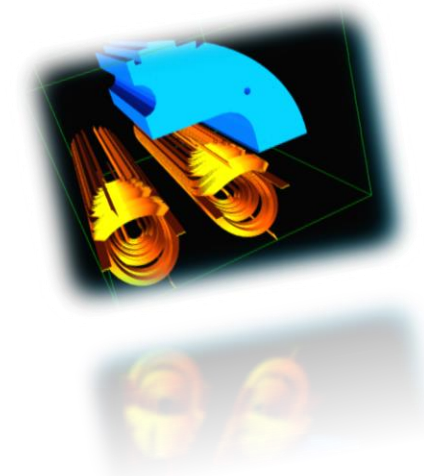




Documentation status MBRD D2 Short model dipole



CERN, 6th July 2017

A. Foussat, (TE MSC-LMF)

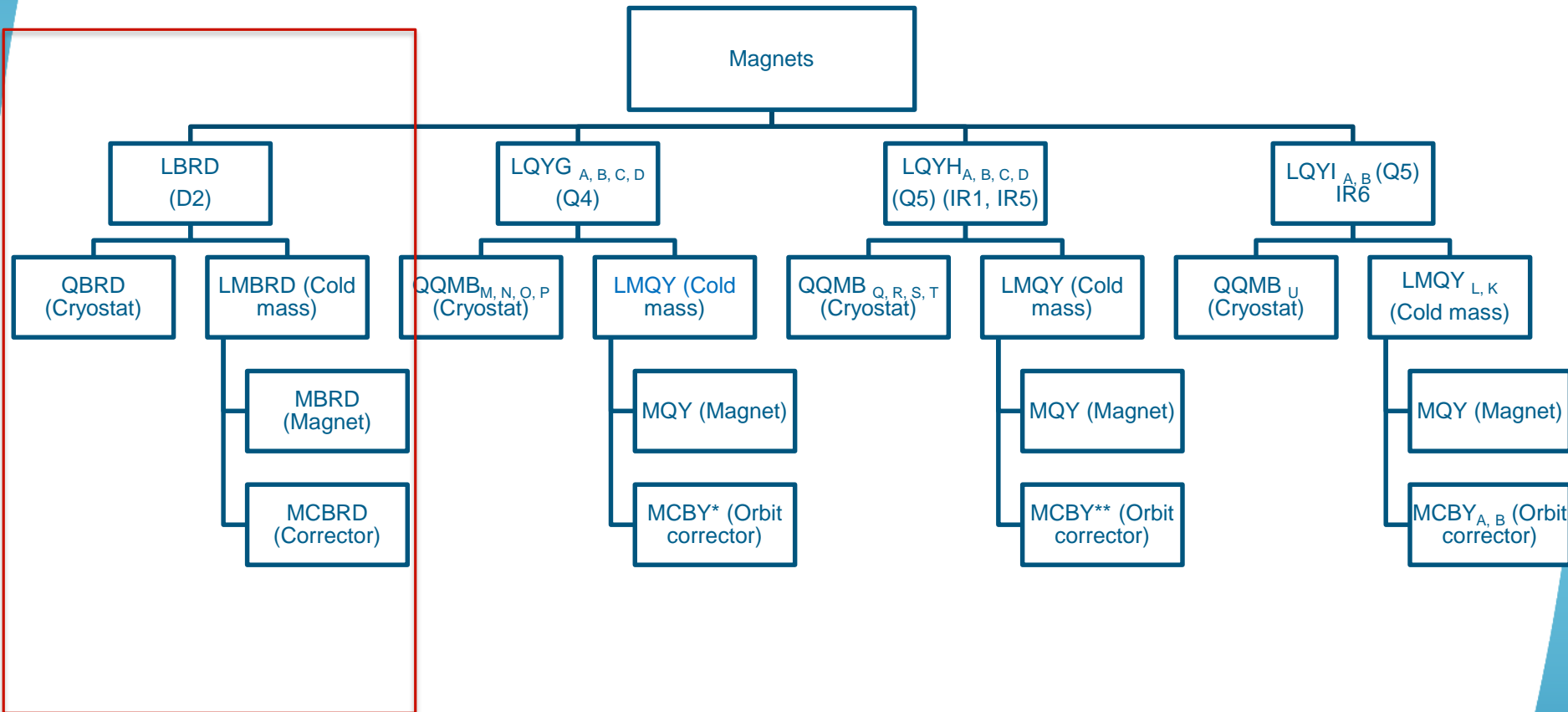
Acknowledgement to J.L Asencio Riquelme (QA HL-LHC)



MBRD-M documentation structure

- *D2 MBRD-M engineering completed* by INFN, objective to issue engineering report by **Oct 2017 (INFN)**;
- *Functional specification drawings and technical specification* archived on EDMS
- *Records of Meetings* :
 - Minutes of official ASG-INFN-CERN on EDMS
 - Minutes of working topical meeting on Indico page
- *Equipment code* definition done : Link 1, Equipment Portal
- *Manufacture dossier*:
 - MBRD-M manufacture inspection plan (MIP) ready at ASG;
 - Model ASG assembly procedures and inspection records to be archived in EDMS from **09/2017**
 - INFN to check with ASG QA officer who shall upload data
 - *MTF structure* proposed by CERN to INFN, to be aligned with ASG main Product breakdown structure and MIP;
- *Interface documents*
 - Cold mass interface requirements defined in MBRD-M INFN function specification
 - SM18 Cold test plan Under Draft version, target completion by **Dec 2017**

D2 equipment code



D2 MTF manufacture steps proposal

Step ID	Step Description
10	Cable insulation
20	wedges insulation
100	Winding coils
110	Dimensional Measurement
120	Electrical Integrity Test
130	E Modulus measurement
140	internal V -tap Wires Soldering
150	Protection heater assembly
200	Collared Coil
205	collars measurement
210	Collaring
215	Dimensional Measurement
220	Electrical Integrity Test
300	Yoke Assembly
310	yoke laminations measurement
320	Perform Yoking
320	Removal of mandrel
330	Dimensional Measurement
340	Mechanical instrumentation
400	inter pole Splicing
410	Electrical Integrity Test
500	Structure assembly
600	Cold test
700	Shipping to CERN

800	<i>COLD MASS</i>
805	Shell Welding
810	Assembly in shells
815	longitudinal Welding
820	Inspection of Welding
825	End-ring Welding
830	Inspection of Welding
835	Applying Axial Force to the Coil
840	Dimensional Measurement
845	Alignment, Marking
850	Holes Welding
855	Dimensional Measurement
860	Electrical Integrity Test
865	Documents for Pressure Codes
1000	Splice Work
1010	Splice Box Assembly
1020	SC Leads Soldering
1030	V -tap Wires Soldering
1040	Dimensional Measurement
1050	Electrical Integrity Test
1100	End Cover welding
1110	End Cover Welding
1120	Inspection of Welding
1130	Dimensional Measurement
1140	Alignment, Marking
1150	Electrical Integrity Test
1160	Pressure Test
1170	Documents for Pressure Codes
1200	Mechanical assembly
1300	Electrical test
1400	Cold test (if applicable)
1500	Magnetic measurements
2000	Shipping to CERN

For MBRD prototype

MBRD / LMBRD PBS structure

PBS structure of MBRD

Step ID	Step Description														
	Cable		Coil		Wedges		End Spacers		Collar		Quench Heater		Collaring Key (Pins)	End plates	MBRDM
10	Cable insulation	10	Winding coils	10	wedges insulation	10	Reception of asset	10	collars measurement	10	Reception of asset	10	Reception of asset	10	Cold test
20	Dimensional Measurement	20	Dimensional Control	20	Electrical Integrity Test	20	Dimensional Control	20	Collaring	20	Dimensional Control	20	Dimensional Control	20	Shipping to CERN
30	Electrical integrity Test	30	Electrical Integrity Test					30	Dimensional Control	30	Wire soldering				
		40	E Modulus measurement					40	Electrical Integrity Test	40	Electric Test				
		50	internal V-tap Wires Soldering												

PBS structure of LMBRD

	Shell		Cold Mass Support		BPM Support		Heat exchanger Tube		Iron Yoke		Bus Bar		Splice		End Cover		LMBRDM
10	Assembly in shells	10	Metallurgical Report	10	Dimensional Control	10	Dimensional Control	10	Yoke laminations measurement	10	Dimensional Control	10	Splice Box Assembly	10	End Cover Welding	10	Magnets geometrical measurement
20	Longitudinal Welding	20	Dimensional Control			20	Fatigue Test	20	Perform Yoking			20	SC Leads Soldering	20	Inspection of Welding	20	Welds Examination
30	Inspection of Welding							30	Removal of mandrel			30	V-tap Wires Soldering	30	Dimensional Control	30	Cold mass geometrical measurement
40	End-ring Welding							40	Dimensional Control			40	Dimensional Control	40	Alignment, Marking	40	Final electrical tests
50	Inspection of Welding							50	Mechanical instrumentation			50	Electrical Integrity Test	50	Electrical Integrity Test	50	Warm magnetic measurements
60	Applying Axial Force to the Coil													60	Pressure Test	60	Pressure and leak tests
70	Dimensional Measurement												70	Documents for Pressure Codes			
80	Alignment, Marking																
90	Holes Welding																
100	Dimensional Measurement																
110	Electrical Integrity Test																
120	Documents for Pressure Codes																

Under review by INFN /ASG by August 2017

D2 equipment product breakdown code

DIPOLESs

Level	JL Eq. Code	Item Description	Category/Item	Own Class	Quantity
	LMBRDM	Cold Mass			1
	LMBRDMS	Shell			1
	LMBRDMS	Cold Mass Support			1
	LMBRDMS	BPM Support			1
	LMBRDMS	Heat exchanger Tube			1
	LMBRDMS	Iron Yoke			1
	LMBRDME	Bus bar			1
	LMBRDME	Splices			batch
	LMBRDMS	End covers			1
	MBRDM	dipole MBRD			1
	MBRDMC	Apperture			2
	MBRDMC		Coil		8
	MBRDMC		Coil		-
			Cable		batch
	MBRDMC		End Spacers		batch
	MBRDMC		Wedges		batch
	MBRDMC	Apperture			-
	MBRDMC		Coil		-
	MBRDMC		Coil		-
			Cable		batch
	MBRDMC		End Spacers		batch
	MBRDMC		Wedges		batch
	MBRDMC	Collars			1
	DQH	Quench Heater			1
	MBRDMC	Aluminum alloying ring			1
	MBRDMC	End plates			1

EDMS D2 drawings folder

The screenshot displays the EDMS (Engineering Document Management System) interface. At the top, there is a navigation bar with 'EDMS', 'Home', 'Favourites', 'Inbox', and 'Caddie'. A search bar and 'Settings' icon are on the right. The main content area is divided into a 'Navigator' on the left and a document view on the right.

Navigator: Shows a tree view of folders. The 'D2 Short Model' folder is selected and expanded, revealing sub-folders like 'Minutes, Presentations and Administrative documents', 'Engineering Drafts & Notes', 'Specifications', 'Functional drawings & models', and 'Fabrication & Assembly Drafts & Notes'. Under 'Specifications', a document '1768546 (v.1) Technical Specification for the construction of a model of the superconducting dipole D2 for the' is listed. Under 'Functional drawings & models', a folder '1796585 (v.1) Tender Drawings' is expanded, showing various drawing titles such as 'LHCMBRDM0001 (v.0) SHORT MODEL DIPOLE D2 - LAYOUT'.

Document View: Shows the 'CERN-0000162215 D2 Short Model' folder with 'Public access'. Below this, there are tabs for 'Documents', 'Structure', 'Used in', 'Access rights', and 'History'. The 'Documents' tab is active, showing a table of documents. The table has columns for '#...', 'Id', 'Title', 'F...', 'Status', 'Created...', and 'Author'. One document is listed with ID '10' and title '1536832 v.1 Link to MS-4120/TE...'. The status is 'In Wor' and the author is 'E. Todescr No'. At the bottom of the document view, there is a pagination bar showing 'Page 1 of 1' and 'Total: 1 (display'.

Example of product based MTF

- HCLMQMC001-CR000631 - Cold Mass LMQMC
 - HCLMQMC010-CR000631 - Helium Vessel
 - HCMQMLS001-TE000016 - Quadrupole MQML
 - HCMQMLS002-TE000031 - Collared coil
 - HCMQMLS003-TE000142 - Coil
 - HCDSC4_000-VA000132 - SC Cable Type 4
 - HCMQMLS003-TE000143 - Coil
 - HCMQMLS003-TE000144 - Coil
 - HCMQMLS003-TE000145 - Coil
 - HCMQM_SL20-CO000213 - Quench Heater for MQML
 - HCMQM_SL20-CO000214 - Quench Heater for MQML
 - HCMQM_SL20-CO000218 - Quench Heater for MQML
 - HCMQM_SL20-CO000222 - Quench Heater for MQML
 - HCMQM_SL20-CO000223 - Quench Heater for MQML
 - HCMQM_SL20-CO000237 - Quench Heater for MQML
 - HCMQM_SL20-CO000238 - Quench Heater for MQML
 - HCMQM_SL20-CO000240 - Quench Heater for MQML
 - HCMQMLS002-TE000032 - Collared coil
 - HCMBCA001-TE000032 - MCBCA Magnet Assembly
 - HCQITESCXT-CR023670 - Cryo Thermometer
 - HCQBBIK001-BA000367 - Flexible K-long
 - HCQBBIK001-BA000398 - Flexible K-long (v1)
 - HCQSQ820-CZ000084 - Cool Line C' - BPM with sensors - SSS Arc
 - HCVCMQD009-IN000002 - Ass. BPM / Beam Screen L-Type:Outer Rin
 - HCVSS_033-BA000184 - SSS V1 Pumping Hose Assembly
 - HCVSS_034-BA000576 - SSS V2 Pumping Hose Assembly
 - HCVCMQD010-IN000002 - Ass. BPM / Beam Screen L-Type:Inner Rin
 - HCVSSB_883-BI000213 - SSS Downstream (outer) (V1)
 - HCVSSBM001-SK000547 - SSS Nested Bellow (V1)
 - HCVSSBM001-SK000615 - SSS Nested Bellow
 - HCBPM_F025-MG000326 - Arc BPM Cryogenic Cables HCBPM_F025

Equipment Folder : Main Info

Equipment Identifier: HCLMQMC001-CR000631
Other Identifier: LMQMC631
Description: Cold Mass LMQMC

Example

Main	Made of	Equipment data	Manufacturing	Operation	Documents	History	Map
Actions : View summary							
Physical							
Manufacturer	CERN						
Resp. Technique							
Status	Manufacturing						
Other Identifier	LMQMC631						
Parent Equipment	HCLQCC001-CR000631						
Parent Slot							
Location	R42						
State	Good						MRC M01
Safety							
RP Classification							
Comments							
Design							
Item in ABS	▶ Cold Mass LMQMC (ver.0)						
Audit							
Created on	2001-01-01	by	HPRIN				
Last modified on	2017-06-02	by	TKRASTEV				
EDMS owner	HPRIN	EDMS group	AT-MEL-ML-LMQ				