test after impregnation - HCMBH_C005-CR000006
 - ▶ 1815451 (v.1) Impregnation - HCMBH_C005-CR000006
 - ▶ 1827792 (v.1) Acceptance - HCMBH_C005-CR000006
 - ▶ 1827867 (v.1) Geometrical measurement - HCMBH_C005-CR000006
 - ▶ LHC-MBH_C-QN-0065 (v.1) LHC-QN-HCMBH_C005-CR000006-mark-on-median-plan
- ▶ **HCMBH_C005-CR000007 - 11T DIPOLE COIL**

Examples - Magnets

- ▶ HCMCSXFP00-I1000001 - Single Aperture (150 mm) Sextupole (b3) MCSXF - Prototype
 - ▶ HCMCSXFC01-I1000001 - Coil
 - ▶ HCMCSXFC01-I1000002 - Coil
 - ▶ HCMCSXFC01-I1000003 - Coil
 - ▶ HCMCSXFC01-I1000004 - Coil
 - ▶ HCMCSXFC01-I1000005 - Coil
 - ▶ HCMCSXFC01-I1000006 - Coil
 - ▶ HCMCSXFC02-I1000001 - Laminations
 - ▶ HCMCSXFC03-I1000001 - Electrical Connections
- ▶ HCMCOXFP00-I1000001 - Single Aperture (150 mm) Octupole (b4) MCOXF Prototype
 - ▶ HCMCOXFC01-I1000001 - Single Aperture (150 mm) Octupole (b4) MCOXF - Coil
 - ▶ HCMCOXFC01-I1000006 - Single Aperture (150 mm) Octupole (b4) MCOXF - Coil
 - ▶ HCMCOXFC01-I1000007 - Single Aperture (150 mm) Octupole (b4) MCOXF - Coil
 - ▶ HCMCOXFC01-I1000008 - Single Aperture (150 mm) Octupole (b4) MCOXF - Coil
 - ▶ HCMCOXFC01-I1000009 - Single Aperture (150 mm) Octupole (b4) MCOXF - Coil
 - ▶ HCMCOXFC01-I1000010 - Single Aperture (150 mm) Octupole (b4) MCOXF - Coil
 - ▶ HCMCOXFC01-I1000011 - Single Aperture (150 mm) Octupole (b4) MCOXF - Coil
 - ▶ HCMCOXFC01-I1000012 - Single Aperture (150 mm) Octupole (b4) MCOXF - Coil
- ▶ HCMCDXFP01-I1000001 - Single Aperture (150 mm) Decapole MCDXF
 - ▶ HCMCDXFC01-I1000005 - Coil - Decapole (MCDXF)
 - ▶ HCMCDXFC01-I1000006 - Coil - Decapole (MCDXF)
 - ▶ HCMCDXFC01-I1000008 - Coil - Decapole (MCDXF)
 - ▶ HCMCDXFC01-I1000009 - Coil - Decapole (MCDXF)
 - ▶ HCMCDXFC01-I1000010 - Coil - Decapole (MCDXF)
 - ▶ HCMCDXFC02-I1000001 - Laminations - Decapole (MCDXF)
 - ▶ HCMCDXFC03-I1000001 - Connection PCB - Decapole (MCDXF)
 - ▶ HCMCDXFC01-I1000011 - Coil - Decapole (MCDXF)
 - ▶ HCMCDXFC01-I1000013 - Coil - Decapole (MCDXF)
 - ▶ HCMCDXFC01-I1000014 - Coil - Decapole (MCDXF)
 - ▶ HCMCDXFC01-I1000015 - Coil - Decapole (MCDXF)
 - ▶ HCMCDXFC01-I1000012 - Coil - Decapole (MCDXF)
- ▶ HCMCTXFP01-I1000001 - Single Aperture (150 mm) Dodecapole (MCTXFP)

Non-linear Correctors (sextupole, octupole, decapole & dodecapole) steered by INFN (A.Musso at CERN)

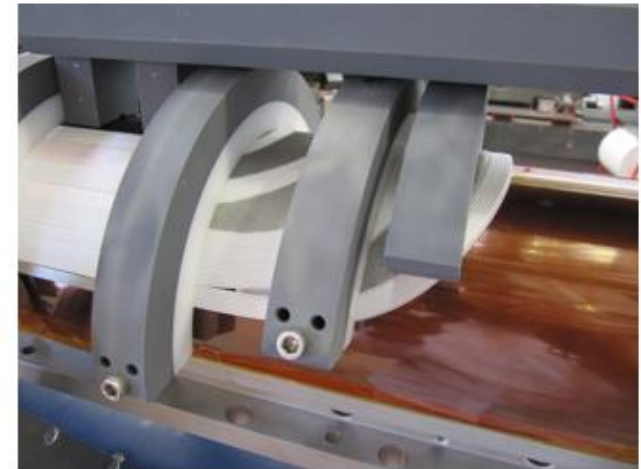


Courtesy of Ezio Todesco /
Andrea Musso



Examples - Magnets

- ▶ HCMCBXFB001-E9000001 - Dipole Orbit Corrector Q2
 - ▶ HCMCBXFB002-E9000001 - Yoke-Stacks
 - ▶ HCMCBXFB003-E9000001 - End-Plates
- ▶ HCMCBXFBC001-E9000001 - Inner Collared Coil
 - ▶ HCMCBXF_C001-E9000003 - Cable
 - ▶ HCMCBXF_C002-E9000002 - Inner Wedges
 - ▶ HCMCBXF_C003-E9000002 - Inner End spacers
 - ▶ HCMCBXFBC002-E9000001 - Inner Quench Heaters
 - ▶ HCMCBXFBC003-E9000001 - Inner Ground Insulation
 - ▶ HCMCBXFBC004-E9000001 - Inner Collaring Shoe
 - ▶ HCMCBXF_C004-E9000002 - Inner Coil collars
 - ▶ HCMCBXF_C005-E9000002 - Inner Collaring rods
 - ▶ HCMCBXF_C010-E9000003 - Fiber Glass Insulation
 - ▶ HCMCBXF_C011-E9000003 - Interlayer Insulation
- ▶ HCMCBXFBC005-E9000001 - Outer Collared Coil
 - ▶ HCMCBXF_C001-E9000004 - Cable
 - ▶ HCMCBXF_C006-E9000002 - Outer Wedges
 - ▶ HCMCBXF_C007-E9000002 - Outer End spacers
 - ▶ HCMCBXFBC006-E9000001 - Outer Quench Heaters
 - ▶ HCMCBXFBC007-E9000001 - Outer Ground Insulation
 - ▶ HCMCBXFBC008-E9000001 - Outer Collaring Shoe
 - ▶ HCMCBXF_C008-E9000002 - Outer Coil collars
 - ▶ HCMCBXF_C009-E9000002 - Outer Collaring keys
 - ▶ HCMCBXF_C010-E9000004 - Fiber Glass Insulation
 - ▶ HCMCBXF_C011-E9000004 - Interlayer Insulation
- ▶ HCMCBXFA001-E9000001 - Dipole Orbit Corrector CP
 - ▶ HCMCBXFA002-E9000001 - Yoke-Stacks
 - ▶ HCMCBXFA003-E9000001 - End-Plates
- ▶ HCMCBXFAC001-E9000001 - Inner Collared Coil
 - ▶ HCMCBXF_C001-E9000001 - Cable
 - ▶ HCMCBXF_C002-E9000001 - Inner Wedges
 - ▶ HCMCBXF_C003-E9000001 - Inner End spacers
 - ▶ HCMCBXFAC002-E9000001 - Inner Quench Heaters
 - ▶ HCMCBXFAC003-E9000001 - Inner Ground Insulation
 - ▶ HCMCBXFAC004-E9000001 - Inner Collaring Shoe
 - ▶ HCMCBXF_C004-E9000001 - Inner Coil collars
 - ▶ HCMCBXF_C005-E9000001 - Inner Collaring rods
 - ▶ HCMCBXF_C010-E9000001 - Fiber Glass Insulation
 - ▶ HCMCBXF_C011-E9000001 - Interlayer Insulation
- ▶ HCMCBXFAC005-E9000001 - Outer Collared Coil
 - ▶ HCMCBXF_C001-E9000002 - Cable
 - ▶ HCMCBXF_C006-E9000001 - Outer Wedges
 - ▶ HCMCBXF_C007-E9000001 - Outer End spacers
 - ▶ HCMCBXFAC006-E9000001 - Outer Quench Heaters
 - ▶ HCMCBXFAC007-E9000001 - Outer Ground Insulation
 - ▶ HCMCBXFAC008-E9000001 - Outer Collaring Shoe
 - ▶ HCMCBXF_C008-E9000001 - Outer Coil collars
 - ▶ HCMCBXF_C009-E9000001 - Outer Collaring keys
 - ▶ HCMCBXF_C010-E9000002 - Fiber Glass Insulation
 - ▶ HCMCBXF_C011-E9000002 - Interlayer Insulation



Courtesy of Fernando Toral/Juan Carlos Perez

Orbit Correctors (MCBXFA & MCBXFB)
steered by CIEMAT (J.C. Perez at CERN)

MTF for Contractors

- Contracts for which the Supplier will use MTF we, the PO, will set up all the data. The MTF will be based on the MIP provided by the contractor. They just need to apply for a CERN Nice Account and we will provide in-situ training of the tool (if required)

Main Made of Equipment data Manufacturing Operation Documents History Map			
Actions: Edit View summary			
Physical			
Manufacturer	CINEL		
Resp. Technique	ABERLE OLIVER 75297 163502		
Status	Manufacturing		
Other Identifier			
Parent Equipment			
Parent Slot			
Location			
State	Good	MRC T01	
Safety			
RP Classification			
Comments			
In production at CINEL Delivered to CERN end 2016			
Design			
Item in ABS	Tertiary Collimator with Wire Demonstrator for BBC (ver.0)		
Audit			
Created on	2014-05-11	by	CKANAQYA
Last modified on	2017-08-03	by	MANEVES
EDMS owner	CKANAQYA	EDMS group	COLLIMATOR-CERN-MTF

Equipment Identifier: HCTCTW0001-CZ000003
Other Identifier: None
Description: Tertiary Collimator with Wire Demonstrator for BBC

- It will allow us to follow-up the production (not only to check the results obtained during the different steps but also the Non-conformities). Approval of the different test will be executed through MTF

Main Made of Equipment data Manufacturing Operation Documents History Map			
Actions: Attach document Display: Extended			
1741958 v.1	170 - SU Targets Alignment - CERN - HCTCTW0001-CZ000002	In Work	Access denied
1743087 v.1	180 - Pre-Installation CERN - Electronic Test - HCTCTW0001-CZ000002	In Work	Access denied
1810089 v.1	210 - Acceptance - CERN - HCTCTW0001-CZ000002	In Work	Doc. page Acceptance-Sheet-HCTCTW0001-CZ000002.xls (58 kb)
1810090 v.1	160 - Data for operation - HCTCTW0001-CZ000002	In Work	Doc. page TCTPH-4R5-B2_SummaryOP.pdf (45 kb)
1810091 v.1	120 - Reception EN-STI - Electronic Test - HCTCTW0001-CZ000002	In Work	Doc. page Fiche_de_suivi_TCTW2.pdf (906 kb) Adjustement_switches_TCTW2.pdf (70 kb) Torque_Test_Report_Collimator_TCTW-00224-11-2016_16-58-59.pdf (494 kb)
1810092 v.1	150 - LVDT Calibration & Motors - HCTCTW0001-CZ000002	In Work	Doc. page LVDT_and_motors_TCTW2.pdf (167 kb) Collimator_TCTW-002_Calibration_Report_07-02-2017.pdf (60 kb) Adjustement_switches_TCTW2.pdf (70 kb)

Collimator TCTW-002 calibration report			
Operator : P. Gander 07 February 2017 Manual Check of Switches / End Stops distances			
	OUTER switches to end stops distances [mm]	INNER switches to end stops distances [mm]	
Plate A	0.31	0.364	
Plate B	0.278	0.44	
Plate C	0.392	0.129	
Plate D	0.262	0.164	
	ANTICO switches to end stops distances [mm]		
Antico AB	0.066		
Antico CD	0.064		

Collimator Name		CERN Name		Arrival Date		
HCTCTW0001-CZ000003		TCTW2		31.06.2016		
		Value	Unit	Specification Value	Comments	Responsible
Mechanical Inspection	Shock	< 1g	-	< 1g		OK
	Water pressure test	30 bar	-	30 bar		OK
	Visual inspection	n/s	-	n/s		OK
Vacuum	Paper Documentation	n/s	-	n/s	From CINEL	L.Louis
	Leak Test	n/s	-	n/s		OK
	Vacuum leak after Bakeout (CINEL)	2.00E-03	mbar	< 4E-06		OK
	Vacuum leak final test (CERN)	4.40E-03	mbar	< 4E-06		OK
	Outgassing	4.00E-08	mbar.L/s	< 2E-7		OK
RF	Vacuum spectrum	n/s	-	Acceptance limit	Conform	OK
	Transverse RF fingers	n/s	-	n/s		OK
	Longitudinal RF fingers	n/s	-	n/s		OK
FINISH	Surface Fineness AC	32	µm	< 60		OK
	Surface Fineness BD	29	µm	< 60		OK

Summary

- MTF is the tool to be used for the Production phase of the equipment
- Follow-up of production (not only to check the results obtained during the different steps but also the Non-conformities)
- All the Manufacturing data of each equipment will be stored in MTF (and EDMS by default)
- Keep traceability of all components/materials belonging to an equipment. Unique data for component
- All this information will have an added value in the future in case troubles during commissioning/operation (and also for newcomers)



***Thanks for your attention
Questions?***

***Special thanks to MTF Support Team for their high-valuable
cooperation with us along the project***

