06/06/2007

List of Non Conformity Reports NC CERN

***Doc. issued by*: ASG/UOP2/F. Terzi**

Id. NC ASG *ASG NC id.*	Id. NC CERN *CERN NC id.*	Compon.N. *Comp. Id. Nr.*	Descrizione Non-Conformità *Non-Conformity description*	Note / Risoluzione *Remarks / NC Resolution*	NC OPEN
2000					
	NC CERN 1		riempitivi di testa: NC su imballaggio, quantità dichiarata e certificati		
	NC CERN 2		riempitivi di testa 4 sets (2 for IL + 2 for OL)	NON EMESSA	-
	NC CERN 3		NASTRO kapton th=0.125mm – L=250mm	NON EMESSA	-
	NC CERN 4	→	riempitivi rett.: NC su imballaggio, quantità dichiarata e certificati (**OUTOKUMPU 02 – 03**)	/ / /	-
	NC CERN 5		riempitivi rett., canali raffr. stabilizz. Cu: NC su imballaggio, quantità dichiarata e certificati		-
	NC CERN 6		nastro per isol. cavo e riempitivi: NC su imballaggio e quantità dichiarata		-
	NC CERN 7	→	cavo con caratteristiche sc inferiori (Ic) id. nr. **01C00006A-7A-8A-9A**		-
02450	NC CERN 8	**Batch 8**	riempitivi rettilinei (Cu wedges)		-
03015	NC CERN 9	**E005**	criccatura riemp. di testa LC e LOC strato **E005**	**E005 scarto**	
03021	NC CERN 10	**E005**	danni "unghietta"G11, riempitivo di testa (pos.4) e stab. Cu usc. elettr. **E005**		
02926	NC CERN 11	**E002**	distacco riempitivo interno strato **E002** e spostamento dei cavi di circa 1 mm	**E002 scarto**, sost.con E005	
03022	NC CERN 19	**2001**	difetti planarità collari tipo 1 e 2 su **2001**		
03030	NC CERN 12	**I005**	errato posiz. riempitivo strato **I005** LC e LOC	**I005 SCARTATO**	
03045	NC CERN 13	**I006**	errato posiz. riempitivi strato **I006** LC e LOC	**I006 SCARTATO**	
2001					
03307	NC CERN 14	**I005**	cricche riempitivi di testa **I005** LC e LOC	(già **SCARTATO**)	
03063	NC CERN 15	**I006**	cricche longitudinali riempitivi di testa **I006** LC e LOC dopo cottura	foto (già **SCARTATO**)	
03243	NC CERN 16	**2001**	cricche longitudinali riempitivi di testa pos.2 **E006**	foto - ACCETTATO	
03299	NC CERN 17	**2002** **E007**	disallineam. spire LC, distacco riempitivo LOC, spellatura Kapton ultima spira, scalino 1^ spira (L=250mm) strato **E007**	foto - ACCETTATO	
03282	NC CERN 18	**2002** **I007**	errato posiz. riempitivi C e LOC strato **I007**	ACCETTATO	
03022	NC CERN 19	**2001**	difetti planarità collari tipo 1 e 2 su **2001**		
03579	NC CERN 20	**2001**	lungh. totale collarato **2001**	ACCETTATO	
04005	NC CERN 21	**2003**	dannegg. filo QH (YT221) su **2003** durante collaraggio	ACCETTATO	
04091	NC CERN 22	**P013**	sovrariscaldamento (240°C) giunz. elettrica durante ricondizionamento del salto strato **P013**, causa malfunzionamento TC	**P013 SCARTATO**	

04022	NC CERN 23	**2004** **E016-E017**	strefolamento cavi sc per **E016** e **E017** prima dell'avvolgimento (02C00018A-20A)	ACCETTATO	
04048	NC CERN 24	**cables**	strefolamento vari cavi sc (**02C00019A-22A24A-25A-26A**)	ACCETTATO	
04079	NC CERN 25	**E019**	strefolamento cavo sc presso LC **E019** dopo polim., danneggiamento riempititvi pos.1 e 2 (all. lettera per dettagli)	**E019 SCARTATO**	
04086	NC CERN 26	**2005**	delaminazione riempitivo pos.16 su **E020** forse causata da errato posiz. attrezzo di contenimento testate	ACCETTATO	
04098	NC CERN 27	**2005**	strefolamento cavo sc in 30 punti su 7 metri su **E021** (cavo 02C00022A)	ACCETTATO	
04100	NC CERN 28	**I025**	corto di spira (tra1^ e 2^ spira) LC durante pulse test su **I025**, causato forse da strefolamento cavo sc	**I025 SCARTATO**	
04145	NC CERN 29	**comp.**	dimensioni interlayer spacers (canali di raffr.) forn. CERN	sost pezzi a carico CERN	
04191	NC CERN 30	**2004** **I024**	gap tra conduttore e end spacer n.5 LC su **I024**	ACCETTATO	
04196	NC CERN 31	**2002**	dannegg. filo QH (YT221) su **2002** durante ri-collaraggio	ACCETTATO	
011001A	NC CERN 32	**2005**	The air gap between last collar on CS and end flange is 5.8 mm (nom. value 2.9 mm –2/+0)	ACCETTATO	
011116B	NC CERN 33	**2004** **P014** **P019** **P020** **P021**	After E-mod. meas., **P014-P019-P020-P021** have small mark both sides of the first turn, 470 mm from pole end CS	ACCETTATO	
011221B	NC CERN 34	**2009** **I039**	**I039** I) zero gap between Cu wedges II) G11 end spacer C.S. has small delamination III) misalignment between turns on ends	ACCETTATO	
2002					
NG4062	NC CERN 35	**2002**	a) outer dim. of the cc, at 7000-7500 mm from N.C.S, is out of tolerance of 0.5 mm about b) values of some harmonic components of the magnetic field are not correct	ACCETTATO	
NG4062	NC CERN 36	**2002**	**2002** extra protection sheet caused the dimensional out of tolerance of 0.5 mm	Remove the extra protection sheet and re-collar the coils.	
020118B	NC CERN 37	**2008** **P026**	small mark of 15 mm on the outer side of the electrical connection of outer layer **E029** (pole nr. **P026**), near the end spacer	ACCETTATO	
020128A	NC CERN 38	**2008** **P027** **P029** **P028**	After Young modulus measurements, poles nr. **P027** and **P029** have a small mark on both sides of the first turn, at 470 mm from pole end (CS); pole nr. **P028** has a similar mark on the opposite side (NCS)	ACCETTATO sotto resp. ASC	
020128C	NC CERN 39	**2007**	**2007**: after collaring, inner diameter of cold bore tubes is less than 49.7 mm	ACCETTATO	
020129A	NC CERN 40	**2006** **E035**	A small damage of insulation occurred on first turn of outer layer **E035**, near the end spacer pos.1: this could be caused by a strand not well positioned in the Rutherford cable.	ACCETTATO	
020129C	NC CERN 41	**2009** **E037**	During winding operation of layer nr. **E037** (1st, 6th, 12th, 19th turns), a lot of problems occurred about the position of some strands in the Rutherford cable (cabling problems): all these problems have been already showed and checked together with CERN personnel (Mr. Lopez)	ACCETTATO	
020315D	NC CERN 42	**2002**	After the reception of c.m. nr. **HCMBB_A001-02000002** in ASC, different electrical checks have been performed giving the following	According to CERN personnel present in ASC during the mentioned checks on 13/03/02, we decided to proceed with the disassembling of	

			results: a) ground insulation of QHs nr. YT211 and YT212 is low (R< 7 kOhm); b) electrical insulation of QH nr. YT 111to dipole D1, is low (R<20 KOhm) (see annexed records "02_MB002_demontage.xls") According to CERN personnel present in ASC, we decided to proceed with the disassembling of the cold mass (end covers, half cylinders, yokes, collared coils-end plates): after this operation the same electrical problems still remain on collared coils	the collared coils, in order to check the integrity of the insulation: this operation will be performed on 21/03/02 under supervision and witness of CERN personnel	
020318A	NC CERN 43	**2004**	Dimensional checks, performed on nr.7 different longitudinal positions, show non conform values about the inner circumferential length of the **half cylinder shell nr. L0084**: Meas. Values: 859.50, 859.21, 859.22, 859.10, 859.12, 859.41, 859.40 Nom. Values: 859.8 (min.), 860.3 (max.)	ACCEPTED	
020319C	NC CERN 44	**2012** **E049**	Outer layer **E049** has two mall gap (0.5 mm max.) between sc cable and end spacers pos.1 and 2 on CS: this problem has been caused by a possible wrong angle of the lateral shape of the end spacers. Same problem occurred on NCS between two turns, near end spacer pos.6. (please ref. to nr.4 photos already sent you by e-mail)	ACCEPTED	
020321A	NC CERN 45	**2012** **I050**	During winding of inner layer nr. **I050**, end spacers nr.3 and 2 (ref. dwg.nr.620RM09103 rev.0 - pos 8 e 14) have been broken: this problem caused a cutting of the insulating tape and a small damage of the surface of the sc cable (please ref. to photos already sent to CERN, by e-mail, by Mr. Musso on 20/03/02)	ACCEPTED	
020328A	NC CERN 46	**2006**	**2006** The air gap between last collar on CS and end flange is 3.6 mm. The air gap between last collar on NCS and end flange is 4.5 mm. (nom. value 2.9 mm –2/+0)	ACCEPTED	
020405A	NC CERN 47	**2002**	**2002** With reference to NC CERN 42, after dismount of the collars, on 21-22-25/03/02, with CERN personnel witness, the following damages on QHs have been detected: 1. QHs n.**YT211** & **YT212** (N.C.S. - coil end) are burnt very close to the electrical connection ("omega" shape piece) to the wires 2. QHs n. **YT111** (N.C.S. - coil end) are burnt very close to the electrical connection ("omega" shape piece) to the wires These damages seem to be happened at CERN during electrical test at RT and cryogenic temperature	Waiting for CERN proposal. --- No proposal from ANSALDO that is in fact waiting recommendations from CERN During a visit at ANSALDO premises on the 11th of July 2002, we (CERN representatives and ANSALDO staff) could see that there are also broken end spacers. CERN suggested Ansaldo trying to replace the broken end spacers before proceeding to re-assembly. This is in view of saving the coils. This subject will be reviewed after Ansaldo has tried to do this. ☞ As usual when a coils' assembly has to be re-assembled and re-collared, the following components shall be replaced: ☞ Ground insulation; ☞ Quench-heaters; ☞ Coils' protection sheets and shim retainers; ☞ Cold bore tubes (because they were cut during cold mass finishing).	
020423A	NC CERN 48	**2011** **E046**	During layer jump welding about pole nr. **P043** (inner layer I046 – outer layer E046) a deformation of the sc cable of layer **E046** (about 10 strands) occurred. Cable id. nr. **02K02201C**	**REJECTED**	
020429A	NC CERN 49	**2012** **I051**	After curing, inner layer nr. **I051**, has some turns detached along 200 mm about from end spacer, on both ends (CS and NCS). This defect has been already showed to CERN people during visit at Ansaldo on 29/04/02.	ACCEPTED	
020503A	NC CERN 50	**2010** **P039**	During electrical test on c.c. **2010**, a short circuit occurred on pole nr. **P039** between inner layer **I042** and outer layer **E042** on pole plane, at	ACCEPTED (on **2010**)	

			5000 mm about from CS end. As the damage has been detected immediately, we have already restored the electrical insulation between layers. All the necessary electrical tests will be properly performed after repairing.		
020503B	NC CERN 51	**2005**	1. During **electrical test on QHs** of c.c. **2005**, (DIQH tests performed by CERN personnel on 02/05/02, according to tech. procedure nr. LHC-DHQ-TP-0001.00 rev.1.1), the QH nr.**YT211** broke (open circuit) at 450 V discharge test (I=20A; E=715J). After discharge, no short circuits have been detected from QH (**YT211**) to ground or to coils. Remarks: QH resistance before discharge was R=20.8 Ohm. 2. Longitudinal welds of shrinking cylinders, performed by CERN and after repairing by CERN, are not acceptable: see AJC-CERN report dated 08/01/02 regarding nr.11 repairing on "TE" side. 3. After Ansaldo repairing of TE side longitudinal weld, some defects still remain and weld is not acceptable (see SIGE-ANSALDO report nr.02052-01-mt)	ACCEPTED	
020522A	NC CERN 52	**2014** **I057**	After curing, inner layer nr. **I057** has nr.2 turns detached along 300 mm about from end spacer, on both ends (CS and NCS). Besides Kapton tape is detached and cut along 200 mm about, at 50 mm from and on CS This defect has been already showed to CERN people during visit at Ansaldo on 22/05/02.	ACCEPTED (on **2014**)	
020522B	NC CERN 53	**2014** **P055**	Pole nr. **P055** has first 3 turns detached along 200 mm about from end spacer, on both ends (CS and NCS). This defect has been already showed to CERN people during visit at Ansaldo on 22/05/02.	ACCEPTED (on **2014**)	
020524A	NC CERN 54	**2015** **I061**	After curing, inner layer nr. **I061** (cable nr. **01B10073A**) has air gap between Cu wedges and end spacers. In particular: • on C.S. gap=2.1mm between Cu wedge and end spacer pos.7 • on C.S. gap=1.9mm between Cu wedge and end spacer pos.13 • on N.C.S. gap=2.1mm between Cu wedge and end spacer pos.3 • on N.C.S. gap=2.3mm between Cu wedge and end spacer pos.4 Besides first turn on N.C.S. is detached along 200mm about This defect has been already showed to CERN people during visit at Ansaldo on 22/05/02.	ACCEPTED (on **2015**)	
020524B	NC CERN 55	**QH4528**	During electrical test at 3kV under pressure, a discharge occurred and QH has been damaged at about 5200mm from end, on C.S.	**QH REJECTED to CERN**	
020530A	NC CERN 56	**2015** **02K03501A**	During winding of outer layer, some defects has been detected about cabling of Rutherford cable. Please see to annexed photos for details.	**cable REJECTED to CERN**	
020611A	NC CERN 57	**QH4704**	During electrical test at 3kV under pressure, a discharge occurred and QH has been damaged at about 2530mm from end (N.C.S.). CERN personnel (Ms. Bajko) as been already informed about it and looked at the defect during visit on 11/06/02.	**QH REJECTED to CERN**	
020628A	NC CERN 58	**QH4445**	During electrical test at 3kV under pressure, a discharge occurred and QH has been damaged at about 800mm from end (N.C.S.).	**QH REJECTED to CERN**	
020703A	NC CERN 59	**2013**	After impulse test on collared coils nr.**2013**, performed at 60 A by CERN personnel, the resistance of **QHs** nr.**4864** and **4779** (ref. pos. **Y112**)	Magnet to be de-collared	

		QH4864 **QH4779**	changed from 20.75Ω to 23.60Ω. Besides, as stated by CERN personnel, an anomalous behaviour of the current occurred during the electrical test. The measured insulating resistance value from QH to pole is acceptable: R=1.19GΩ (ref. value R>1.00GΩ).		
020709A MA022847	NC CERN 60	-	A low quality packaging (wooden box) has been used: so many of the Cu wedges in the wooden box Nr. 1- Lot Nr. 176700805 - Profile 4 have been damaged during shipping. This means that an extra cost shall be applied by ASC to check the quality of the Cu wedges and to restore small damages	Contact CERN immediately in case of damaged components during shipping	
020715A	NC CERN 61	**QH4389**	During electrical test at 3kV under pressure, a discharge occurred and QH has been damaged at about 8000mm from end (C.S.).	**QH REJECTED to CERN**	
020711A	NC CERN 62	**2018** **E076**	After curing process of outer layer nr. **E076**, an end spacer on no-connection side (pos.3 – batch nr. 41-42) showed some damages (delaminating). The end spacer has been shipped to CERN by Mr. Musso on 11/07/02.	ACCEPTED on **2018**	
020710A	NC CERN 63	**2011** **E045** **E046** **E047** **E048**	After collaring, the end spacers on CS and NCS of outer layers nr. **E045-E046-E047-E048** (collared coils **2011**) showed some small cracks. This problem has been already showed to Mr. Musso during visit in ASC.	ACCEPTED	
020719A	NC CERN 64	**2011**	Electrical test on c.c. **2011**, after collaring, showed QH nr. **YT211** (D2 – Upper pole – Left) interrupted.	Problem to be checked De-collaring	
020722A	NC CERN 65	**2017** **E070** **P067**	About pole nr.**P067**, outer turn on **E070**, is not completely glued to the end spacer on NCS (right side-CS view) (ref. dwg.nr.620RM08202/F - pos.nr.8)	ACCEPTED on **2017**	
020729A	NC CERN 66	**2011**	With reference to **NC CERN 63**, after de-collaring of coils on CS, we found the QH strip broken just on the connection to omega piece. Possible causes of this damage could be: 1) a cutting effect due to a no support surface under the QH strip end; 2) a too much high stress value during collaring on coil ends This damage has been already showed to CERN people (Mr. Savary and Mr. Musso) during their visit at Ansaldo.	ACCEPTED	
020802A	NC CERN 67	**2012**	After magnetic measurements on c.c. **2012**, b1 component value is out of tolerance.	ACCEPTED	
020802B	NC CERN 68	**2014**	After magnetic measurements on c.c. **2014**, b1 component value is out of tolerance.	ACCEPTED	
020503C	NC CERN 69	**2004**	X-ray test of longitudinal welds on **2004** shrinking cylinders, showed defects on WA (nr.20 films) and WB welds (nr.2 films) as described on test report Ansaldo-SIGE nr. 02052-1-IS. Both report and films have been submitted to CERN analysis.	ACCEPTED	
020904A	NC CERN 70	**2006**	Geometrical measurements performed on **2006**, installed on welding press under a pressure of 250 bar, before longitudinal welding, showed a twist of ± 7 mrad between cold bore tubes (nom. value ± 3 mrad max.) This non-conformity comes from problems created by the malfunctioning of the welding press, with consequent misalignment between upper and intermediate beams, occurred on week nr.30 during the first pressure cycle on 2006. Note: the beams have been re-aligned on week 31 and an electro-valve	ACCEPTED	

			has been substituted on week 36		
0201011 A	NC CERN 71	**2004**	After repairing of longitudinal weld WA on CM nr. **HCMBB_A001-02000004**, X ray examination showed a lack of fusion, about 60 mm long (ref. film pos. 26-27). Films delivered to CERN (Mrs. Bajko) on 09/10/2002. Reference documents: SIGE Test Reports 02052-1, 02052-3 & 02052-6	ANSALDO shall repair the defective part of the weld and then, check it again according to the Technical Specification. Lack of fusion is a type of defect that is not acceptable.	
021023A	NC CERN 72	**2004**	Geometrical measurements of end-cover positioning, after welding, performed on c.m. HCMBB_A001-02000004, showed the following out-of- tolerance: 1) angle between end-cover CONNECTION SIDE and "C-plane" is -0.51mrad around Z-axis (nom. tol.=±0.36mm) 2) angle between end-cover LYRE SIDE and "L-plane" is -0.49mrad around X-axis (nom. tol.=±0.36mm)	The end covers shall be re-positioned according to the specified tolerances. In order to avoid cutting entirely the welds and so avoid re-doing all the work, we suggest to try first the following alternative methods*: ▪ Re-positioning the end covers by redoing partially the circumferential weld in appropriate sectors; ▪ Re-positioning the end coves by applying hammering in appropriate sectors. For such delicate operations, CERN staff will provide technical support on the shop floor level. Should these solutions be not successful, the end covers shall be then removed and re-positioned starting from the very beginning of the positioning and welding procedure.	
021025A	NC CERN 73	**2011** **P044**	After re-collaring of c.c. **2011**, on pole **P044**, QH nr.4751 has 2 wires with wrong reference colour: wire YT221 is GREEN-GREY (instead of yellow), wire YT222 is YELLOW (instead of green-grey)	Although the colour of the above mentioned wires is not correct, we would like to draw your attention on the necessity to keep the right numbering and position on the end connector.	
021017B	NC CERN 74	**2006**	X-ray test of longitudinal welds **WA** & **WB** on **2006** shrinking cylinders, showed defects as described on test reports Ansaldo-SIGE nr. **02052-5**. Both report and films have been submitted to CERN analysis on on17/10/02	The films and related reports have been seen by CERN radiologist, A.Costa, together with F.Savary. Comments and recommendations were given to Ansaldo during a meeting at their premises held on 17th October 2002. See also separate report of the company AJC International, A.Costa, dated 13/10/02 (ref.2814).	
021202A	NC CERN 75	**2006**	During electrical test performed before welding of end covers, open circuit of temperature sensor **TT821** id. nr. **CX_LS_X09260** has been detected.	The electrical circuit of the affected temperature sensor shall be left in place but the wires shall be cut to a reasonable length and their extremity properly insulated. A new temperature sensor shall be put in place, fixed to the end plate. CERN staff will give recommendations on where to put the sensor and how to fix it at the occasion of a next visit. --- CERN suspects the welding operations to induce high currents in the instrumentation circuits. In order to minimize such risk, CERN recommends ANSALDO to follow strictly the "Installation Procedure" entitled "Pre-series MBA – MBB Cold Mass Instrumentation", Rev.3 dated September 2002 (doc. Ref. LHC-MMS-GB/5837) by G.Brun. --- A new temperature sensor (id. nr. **CX_LS_X_08961**) has been installed on the end plate of the active part assembly.	
021125C	NC CERN 76	**2004**	Final geometrical measurements performed on c.m. **HCMBB_A001-02000004** showed an out-of- tolerance of 3.91 mrad of twist value on one point near Lyre Side.	The out of tolerance probably is due to the relatively bad quality of the measurements in this zone. Based on our experience with other cold masses, which shows similar errors we consider that the cold mass can be used as is. The values were checked also with SL-AP.	
2003					
030115A	NC CERN 77	**2024** **P096** **I099**	During discharge test performed on pole nr.**P096,** with end under load, a discharge occurred on CS end at 4.8kV between 6th and 7th turns of inner layer nr.**I099**.	After having inspected the damage, one strand of inner layer I099 broken as can be seen on the enclosed picture, on Thursday 16th January 2003 at ANSALDO premises (A.Musso and F.Savary together with	

				ANSALDO staff), we decided, obviously, to reject the layer. ANSALDO to cut out the head of the damaged layer so that CERN staff can bring it to Geneva for further investigation. CERN staff will give additional recommendations to Ansaldo (action F.Savary and M.Bajko) on how to proceed (what to do, what to measure and what to record) for the correction of the cold mass. CERN staff will also follow carefully the execution of the corrective actions. **I099 REJECTED (will be substituted by I3099)**	
021210A	NC CERN 78	**2009**	Intermediate geometrical measurements (after longitudinal welding of the shrinking cylinder) performed on CM nr.**2009** showed an out-of-tolerance about the curvature (09/12/2002). After repairing of longitudinal welds, a geometrical check didn't show the out-of-tolerance any more (24/02/2003). Please refer to the annex graph about the curvature of outer and inner tubes in which we can compare the results of different measures performed on 9th DEC '02 and 24th FEB '03. According to these results, we propose to use-as-is CM 2009.	As the two latest measurements shows that the curvature of the magnet is within the required tolerance the assembly can go ahead. However further investigation should be made at CERN with the collaboration of Ansaldo to understand the changes of the shape we have seen in this magnet.	
030116A	NC CERN 79	**2006**	Final geometrical measurements performed on c.m. **HCMBB_A001-02000006** showed an out-of- tolerance about the positioning of the cold feet pads after welding. Measured values of distance between feet and midplane are the following: 293.16 mm on CS and 293.19 mm on LS (nom. value = 294.00 ±0.5 mm.)	Apply a shim of 0.5 mm on all the 3 cold feet. In such a way the distance will increase and the difference between the nominal and real will be 0.34mm on the connection side, -0.04mm on the central pad and 0.31 mm on the lyre side. The shims should be fixed on the pads in order to assure that they will be in place at the moment of the cryostating	
030110A	NC CERN 80	/	Dimensional measurements performed on 50 cold feet pads, showed a wrong machining about the length: real value = 350.0 mm (nominal value = 360.0 mm). This means -5.0 mm of length each side. All the other machining are properly made and the relevant dimensions are in tolerance.	This non-conformity is accepted exceptionally.	
030115A	NC CERN 81	**2023** **P092**	During discharge test performed on c.c. **2023** after collaring, an interturn discharge occurred on pole nr. **P092** (aperture 2 – upper pole).	The pole cannot be used "as is". The assembly has to be de-collared for investigation and repair.	
021018A	NC CERN 82	**2012**	X-ray test of longitudinal welds **WA** & **WB** of shrinking cylinders on CM nr.**2012**, showed defects as described on test reports Ansaldo-SIGE nr. **02052-8 & 9**. After 1st repair, some other tests and repairs followed, according to Ansaldo-SIGE reports nr. **02052-15 & 16**, **02052-17 & 18**, **02052-22 & 23** and according to Ansaldo-CERN discussion. All these reports and films have been submitted to CERN analysis. At the end only 2 repairs were agreed to be done Results of these repairs (4th time at the same positions nr. WA 20-21 & WB 2-3) are in Ansaldo-SIGE reports nr. **03052-28.** Weld WB 2-3 is OK. Weld WA 20-21 shows a lack of fusion of about 27 mm between 1st & 2nd pass and two lacks of fusion of 45 mm about between 3rd & 4th pass.	Considering the successive repairs, which have been checked as described by AS in page 2 (level R3 on both welds), the two defects still present in WA, position 20-21, can remain and the weld should be left "as is". Ansaldo Superconduttori S.p.A must take the responsibility of such an outcome.	
030124A	NC CERN 83	**2020**	During assembling of CM nr.**2020**, the sc cable on CS has been cut at wrong length. Real length of the cables are 1150 mm and 520 mm. (please ref. to e–mail sent by Mr.Drago on 24/01/03)	CERN recommends making the additional junction with a piece of superconducting cable (ideally of the same cable-length) taking care of having a minimum overlap of a transposition pitch, i.e. min. 125 mm. Ansaldo shall submit to CERN a drawing showing the proposed arrangement and a dummy assembly for qualification before proceeding to repairing on the cold mass itself	
021218A	NC CERN 84	**2010**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2010**, showed defects as described on test reports Ansaldo-SIGE nr. **02052-20 & 21**. Reports and films have been submitted to CERN	Considering the successive repairs, which have been checked as described by AS above, the defect still present in W1, position 10-11, can remain and the weld should be left "as is".	

			analysis on 05/02/2003. After 1st repair, some other tests and repairs followed, according to Ansaldo-SIGE reports nr. **03052-41, 43, 47, & 56** and according to Ansaldo-CERN discussion. W2 weld is acceptable; on W1 weld n.1 defect still remain. In agreement with CERN, taking into account that a 4th repair on the same position could give worst result, **W1 weld can be accepted as it is**.	Ansaldo Superconduttori S.p.A must take the responsibility of such an outcome.	
030115B	NC CERN 85	**2008**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2008**, showed defects as described on test reports Ansaldo-SIGE nr. **02052-24 & 25**. Reports and films have been submitted to CERN analysis on 05/02/2003: ASG and CERN agreeded to proceed with n.1 repair on **W1** and n.4 repairs on **W2**. After these repairs, X-ray test report nr. **03052-39** showed no defects.	Reports and films have been submitted to CERN analysis on 05/02/2003: ASG and CERN agreeded to proceed with n.1 repair on **W1** and n.4 repairs on **W2**. After these repairs, X-ray test report nr. **03052-39** showed no defects.	
030122A	NC CERN 86	**2007**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2007**, showed defects as described on test reports Ansaldo-SIGE nr. **03052-26 & 27**. Reports and films have been submitted to CERN analysis on 05/02/2003: ASG and CERN agreeded to proceed with n.2 repairs on **W1** and n.7 repairs on **W2**. After these repairs (1st repair), X-ray test report nr. **03052-37** showed n.1 defect on **W1** and n.1 defect on **W2**. ASG proceeded with repairs (2nd repair): X-ray test report nr. **03052-43** showed no defect on **W1** and n.1 defect on **W2.** In agreement with CERN, taking into account that a 3rd repair on the same position could give worst result, **W2 weld can be accepted as it is**.	Use-as-is	
030203A	NC CERN 87	**2009**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2009**, showed defects as described on test reports Ansaldo-SIGE nr. **03052-33 & 34.** Reports and films have been submitted to CERN analysis on 06/02/2003. After 1st repair, some other tests and repairs followed, according to Ansaldo-SIGE reports nr. **03052-57, 61, 62 & 66** and according to Ansaldo-CERN discussion. At the moment on W1 and W2 nr.1+1 defects still remain. In agreement with CERN, taking into account that a 4th repair on the same position could give worst result, **W1 & W2 weld can be accepted as it is**.	Considering the successive repairs, which have been checked as described above by AS, the defect still present in W1 and W2 can remain and the welds should be left "as is". Ansaldo Superconduttori S.p.A. must take the responsibility of such an outcome.	
030218A	NC CERN 88	**2012**	Final geometrical measurements performed on c.m. HCMBB_A001-02000012 showed an out-of-tolerance about the positioning of end-cover on lyre side, after welding. Measured value of the centre of the end-cover is -1.45 mm on x-axis	The maximum acceptable error on the end cover positioning is ±0.75mm. Therefore the end cover as it is not accepted. Further investigations shows that also the corrector magnets are misaligned with the same order of magnitude, as the error was committed during the definition of the reference axes. The end cover should be cut and repositioned as well as the corrector magnet. We suggest making the cut of the end cover in the welded zone in such a way to save the correct overall length of the magnet. Than perform an eccentric machining in order to correct the horizontal misalignment mentioned here before. The machining can be made at a bigger diameter than specified and the gap between the cylinder and the transition ring corrected with stainless steel shim. The end cover could be re-used on a different magnet by taking into account its short length, which can be compensated by the length of the cylinder.	
030123A	NC CERN 89	**2020**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2020**, showed defects as described on test reports Ansaldo-SIGE nr. **03052-29 & 30**.	Successive repairs according to description given in page 2 of this document and final result can be accepted.	

			Reports and films have been submitted to CERN analysis on 05/02/2003: ASG and CERN agreeded to proceed with n.2 repairs on **W1** and n.2 repairs on **W2**. After these repairs (1st repair), X-ray test report nr. **03052-38** showed n.1 defect on **W1** and n.2 defect on **W2**. ASG proceeded with repairs (2nd repair): X-ray test report nr. **03052-43** showed n.1 defect on **W1** and no defect on **W2.** In agreement with CERN, taking into account that a 3rd repair on the same position could give worst result, **W1 weld can be accepted as it is**.		
030320A	NC CERN 90	**2008**	Final geometrical measurements performed on c.m. **2008** showed: • out-of-tolerance about the positioning of the cold feet pads after welding: measured values of distance between feet and midplane are 293.30 mm on CS and 293.49 mm on LS (nom. value = 294.00 ±0.5 mm.) • out-of-tolerance about outer diameter of the flanges on CS on V1 (d=75.72mm) and V2 (d=75.78mm): nom. value = 76mm -0.05/-0.15 • out-of-tolerance about outer diameter of the flanges on LS on V1 (d=73.33mm) and V2 (d=73.29mm): nom. value = 73.5mm -0.05/-0.15	1. Use a shim of 0.5mm on the 3 cold feet pads in order to correct the distance between the cold feet pads and the mid plane of the cold mass. 2. According to the new-relaxed tolerances the diameter of the flanges are acceptable up to 76mm-0.05/-0.025 on Cs and 73.5mm-0.05/-0.25 on LS. The flange V1 on CS of a diameter of 75.72mm still out of the relaxed tolerances should be repaired at CERN at the RECEPTION.	
030213B	NC CERN 91	**2005**	**10. Description of non conformity** During disassembling activities on cold mass nr. **2005**, a strand of sc cable on electrical **connection nr.4 on CS**, has been damaged. Please refer also to nr.2 e-mail sent you on 13/02/2003 about difficulties we had during this work. Here is a detailed description of the sequence (see next 3 pictures) of the activities performed on 13/02/2003 and the damage occurred: a) starting from connection end, we cut the Cu piece in different parts (4 pieces), using a small grinding wheel b) de-soldering of Cu pieces and sc cable by heating the 4 different parts (1 part each time) up to reach T=250°C in 10 min., in order to remove the Cu pieces from the sc cable: this means that the sc cable has been heated 4 times in 4 different parts during the removal of the Cu piece c) during the removal of the last Cu piece, a strand has been damaged at about 90 mm from end plate F. Terzi (21/03/2003) **Repairing procedure** Here is a description of the repair of the sc cable (id. nr. **02C00023A**) regarding outer layer **E023** on cold mass **2005**. We proceeded with soldering an extra length of cable starting just 25 mm under the end spacer, in order to have 130mm of overlapping: this condition will give us a good situation to do a proper shaping of the electrical connection after collaring. Main parameters are: • soldering temperature: 230 ±10 °C • brasing alloy = Sn95-Ag5 • fluxant = KESTER 135 F. Terzi (05/05/2003)	Because the superconducting cable (at the level of the electrical connections between the poles, mainly) had to be heated up several times during the disassembling operations (following q.h. failure and defects in longitudinal welds, please refer to NC CERN 51), CERN Project Engineers have to make reserves until the results of the cold tests are known. Regarding the broken strand, the repair proposed by Ansaldo, which is described in page 4 of this document, can be accepted with reserves until the results of the cold tests are known. Ansaldo must take responsibility for the above mentioned dispositions.	
030314A	NC CERN 92	**2021**	During the welding of the end plate on CS of cold mass nr. **2021**, the connecting wire of temperature sensor **TT821** was cut by the edge of the end plate and the shell. Now the length of the cable, out of the end plate, is reduced to 1m	The length of cabling remaining available (1 m) can be extended to the nominal value, 4 m, by welding/soldering a new piece of cabling of about 3 m (as long as necessary to reconstruct it according to nominal length for a correct assembly in the instrumentation feed-through	

			about, instead of 4m nominal value. After the electrical test, that the temperature sensor (CX_LS_X13727) is working.	system). There are 4 wires to be lengthened. A heat-shrinkable sleeve (type RT 102, qualified for low temperature application) shall protect each connection. The 4 connections shall be shifted one with respect to the other so that they do not overlap. Then, the 4 connections shall be protected in a common heat-shrinkable sleeve. The section of repairing shall be totally contained in the volume of the end cover (this repairing-zone cannot go into the IFS). Finally, the standard electrical tests shall be repeated and results reported in the traveller.	
030326A	NC CERN 93	**2012**	Final geometrical measurements performed on c.m. **2012** showed out-of-tolerance as described on test report on next page. About this magnet, we remind you that we have already cut the end cover on lyre side because of wrong positioning.	The length of the ends of the cold bore tubes can be accepted in this particular case with a relaxed tolerance of 64±0.5mm. The centre of the cold bore tube will be also accepted as the measured value is: with an error of 0.43mm with respect to the theoretical axis. (The changes of some of the assembly tolerances are under study at CERN. We have used the above-mentioned criterias according to the new non-official values.)	
030326B	NC CERN 94	**2020**	Intermediate geometrical measurements (after longitudinal welding of the shrinking cylinder) performed on c.m. nr.**2020** showed an out-of-tolerance about the curvature. Please ref. to test report (midplane analysis) already sent Mrs. Bajko.	The cold mass geometry should not be corrected us this action seems to give an instable, temporary effect. The cold mass can be assembled if the following condition is respected: The centre of the cylinder on both connection and non-connection side should not be misaligned more than 1.75mm with respect the theoretical position of the end cover. About 1mm error can be corrected by making an eccentric machining of the cylinder with respect to its inner diameter. This would allow the end cover to be installed on the cylinder with a maximum error of ±0.75mm. In spite of the fact that the tolerance of the end cover position is ±0.5mm in this particular case the cold mass would be accepted if the end cover is within ±0.75mm.	
030326A	NC CERN 95	**2012**	Final geometrical measurements performed on c.m. **2012** showed out-of-tolerance about the positioning of the cold feet pads after welding: measured values of distance between feet and midplane is **293.25 mm** on **CS** and **293.50 mm** on **CENTER** (nom. value = 294.00 ±0.5 mm.) See next page for more details.	Use a shim of 0.5mm on the 3 cold feet pads in order to correct the distance between the cold feet pads and the mid plane of the cold mass.	
030402B	NC CERN 96	**2012**	During final electrical measurements on c.m. **2012**, we found that the two voltage taps identification labels **EE014** and **EE015** has been interchanged one to the other.	The identification labels at the level of the temporary connector (extremity of the IFS) shall be made right. The identification labels at the level of the diode can remain "as is".	
030402A	NC CERN 97	**2020**	During electrical test, before welding of end-covers, performed on c.m. **2020**, an open circuit has been detected on QH nr. **YT112**.	The open circuit cannot be left "as is". It has to be repaired.	
030408A	NC CERN 98	**2010**	During the assembling of cold mass nr. **2010**, a dimensional check of bus-bars showed a reduced length L=105 mm (nom. L=120mm) of the sc cable of bus-bar installed on M1 line - lyre side. Bus-bar serial nr: **00000024** (type B) On next page you can find the Certificate of Conformity and a picture of the bus-bar.	CERN P.E. proposes to "use-as-is" the magnet. CERN P.E. has informed the person in charge of the bus bars at CERN on the above mentioned non-conformity (which must be communicated to the manufacturer of the bus bars). The non-conformity is circulated at CERN to define how to repair (or how to use) the magnet in such conditions.	
030415A	NC CERN 99	**2007**	Final geometrical measurements performed on cold mass nr. **2007** showed out-of-tolerance about: • vertical shape and offset of V2 tube • twist between V1 & V2 tubes • position of center of V2 flange on Lyre Side End: Y_{meas}=64.34mm (Y_{th}=64.0 ± 0.3mm) See next pages for details.	1. The local offset of 1.2mm is acceptable for the mechanical aperture for this particular case. (checked with B. Jeanneret AP), and it will not cause problems nor for the insertion of the beam screen (checked with P. Cruickshank_ AT VAC) 2. The mechanical twist between the v1 and v2 tube has been relaxed on its local value from +/-3mrad to +/-6mrad therefore this is also acceptable	

				3. the length of the cold bore tube has been relaxed also to 64 mm +/- 0.5mm therefore this is also acceptable.	
030423A	NC CERN 100	**2010**	Final geometrical measurements performed on cold mass nr. **2010** showed out-of-tolerance about: • cold mass total length • twist between V1 & V2 tubes • offset of V1 tube See next pages for details.	1.The length of the cold mass should be within the specified tolerances of $15158^{\pm 2}$mm at 20°C. Therefore the length of 15159.64mm at 20°C is acceptable. 2. The local twist of ± 6 mrad is accepted in the reviewed tolerances, which will be confirmed soon, therefore the value of 3.4 mrad is acceptable. 3.1. The radial offset of the CBT is depending on the horizontal and the vertical offset of the CBT. The horizontal shape of this magnet being on the limit of the tolerances, the vertical shape should be adjusted as close as possible to the theoretical shape. Aligning the CFP supports in the same plane can do this adjustment. (Actually they seem to have from one support to the other up to 0.3mm differences. Those supports should be aligned, then fixed and checked their stable position before the final assembly of the cold masses.). This has been tried but did not give satisfactory results because of the too high error in the horizontal plane. 3.2. **The correction of this particular non-conformity, should it be possible, needs further investigation at CERN (it is the first time we observe such case) to define what to do. Therefore, the magnet can be sent "as is" to CERN.**	
030319A	NC CERN 101	**2021**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2021**, showed defects as described on test reports Ansaldo-SIGE nr. **03052-48, 49 & 55**. Reports & films have been submitted to CERN analysis on **26/03/2003**. ASG and CERN agreed to proceed with: • **n.13** repairs on **W1** • **n.1** repair on **W2**	The radiographs of the last repairs have been seen together with Mr.Rossi of SIGE and Ansaldo on the 14th of May. All repairs are acceptable. Some of them have been declared so (meaning "acceptable") although there were still some defects because these defects are not critical. Ansaldo must take responsibility for such outcome.	
030320B	NC CERN 102	**2014**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2014**, showed defects as described on test reports Ansaldo-SIGE nr. **03052-52 & 53**. Reports & films have been submitted to CERN analysis on **25/03/2003**. ASG and CERN agreeded to proceed with **n.9 repairs on W1** & **n.20 repairs on W2.** After these repairs (1st repair), X-ray test report nr. **03052-70 & 72** showed **n.2 defects on W1** & **n.3 defects on W2**, in agreement with CERN analysis. ASG proceeded with 2nd repair: X-ray test report nr. **03052-76** showed **no defects**.	On the 13th of May 2003, CERN Project Engineer has examined the radiographs of the repair-welds, W1 R and W2 R. W1 R shall be repaired according to the inspection report of SIGE, document under ref. 03052-70 dated 06-05-03. W2 R, defects on sections 5-6 and 34-35 can be left "as is". This must be done under Ansaldo responsibility.	
030404B	NC CERN 103	**2023**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2023**, showed defects as described on test reports Ansaldo-SIGE nr. **03052-59 & 60**. Reports & films have been submitted to CERN analysis on **28/04/2003** . ASG and CERN agreeded to proceed with: **n. 33 repairs on W1** & **n. 17 repairs on W2.** After these repairs (1st repair), X-ray test report nr. **03052-82** showed **n. 2 defects on W1** & **n. 2 defects on W2.** ASG proceeded with 2nd repair: X-ray test report nr. **03052-90** showed **no defects.**	Repair the welds according to conclusions of the inspection report of SIGE that were reviewed together with Anaslado and Mr.Rossi of SIGE on the 14th of May 2003.	

030509A	NC CERN 104	**2009**	Final geometrical measurements performed on c.m. **2009** showed out-of-tolerance about the positioning of the cold feet pads after welding: measured values of distance between feet and midplane is **293.34 mm** on **CS** and **293.40 mm** on **CENTER** (nom. value = 294.00 ±0.5 mm.) See next page for more details.	Add a shim of 0.5mm on all 3 cold feet pads.	
030512A	NC CERN 105	**2024**	During discharge test at 3 kV on c.c. **2024**, a short circuit occurred between poles nr. **02P30096** and **02P00097** (aperture D2) at 1610 mm from CS end. According to CERN, we proceeded with de-collaring of about 3m of collared coils from CS: the damage has been caused by a non-ferrous inclusion between the poles and sc cables were not damaged. Then we proceeded with restoring the insulation between the poles. Damage and restored insulation has been shown to CERN personell (Mr. Musso) on 13/05/2003. All necessary electrical test will be performed after re-collaring.	Repair ground insulation as said above, redo the assembly of the collar packs and the collaring operation.	
030513A	NC CERN 106	**2009**	During He leak test on CM **2009**, a leak has been detected between cold mass pressurized at 26 bar and insulating vacuum. The calculated leak rate is **5.92E-9 mbar·l/s** (nom. value 1.0E-9 mbar·l/s max.). As the leak is very small, we believe it comes from an "Helicoflex" seal. See next page for details.	The results of the leak test have been communicated to AT-VAC at CERN (E.Mahner and J.Hansen) for checking and they confirmed that such non-conformity cannot be accepted. AT-VAC proposed to check the leak-tightness of the test equipment. Ansaldo should then redo the test after having replaced the "Helicoflex" seals. CERN informed Ansaldo that an alternative design of the end flanges using welded caps in lieu of bolted joints is being evaluated. More information on such solution will be communicated in the next days.	
030519A	NC CERN 107	**2021**	Final geometrical measurements performed on cold mass nr. **2021** showed out-of-tolerance about the twist between V1 & V2 tubes See next page for details.	1. The NC regarding the length of the cold mass: The cold mass total length at 20C is 15160.8 mm instead of the maximum allowable length of 15160.4mm.We propose to make a repair in the following way: respecting the tolerance of 64 +/-0.55 between the flanges and the end covers (on connection and lyra side) reduce the total distance between flange and flange to the maximum allowable: 15160.4 + 2* 64.5 =15289.2mm. The correction should be made at Ansaldo before delivery of the cold mass at CERN. The position of the M and X lines will remain out of tolerance on each side of 0.3mm according to the cold mass length. 2. The NC regarding the twist: Is acceptable as the new tolerances allow to accept mechanical local twist up to +/-6mrad.	
030520A	NC CERN 108	**2024**	During HV electrical test on c.c. **2024**, after re-collaring (ref.to **NC CERN 105**), a discharge occurred between pole nr. **02P00097** (aperture D2 – lower pole) and QH nr. **YT211** at 2.6kV	The collared coils cannot be accepted "as is". The assembly shall be de-collared, the critical components replaced (ground insulation, quench heaters, …) and then, the whole shall be re-collared. One must localize the defect for further inspection before re-assembly.	
030520B	NC CERN 109	**2025**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2025**, showed defects as described on test reports Ansaldo-SIGE nr. **03052-77 & 78**: ASG proceeded with **n. 2 repairs on W1** & **n. 3 repairs on W2.** After these repairs (1st repair), X-ray test report nr. **03052-80** showed **n.1 defects on W2**, in agreement with CERN analysis. ASG proceeded with 2nd repair: X-ray test report nr. **03052-83** showed **a small defect, acceptable** in agreement with CERN.	Repair according to conclusions stipulated in the inspection report of SIGE 03052-77 & 78, 03052-80 and 03052-83.	

030528A	NC CERN 110	**2014**	Final geometrical measurements performed on c.m. **2014** showed an out-of-tolerance about the positioning of the cold feet pads after welding: measured values of distance between feet and midplane are **293.38 mm** on CS (nom. value = 294.00 ±0.5 mm.).	Description of proposed action (use continuation page if necessary) Apply a **shim of 0.5 mm on all the 3 cold feet**. In such a way the distance will increase and the difference between the nominal and real will be 0.12mm on the connection side, -0.21mm on the central pad and -0.15 mm on the lyre side: all assembly tolerances are respected. The shims should be fixed on the pads in order to assure that they will be in place at the moment of the cryostating	
030530A	NC CERN 111	**2002**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2002**, showed defects as described on test reports Ansaldo-SIGE nr. **03052-84 & 85** ASG proceeded with **n. 8 repairs on W1** After these repairs, X-ray test report nr. **03052-86** showed **no defects on W1**	Repair according to conclusions stipulated in the inspection report of SIGE 03052-84 & 85.	
030611A	NC CERN 112	**2032**	Warm magnetic measurements carried out on the collared coils **2032** showed anomalies in high order multipoles (b8-b13-a6-a7-a9-a11) in 4-5 positions along the magnet axis in aperture 1. (ref. test report nr. **HCMB__A001-02000032_cc**)	The collared coils assembly cannot be used "as is". It shall be dismounted for further investigations and then, reworked. In reality, the repair work was completed (and the origin of the problem identified) before this non-conformity was closed	
030616A	NC CERN 113	**2022**	Final geometrical measurements performed on c.m. **2022** showed out-of-tolerance about total offset of V1 & V2 tubes. See next page for details.	Following the decisions taken on other cold masses having the same kind of error (out of tolerance of 1mm radially of about 0.1mm) we propose to use as is. (the corrective actions giving a non-stable results in time we abandoned the re-shaping of the cold masses). This cold mass could be placed if necessary in the middle of the cell.	
030626B	NC CERN 114	**2017**	X-ray test of longitudinal welds W1 & W2 of shrinking cylinders on CM **2017**, showed defects as described on test reports Ansaldo-SIGE nr. **03052-92**. ASG proceeded with **n.3 repairs on W1** & **n.19 repairs on W2**. After these repairs, X-ray test report nr. **03052-97** showed **n.1 defect on W1** & **n.3 defects on W2.** After 3nd repair, X-ray test report nr. **03052-99** showed **n.2 defects on W2**: these defects are **acceptable**, in agreement with CERN.	Repair according to conclusions stipulated in the inspection report of Ansaldo-SIGE nr. **03052-92**	
030626A	NC CERN 115	**2020**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2020**, showed defects as described on test reports Ansaldo-SIGE nr. **03052-87 & 88** ASG proceeded with **n. 1 repairs on W1** After this repair, X-ray test report nr. **03052-93** showed **no defects on W1**.	Repaired according to conclusions stipulated in the inspection report of Ansaldo-SIGE **03052-87.** Acceptable according to test report nr. **03052-93.**	
030627A	NC CERN 116	**2027**	During electrical test on CM **2027**, under pressure, before longitudinal weld, QH nr. **YT122** showed a resistance **R=60Ω**, instead of typical value of 21Ω.	The cold mass should be opened until the error is detected and repaired.	
030627B	NC CERN 117	**2018**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2018**, showed defects as described on test reports Ansaldo-SIGE nr. **03052-95 & 03052-96**. ASG proceeded with **n.1 repairs on W1** & **n.4 repairs on W2**. After these repairs, X-ray test report nr. **03052-100** showed **n.2 defects on W2.** These defects have been considered **acceptable**, in agreement with CERN, after technical discussion on 04/07/2003.	Repair according to conclusions stipulated in the inspection report of Ansaldo-SIGE **03052-95 & 03052-96**.	
030630A	NC CERN 118	**2002**	Final geometrical measurements performed on c.m. **2002** showed out-of-tolerance about total offset of V1 & V2 tubes. See next page for details.	Following the decisions taken on other cold masses having the same kind of error (out of tolerance of 1mm radially of about 0.1mm) we propose to use as is. (the corrective actions giving a non-stable results	

				in time we abandoned the re-shaping of the cold masses). This cold mass could be placed if necessary in the middle of the cell.	
030715A	NC CERN 119 Rev.1	**2027**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2027**, showed defects as described on test reports Ansaldo-SIGE nr. **03052-101 & 03052-102**. ASG proceeded with **n.15 repairs on W1** & **n.37 repairs on W2**.	Repair according to indications of test report Ansaldo-SIGE nr. **03052-101 & 03052-102**. Report on results of inspection of the repair welds. After 3rd repair, **nr.3 defects** on **W1** and **nr.1 defect** on **W2** still remain. These defects are very small, then acceptable as they are, under ASG responsibility (see test report SIGE **03052-175 & 179**).	
030715B	NC CERN 120	**2013**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2013**, showed defects as described on test reports Ansaldo-SIGE nr. **03052-105 & 03052-106**: **n.5 repairs on W1** & **n.10 repairs on W2.** According to CERN discussion of July, 14-15 (Mrs. M. Bajko), ASG will proceed with **n.10 repairs on W2** only.	Results of radiographic inspection of the repair welds were seen during a meeting at Ansaldo on the 22nd of July (F.Savary and L.Maggiora). Proceed to repairing according to conclusions of the above mentioned inspection and further agreements formulated during the meeting.	
030716A	NC CERN 121	**2016**	During electrical test performed before welding of end covers on CM **2016**, an open circuit of temperature sensor **TT821** (serial nr. **CX_LS_X11792**) has been detected.	The electrical circuit of the affected temperature sensor shall be left in place but the wires shall be cut to a reasonable length and their extremity properly insulated. A new temperature sensor shall be put in place, fixed to the end plate. One shall follow the instructions given by CERN when the same repair had to be done on the magnet 2006. CERN reminds ANSALDO to follow strictly the "Installation Procedure" entitled "Pre-series MBA – MBB Cold Mass Instrumentation", Rev.3 dated September 2002 (doc. Ref. LHC-MMS-GB/5837) by G.Brun. --- A new temperature sensor (id. nr. **CX_LS_X _16039**) has been installed on the end plate of the active part assembly.	
030713A	NC CERN 122	**/**	Lower half yoke made by lamination packs batch nr. **EYA00044** and by compensation lamination packs batch nr.**MAL00019** (packs nr. 1–3) is **14593 mm** long (nom. length = 14598 +0/ -3 mm)	Because this non-conformity has a negligible effect on the main field integral, the lower half-yoke can be used "as is".	
030713B	NC CERN 123	**2016**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2016**, showed defects as described on test reports Ansaldo-SIGE nr. **03052-106.** ASG proceeds with n. 1 repair on W1 & n. 1 repair on W2.	Proceed to repairing according to indications of SIGE. Then, radiograph the repair welds.	
030721A	NC CERN 124	**L0270**	A visual inspection of convex half shell nr. **L0270** showed some grindings on the outer surface of the shell: inner surface seems to be OK.	After checking with colleagues of the Component Centre section, the shell can be used "as is". This is on the condition that the surface of the chamfer is satisfactory (any shell presenting deep and extended longitudinal scratches shall be put aside, the information shall be given to CERN who will take the necessary actions with the manufacturer and supplier, the firm Butting). We draw the attention of Ansaldo Superconduttori on the importance of carrying out inspection on incoming material & components. In the particular case of the shells, CERN resident inspector, J.Heer, will provide help for such inspection	
030722B	NC CERN 125	**2020**	During He leak test on CM **2020**, a leak has been detected between cold mass pressurized to 26 bar and insulating vacuum. The test has been performed again under CERN witness, on 18/07/2003, with similar result (see next page for details): calculated leak rate = **3.70E-9 mbar·l/s** (nom. value 1.0E-9 mbar·l/s max.). Based on previous experience (ref. to NC CERN 119), ASG suggests to weld a s.s. ring in order to close the flange of the capillary tube cold	The proposal of Ansaldo to close the top box of the IFS by welding the cover flange with a stainless steel ring in lieu of the 8 clamps can be accepted. The pressure and helium leak test shall be redone. For the execution of the final electrical tests, Ansaldo will remove the cover flange by grinding the weld. After the execution of the electrical tests, Ansaldo will close the top box	

			head and to repeat the test.	of the IFS with a "Viton" seal by spot-welding the cover flange with the same stainless steel ring. In order to protect the instrumentation wiring during the subsequent work packages at CERN (the top box has to be cut off), Ansaldo is requested to put inside the top box a stainless steel sleeve of sufficient height (more than 45 mm).	
030723A	NC CERN 126	**2017**	Final geometrical measurements performed on c.m. **2017** showed out-of-tolerance about total offset of V1 & V2 tubes. See next page for details.	Because there are just a few points out-of-tolerance, because the deviations do not exceed 0.2 mm with respect to the limit of the tolerance range and because all other geometric requirements are satisfactory (seen on the relevant inspection reports), the cold mass can be used "as is".	
030731A	NC CERN 127	**Cu wedges** **batch nr. 31**	Copper wedges type III/IV - IV/V – V/VI (for inner layer) and type I/II (for outer layer), belonging to **batch nr. 31 (SE000031)** have been wet by rain water during the shipping from FILMCUTTER to ASG. All the copper wedges have been already insulated, cut at proper length and joined together in sets of 4 pieces for each type, ready to be installed. The total quantity of the copper wedges is 320 pcs. each type = 1280 pcs. (quantity for 10 collared coils) This material has been showed to Mr. J.Heer and Mr. A.Musso in ASG. Please find here after some photos.	**The copper wedges cannot be used "as is" even if dried.** As already discussed with our Mr.Musso, there are two solutions: 1. Redo the whole work, meaning the entire batch, with new copper wedges; 2. Remove the ground insulation, dry the copper wedges and redo the ground insulation. Solution 1 is strongly recommended because there is a non-negligible risk of oxidation of the copper wedges with solution 2. The cost of the copper wedges (1600 CHF/cold mass) and of the ground insulation tapes (1000 CHF/cold mass) has been communicated to ANSALDO for further evaluation. ANSALDO must inform CERN about the solution retained before implementation of the disposition for acceptance. ANSALDO shall specify better adequate transport conditions for their sub-contractors/suppliers in order to avoid such incident.	
030805A	NC CERN 128	**2005**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2016**, showed defects as described on test reports Ansaldo-SIGE nr. **03052-115 & 116: nr.4 defects** on **W1** and **nr.2 defects** on **W2.** ASG will proceed with these repairs.	Ok, repair according to indications of SIGE in the above mentioned report.	
030805B	NC CERN 129	**2024**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2024**, showed defects as described on test reports Ansaldo-SIGE nr. **03052-119: nr.4 defects** on **W1** and **nr.1 defect** on **W2.** ASG will proceed with these repairs.	Ok, repair according to indications of SIGE.	
030807A	NC CERN 130	**2016**	Final geometrical measurements performed on c.m. **2016** showed out-of-tolerance about total offset of V1 & V2 tubes. See next page for details.	Because there are just a few points out-of-tolerance, because the deviations do not exceed 0.2 mm with respect to the limit of the tolerance range and because all other geometric requirements are satisfactory (seen on the relevant inspection report of ITP-20), the cold mass can be used "as is".	
030820B	NC CERN 131	**2013**	Final geometrical measurements performed on c.m. **2013** showed out-of-tolerance of 5mm (C.S. direction) about the longitudinal positioning of the heat exchanger tube.	To be cut and re-positioned the tube.	
030717A	NC CERN 132	**2035**	Warm magnetic measurements carried out on the collared coils **2035** showed anomalies (red alarms) in high order multipoles **b8** and **a6** on **position #19** of the straigth part in **Aperture 1**. **Aperture 2 is OK**. (ref. test report nr. **HCMB__A001-02000035_cc.xls**)	The collared coil must be to open in order to check Non Conformities produced during the assembly.	
030901A	NC CERN 133	**2029**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2029**, showed defects as described on test reports Ansaldo-SIGE nr. **03052-127: nr.4 defects** on **W1** and **nr.2 defects** on **W2.** ASG will proceed with these repairs.	Repair according to indications of the inspection report established by SIGE as mentioned above.	

030910A	NC CERN 134	**2054**	During collaring of **CC 2054**, at 300 bar of pressure, before inserting Ø13mm rods, HV electrical test at 2.6kV showed a discharge between **QH YT121** (serial nr. **ASGCICO-B0096**) and 1st-2nd turns of outer layer **02E00217** of pole **02P00214.** We stopped collaring and verified that the discharge occurred at 4900mm from NCS. Then we opened the collared coils along 2m around the region of the discharge and checked the problem: the QH metal strip cut the polyimide tape for about 10mm. See annexed photo for details.	The disposition is "repair" according to the proposal of Ansaldo formulated on the phone via Mr. G.Drago. This disposition is implemented under the full responsibility of Ansaldo. We (CERN) would like to point out the importance of such decision because the quench heaters are known to be a very critical item. It would have made sense to remove all collars and to inspect the damaged quench heater on its entire length and finally to replace it. This incident demonstrates clearly that there is a weak point somewhere in the quality assurance plan. Ansaldo must pay more attention when installing critical items like the quench heaters (what about incoming inspection at reception of the quench heaters at Ansaldo or visual check during their installation in a magnet?). It must be clear that there cannot be room for taking any risk with critical items like the quench heaters. Ansaldo must take immediately measures to reinforce quality assurance in this respect.	
030915B	NC CERN 135	**2033** **EYA00055**	Temperature sensor on half yoke has been installed at 1149mm from CS (nom. 1290mm) because the yoke pack (batch nr. EYA00055) for TT sensor has been already manufactured according to previous design.	The yoke pack can be used as is with the temperature sensor at 1149 mm from the connection side.	
030918A	NC CERN 136-P1 136-P2 136-P3	**2062** **02E00250**	After curing, first 2 turns of outer layer **02E00250** are not completely glued in the region near NCS from 190mm to 650mm from end and in the region near CS from 190mm to 440mm from end: see annexed photos on next page. This problem has been already showed to M. Bajko (CERN) during her visit in ASG on 18/09/2003. The layer was made with the new winding machine. Probably the winding tension of the first turn was less important than the others. ASG propose to glue these detached turns by epoxy resin using the same tools we use for the re-conditioning of the layer jump region.	N.C. closed under complete responsibility of ASG. CERN accept it with full reserve for possible geometric, magnetic (field quality), and quench performance problems. In case of new N.C.s (appearing after the c.m. reception at CERN), traceable back to the N.C. in object, ASG will be asked to reimburse the extracost due cold tests, de-cryostating and re-cryostating. As we have already mentioned 2 weeks ago: we consider that in Ansaldo there is a WEAK POINT IN THE QUALITY ASSURANCE PLANE. The fault was detected by CERN personal in a relatively advanced phase of the assembly of this poles, as similar problems were detected on the layer 252 also in the production line and without NC opened. Ansaldo must open each time a NC when a fault is detected and submit it for acceptance to CERN with a PROPOSAL of repair BEFOR THE REPAIR IS DONE. Ansaldo must REINFORCE the quality assurance in all working posts.	
030919A	NC CERN 137	**2036** **FSG00033**	Temperature sensor on half yoke has been installed at **1149mm** from CS (nom. 1290mm) because the yoke pack (batch nr. **FSG00033**) for TT sensor has been already manufactured according to previous design. Half yoke will be installed on **CM 2036**	The assembly can be used "as is". There must be a clear warning indicating this non-conformity at magnet delivery.	
030918B	NC CERN 138	**2062** **02E00252**	After curing, first 2 turns of outer layer **02E00252** are not completely glued in the region near CS from 300mm to 350mm from end: no photo is available because the detachment is very small. The layer was made with the new winding machine. Probably the winding tension of the first turn was less important than the others. ASG propose to glue these detached turns by epoxy resin using the same tools we use for the re-conditioning of the layer jump region	Disposition according to ASG proposal as described above under full responsibility of ASG. CERN accept it with full reserve for possible geometric, magnetic (field quality), and quench performance problems. In case of new N.C.s (appearing after the c.m. reception at CERN), traceable back to the N.C. in object, ASG will be asked to reimburse the extracost due cold tests, de-cryostating and re-cryostating.	
030925D	NC CERN 139	**2011**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2011**, showed defects as described on test reports Ansaldo-SIGE nr. **03052-148 & 149: nr.6 defects** on **W1** and **nr.10 defect** on **W2.** ASG will proceed with these repairs.	Ok with the proposed disposition: repair according to recommendations of SIGE. As a reminder: do not forget to radiograph the repair welds for checking.	
031002A	NC CERN 140	**2029**	Final electrical measurements performed on CM **2029** showed a wrong value about corrector magnet **MCO Apt1 – Bus 11/EE841**. Measured value=3293.69 mohm	It is proposed to allow the manufacturer to deliver the magnet "as is". A first possibility is that the instrumentation wires added for the full test	

			Nominal value > 6500 mohm. See next page for details.	configuration in the manifold between M1 and M2 have not been connected correctly. In this case, the problem will be automatically solved during the stripping operation (these wires are removed at that stage). A second possibility, which is more likely, is that the voltage tap EE841 has been connected on the wrong side of the corrector, as indicated in the enclosed sketch. In this case the voltage tap cannot serve in the machine. Should it be the case, we propose to use the magnet "as is". Ansaldo to reinforce quality control to avoid this kind of mistake. Ansaldo to indicate clearly in the traveller of 2029 the id number of the edms document related to the said non-conformity, insisting on the content of the non conformity. The document id number is **407043**.	
031002B	NC CERN 141	**2068** **02E00274**	After curing of outer layer **02E00274**, first turn (from 190mm to 600mm from end) and Cu wedge (along 40mm) are not completely glued in the region near CS: see annexed photo on next page. This problem has been already showed to Mr. A. Musso (CERN) during his visit in ASG on 02/10/2003. The layer was made with the new winding machine. ASG propose to glue the detached turn and the Cu wedge by epoxy resin using the same tools we use for the re-conditioning of the layer jump region.	The repair can be done following the method proposed here above but this is to be done under full responsibility of Ansaldo Superconduttori.	
031009A	NC CERN 142	**2015**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2015**, showed defects as described on test reports Ansaldo-SIGE nr. **03052-133 & 136: nr.1 defects** on **W1** and **nr.1 defect** on **W2.** ASG will proceed with these repairs.	Ok with the proposed disposition: repair according to recommendations of SIGE	
031010A	NC CERN 143 Rev.1	**2033**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2033**, showed defects as described on test reports Ansaldo-SIGE nr. **03052-157 & 158: nr.4 defects** on **W1** and **nr.9 defect** on **W2.** ASG will proceed with these repairs. After 3rd repair **nr.1 defect** on **W1** and **nr. 2 defects** on **W2** still remain, but acceptable as they are under ASG responsibility (see test report SIGE **03052-163& 180**).	Proceed to repairing according to indications given in Ansaldo-SIGE test report 03052-157 & 158. Then, report on final results.	
031010B	NC CERN 144	**2036**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2036**, showed defects as described on test reports Ansaldo-SIGE nr. **03052-167 & 168: nr.7 defects** on **W1** and **nr.18 defect** on **W2.** ASG will proceed with these repairs.	Proceed to repairing according to indications given in Ansaldo-SIGE test report 03052-167 & 168. Then, report on final results.	
031015A	NC CERN 145	**2071** **02E00285**	During winding of outer layer **02E00285** (sc cable nr. **02K18601D**) a crash of the winding machine CSA1 occurred and the spool fell down to ground. ASG checked the cable: nor the polyimide insulation, nor the cable have been damaged. See annexed photos for details.	Because no damage was caused to the cable, it can be used as is. Be aware that such disposition is to be taken under full responsibility of Ansaldo Superconduttori.	
031028A	NC CERN 146	**2065** **02I00262**	During electrical test, with end under load, on pole **02P00259** (cold mass **2065**), an anomalous L value has been detected. Then resistance measurement and discharge test showed a short circuit on CS between 6th and 7th turn of inner layer **02I00262** (SC cable **01B10279A**). See annex photo for details. Note: critical current of SC cable Ic=538A (min. required Ic=491A) Pole is left pending, waiting for CERN inspection.	The layer cannot be used in these conditions. It is definitely **REJECTED** (after visual inspection in ASG premises). ---------- Rejected layer will be changed with a new one (id nr. **02I30262**)	
031028C	NC CERN 147	**2034**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2034**, showed defects as described on test reports Ansaldo-SIGE nr. **03052-174 & 178: nr.6 defects** on **W1** and **nr.2 defect** on **W2.** ASG proceeded with these repairs. **After these repairs NO defects** have been detected on **W1** and **W2**	Following the satisfactory results of the radiographic examination of the repair welds, the disposition use–as-is can be applied.	

			(see test report SIGE **03052-182**).		
031028D	NC CERN 148	**2054**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2054**, showed defects as described on test reports Ansaldo-SIGE nr. **03052-184 & 185: nr.2 defects** on **W1** and **nr.3 defect** on **W2.** ASG proceeded with these repairs. **After these repairs NO defects** have been detected on **W1** and **W2** (see test report SIGE **03052-187**).	Following the satisfactory results of the radiographic examination of the repair welds, the disposition use–as-is can be applied.	
031104A	NC CERN 149	**2063** **02E00256**	After collaring of **CC 2063**, HV electrical test at 2.6kV showed a discharge between **QH YT212** (serial nr. **ASGCICO-B0130**) and outer layer **02E00256** of pole **02P00253.** We verified that the discharge occurred at 6500mm from NCS.	Identify the cause of the discharge and repair. Describe precisely the action undertaken to sort out the problem in this particular case of c.c.2063.	
031111A	NC CERN 150	**2054**	After welding of end –covers on **CM 2054**, a visual check showed a twist of wires nr.1 & 2 about auxiliary bus-bars installed on M1-line. This means that wires nr.1 & 2 are in reversed position. However, the identification of wires nr.1 & 2 is correct. This problem is related to a manufacturing error of the supplier of the bus-bars and cannot be solved by ASG because the auxiliary bus bars are joined together by resin. See sketch about the connections on next page.	"Use-as-is", disposition acceptable after checking with Mr. J.P.Tock at CERN before delivery of the magnet. Important to put a clear warning on the magnet to draw the user at CERN during testing, stripping and installation.	
031111A	NC CERN 151	**2039**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2039**, showed defects as described on test reports Ansaldo-SIGE nr. **03052-186 & 189: nr.3 defects** on **W1.** ASG proceeded with these repairs. **After these repairs NO defects** have been detected (see test report SIGE **03052-195**).	Use-as-is after repair.	
031113A	NC CERN 152	**2050**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2050**, showed defects as described on test reports Ansaldo-SIGE nr. **03052-196 & 197: nr.1 defect** on **W1** and **nr.1 defect** on **W2.** ASG will proceed with these repairs.	Repair according to indications given in the test report Ansaldo-SIGE 03052-196 & 197. Then, report on final results.	
031112A	NC CERN 153	**2046**	During collaring of **CC 2046**, at 300 bar of pressure, before inserting Ø13mm rods, HV electrical test at 2.6kV showed a discharge between: a) **QH YT111** (serial nr. **ASGCICO-B0163**) and pole **02P00183** (D1-Lower Pole) at 8800mm from NCS b) **QH YT221** (serial nr. **ASGCICO-B0131**) and pole **02P00184** (D2-Upper Pole) at 2080 from NCS We stopped collaring.	Identify the cause of the problem and sort it out before going further.	
031113B	NC CERN 154	**2041**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2041**, showed defects as described on test reports Ansaldo-SIGE nr. **03052-198 & 199: nr.6 defects** on **W1.** ASG will proceed with these repairs.	Repair according to indications of test report Ansaldo-SIGE mentioned above. Then, report on final results.	
031119A	NC CERN 155	**2040**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2040**, showed defects as described on test reports Ansaldo-SIGE nr. **03052-200: nr.3 defects** on **W1 & nr.1 defect** on **W2.** ASG will proceed with these repairs.	Repair according to indications given in the above mentioned report. Then, report on final results.	
031120B	NC CERN 156	**2050**	Final geometrical measurements performed on c.m. **2050** showed out-of-tolerance about total offset of V1 & V2 tubes. See next page for details.	The mechanical twist was out of the specified tolerance of± 6mrad. This criteria is used to minimize the twist and to assure that the integral I0max=0.18 is not exceeded. In this case the value of the integral is I0= 1.04e-1, therefore all criteria(integral and average) on the mechanical twist is respected. The magnetic measurements shows also an important twist, but it was still confirmed acceptable.(see mail of E. Wildner on 14. Nov. 2003)	

<table>
<tr><td></td><td></td><td></td><td></td><td>We propose to make a control on the upper and lower beam of the welding press and in continuation on the upper and lower cradles. The measurements under the press are recommended in order to detect in time, before welding the cold mass, errors on the twist. An improvement on the alignment of the yoke and half cylinder is necessary. This point was discussed with Ansaldo and a proposal was made.</td><td></td></tr>
<tr><td>031128A</td><td>NC CERN 157</td><td>2044</td><td>X-ray test of longitudinal welds W1 & W2 of shrinking cylinders on CM nr.2044, showed defects as described on test reports Ansaldo-SIGE nr. 03052-205: NO defects on W1 & nr.1 defect on W2.
ASG will proceed with these repairs.</td><td>Repair according to indications given in above mentioned test report.
Then, report on the final results.</td><td></td></tr>
<tr><td>031128B</td><td>NC CERN 158</td><td>2048</td><td>X-ray test of longitudinal welds W1 & W2 of shrinking cylinders on CM nr.2048, showed defects as described on test reports Ansaldo-SIGE nr. 03052-207: nr.1 defect on W1 & nr.1 defect on W2.
ASG will proceed with these repairs.</td><td>Repair according to indications given in the above mentioned report.
Then, report on the final results.</td><td></td></tr>
<tr><td>031217A</td><td>NC CERN 159</td><td>2048</td><td>Final geometrical measurements performed on c.m. 2048 showed out-of-tolerance about the twist of the cold mass.
See next page for details.</td><td>Following the NC on the mechanical twist, which is an indicator of a possible magnetic twist, the magnetic data were checked by E. Wildner and the twist was found acceptable.(mail of E. Wildner to V. Remondino on the 17th of Dec).</td><td></td></tr>
<tr><td>031223A</td><td>NC CERN 160</td><td>2038</td><td>X-ray test of longitudinal welds W1 & W2 of shrinking cylinders on CM nr.2038, showed defects as described on test reports Ansaldo-SIGE nr. 03052-215: nr.3 defects on W1 & nr.1 defect on W2.
ASG will proceed with these repairs.</td><td>Proceed to repair following indications given in the above mentioned report.
Then, report on final results.</td><td></td></tr>
<tr><td colspan="6">2004</td></tr>
<tr><td>040122A</td><td>NC CERN 161</td><td>2066
Bus-bar A186</td><td>During electrical connection of bus-bars, after longitudinal welding of CM 2066, we found a deformation of the bus-bars nr.A186 for diode connection (bus-bars set nr. HCDCBHA055-BI000186)
Besides this bus-bar is in contact with bus-bar nr.A186/C.
(see next page for detailed photos)</td><td>The flexible diode connection bus bars can be reshaped.
CERN will bear the costs for the additional work required.

18/02/2004
The flexible diode connection bus bars have been reshaped and re-positioned. Here are some pictures about the adjustment of the position of the bus-bars.F. Terzi</td><td></td></tr>
<tr><td>031205A</td><td>NC CERN 162</td><td>Press for E-mod. meas. on coil heads</td><td>A dimensional check on REJLERS-CERN press, for E-modulus measurements on coil heads, has been performed by ASG in collaboration with CERN people.
This check showed that the dimension of the cavity was lower than the nominal one, moreover a deformation of the heigth of two sizing bars, from the nominal value 22.0 mm to 21.76 mm (bar nr.1) and 21.48 mm (bar nr.2) – (average values), was detected.

Table 2. Dimension of the sizing bar as measured on 28th of November 2003
<table><tr><td>bar 1</td><td>21.76</td><td>21.67</td><td>21.76</td></tr><tr><td>average: 21.76mm</td><td>21.73</td><td>21.81</td><td>21.81</td></tr><tr><td>bar 2</td><td>21.43</td><td>21.43</td><td>21.41</td></tr><tr><td>average: 21.48 mm</td><td>21.50</td><td>21.54</td><td>21.54</td></tr></table>(extract from AT-MAS/MB 7265)
See CERN Visit Report nr. AT-MAS/MB 7265 dated 18-21/12/2003 for further details.
The failure of the press caused wrong measurements of E-modulus of</td><td></td><td>X</td></tr>
</table>

			coil heads regarding different collared coils. As a consequence, the shim calculation gave wrong results and wrong shims on the heads were installed on several collared coils. Some of these collared coils were assembled in cold masses.		
040112B	NC CERN 163	**2043**	During He leak test on **CM 2043**, a leak has been detected between cold mass pressurized to **5 bar** and insulating vacuum. The test has been performed several times, after checks of all the seals, with similar result: leak rate **Q≈1E-6 mbar·l/s** (nom. value 1.0E-9 mbar·l/s max.)	The cold mass cannot be delivered in the conditions mentioned above. There is a factor of 100 with respect to the specification! In the description of the non-conformity, a check of all the seals is mentioned. What about a check of the welds? ASG shall investigate further to localize the leak and to repair it. ---------- A leak on the internal bellow of heat exchanger was found. This bellow has been changed and the He leak test repeated successfully (ref. to Test Report **Leak_test_2043.xls**)	
040112A	NC CERN 164	**2048**	During He leak test on **CM 2048**, a leak has been detected between cold mass pressurized to **5 bar** and insulating vacuum. The test has been performed several times, after checks of all the seals, with similar result: leak rate **Q≈1E-7 mbar·l/s** (nom. value 1.0E-9 mbar·l/s max.)	The cold mass cannot be delivered in the conditions mentioned above. There is a factor of 1000 with respect to the specification! In the description of the non-conformity, a check of all the seals is mentioned. What about a check of the welds? ASG shall investigate further to localize the leak and to repair it. ---------- Helicoflex seal and end-caps on N-line has been changed. He leak test repeated successfully (ref. to Test Report **Leak_test_2048.xls**)	
040114A	NC CERN 165	**2046**	During electrical test performed before welding of end covers on **CM 2046**, the temperature sensor **TT821** (serial nr. **CX_LS_X14243**) showed an electrical resistance **R=133 Ohm** (at **T=17°C**) – (reference value **R=46.19 Ohm** at **22°C**).	The temperature sensor shall be replaced by another one fixed to the end plate of the active part assembly. Please indicate here after the ID of the new temperature sensor. ---------- A new temperature sensor (id. nr. **CX_LS_X _14200**) has been installed on the end plate of the active part assembly.	
040119A	NC CERN 166	**2043**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2043**, showed defects as described on test reports Ansaldo-SIGE nr. **03052-202 & 203: nr.4 defects** on **W1 & nr.1 defect** on **W2.** ASG will proceed with these repairs.	Repair according to indications given in the above mentioned test report. Then, report on final results.	
040119B	NC CERN 167	**2064**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2064**, showed defects as described on test reports Ansaldo-SIGE nr. **04052-221: no defects** on **W1 & nr.1 defect** on **W2.** ASG will proceed with these repairs.	Repair according to indications given in the above mentioned test report. Then, report on the final results. As far as we know, the welds of this cold mass have not been checked fully (please refer to e-mail of Mr. Drago dated December 16th, 2003 regarding priority cold masses). In order for us to trace back easily information, please add in this non-conformance report the position of the weld sections, which have been inspected (including the production test plates).	
040127A	NC CERN 168	**2047**	About collared coils **CC 2047**, with reference to doc. nr. **NC CERN 162** about the failure of the press for E-modulus measurements of coil heads and according to following data analysis with CERN, shims on heads need to be replaced. New shims will be estimated according to CERN procedure dated 04/12/2003 (already used for the modification of shims on CC 2072)	Ok to replace the installed shims with new ones determined by following the above mentioned procedure dated 04/12/2003.	
040127B	NC CERN 169	**2051**	About collared coils **CC 2051**, with reference to doc. nr. **NC CERN 162** about the failure of the press for E-modulus measurements of coil heads and according to following data analysis with CERN, shims on heads need to be replaced. New shims will be estimated according to CERN procedure dated 04/12/2003 (already used for the modification of shims on CC 2072)	Ok to replace the installed shims with new ones determined by following the above mentioned procedure dated 04/12/2003.	

040128B	NC CERN 170	**2051**	During collaring of **CC 2051**, electrical check on QHs showed an open circuit on **QH YT112** (serial nr. **ASGCICO-A0147**).	The collared coils assembly cannot be used as is. It shall be dismounted and reworked with good quench heaters.	
040127C	NC CERN 171	**2046**	During He leak test on **CM 2046**, a leak has been detected between cold mass pressurized to **5 bar** and insulating vacuum. The test has been performed several times, after checks of all the seals, with similar result: leak rate **Q≈1E-6 mbar·l/s** (nom. value 1.0E-9 mbar·l/s max.)	The cold mass cannot be used as is. ASG shall investigate further to localize the leak and to repair it. ---------- A leak on the internal bellow of heat exchanger was found. This bellow has been changed and the He leak test repeated successfully (ref. to Test Report **Leak_test_2046.xls**)	
040127D	NC CERN 172	**2063**	Warm magnetic measurements, carried out on the **CC 2063**, showed anomalies in high order multipoles, in particular about multipole b8 (up to 6 sigma, yellow alarm), in different positions along the magnet axis in Aperture 2, possibly caused by a movement of the conductor of block 6 (ref. test report **HCMB__A001-02000063_CC.xls**). Besides, after collaring we had to re-size the inner diameter of the cold bore tubes along the whole length. Considering these two events, ASG is worried about a possible shift of the inner turns of the coils towards the cold bore tubes, as already occurred on CC 2032 (please ref. to NC CERN 112). As a consequence, ASG decided, independently and without any CERN request, to proceed with **de-collaring** of **CC 2063** at his own costs.	CERN has no objection to the decision taken by ASG.	
040127E	NC CERN 173	**2072**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2072**, showed defects as described on test reports Ansaldo-SIGE nr. **04052-225: nr.2 defects** on **W1 & nr.2 defects** on **W2.** ASG will proceed with these repairs.	Proceed to repairing according to indications given in the above-mentioned report. Then report on the final results.	
040128B	NC CERN 174	**2064**	Final geometrical measurements performed on c.m. **2064** showed out-of-tolerance about the positioning of the cold feet pads after welding: measured values of distance between feet and midplane is **293.18 mm** on **CS** and **293.26 mm** on **LS** (nom. value = 294.00 ±0.6 mm.) See next page for more details.	To adjust the before mentioned dimension a shim of a 0.5mm thickness was fixed on the 3 cold feet pads.	
040120A	NC CERN 175	**S.s. collars** **MAL00200** **MAL00201** **MAL00202** **MAL00203**	A dimensional test on 4 collars (each batch) regarding different batches nr. **MAL00200 - MAL00201 - MAL00202 - MAL00203** has been performed. We found non-conforming values about the planarity on both measuring conditions: "Free State" and "Restrained Condition" (CERN ref. dwg. LHCMB__A0099 rev.C). Please find annexed Test Reports nr. **MA040406, MA040407, MA040408 & MA040409** for details. Refer also to e-mail to CERN dated 23/01/2004	The batches MAL00200 and MAL00201 shall be sent back to Malvestiti for correction. This has already been agreed between CERN and Malvestiti. The two other batches MAL00202 and MAL00203 can be used as is.	
040203A	NC CERN 176	**2069**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2069**, showed defects as described on test reports Ansaldo-SIGE nr. **04052-229 & 230: nr.1 defect** on **W1 & NO defects** on **W2.** ASG will proceed with these repairs.	Repair according to indications given in the above mentioned inspection report. Then, report on the final results.	
040216C	NC CERN 177	**Bus bars set nr. A166-195 and B181-210**	With reference to dwg. nr. LHCDCCHA0001-0002-0003-0004 (all rev, index D), the length of the glass cloth of auxiliary bus bars is too short (about 120mm) on both sides. The end taping is in the position where the clamps (DWG,nr. LHCMB_E0057 & 0058) have to be mounted. The glass epoxy plate 12x15x2.2mm (dwg. nr. LHCDCCHA0003 pos.6) is missing. See attached pictures for details. Bus bar sets id. number:	ASG propose to reject these Non Conforming collars. In agreement with CERN and Malvestiti, these batches MAL00208 and MAL00217 shall be sent back to Malvestiti for correction.	**X**

			• **HCDCBHA055-BI000166** to **BI000195** (bus bars type A) • **HCDCBHA056-BI000181** to **BI000210** (bus bars type B) Total number of non-conforming bus bars: 30 type A + 30 type B		
040209A	NC CERN 178	**S.s. collars MAL00208 MAL00217**	A dimensional test on different collars regarding batches nr. **MAL00208** & **MAL00217** has been performed. We found non-conforming values about the planarity on both measuring conditions: "Free State" and "Restrained Condition" (CERN ref. dwg. LHCMB__A0099 rev.C). Please find annexed Test Reports nr. **MA040743** & **MA040744** for details.	ASG propose to reject these Non Conforming collars. In agreement with CERN and Malvestiti, these batches MAL00208 and MAL00217 shall be sent back to Malvestiti for correction.	
040211A	NC CERN 179	**2051**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2051**, showed defects as described on test reports Ansaldo-SIGE nr. **04052-232: nr.1 defects** on **W1 & NO defects** on **W2.** ASG will proceed with these repairs.	Repair according to indications given in the above mentioned test report. Then, report on the final results.	
040212A	NC CERN 180	**2072**	Final geometrical measurements performed on c.m. **2072** showed out-of-tolerance about the positioning of the cold feet pads after welding. Measured values of distance between feet and midplane are: • **293.169 mm** on **CONNECTION SIDE** (nom. value = 294.00 ±0.6 mm.) • **293.247 mm** on **CENTRAL POSITION** • **293.093 mm** on **LYRE SIDE** See next page for more details.	To adjust the before mentioned dimension, a shim of a 0.5mm thickness was fixed on the 3 cold feet pads. The action proposed is acceptable nevertheless there are two points on to be mentioned: 1. the cold feet pads by fabrication should be such that this errors theoretically are avoided; therefore we ask Ansaldo to check with attention the dimensions of the cold feet pads delivered by your suppliers.. In this particular case we aske Ansaldo to present the CC of the pads assembled on this cold mass 2. the longitudinal position of the cold foot on the connection side is on the limit of the tolerance. At this stage of the assembly a better positioning of the pad could and should be made.	
040216A	NC CERN 181	**2073**	During electrical test at **3 kV**, performed before welding of end covers on **CM 2073**, a discharge occurred between **QH YT211** (serial nr. ASG-CICO-A0120) and Outer Layer **02E00295** (Dipole **D2-UP**).	ASG will proceed to dismantle the CM active part and the Collared Coils. CERN shall be informed about the planning for these operations so that someone can witness and follow the inspection of the components, as deemed necessary.	
040216B	NC CERN 182	**2032**	During electrical performed before welding of end covers on **CM 2032**, we found the following wrong cabling (colour) of wires regarding **V-taps EE012** and **EE013**: • **EE012** wire is **BROWN** (instead of red) • **EE013** wire is **RED** (instead of brown)		**X**
040226A	NC CERN 183	**2063**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2063**, showed defects as described on test reports Ansaldo-SIGE nr. **04052-239: NO defects** on **W1 & nr.1 defect** on **W2.** ASG will proceed with these repairs.	Repair according to indications given in the above mentioned inspection report. Then, report on the final results.	
040227A	NC CERN 184	**2066**	Before the He leak test on **CM 2066**, a local test on X-line has been performed before putting the CM inside the vacuum vessel. A leak has been detected on the internal bellow of heat exchanger, with CM pressurized to **5 bar**: leak rate **Q≈1E-6 mbar·l/s** (nom. value 1.0E-9 mbar·l/s max.)	The cold mass cannot be used as is. ASG shall investigate further to localize the leak and to repair it. ---------- X-line internal bellow (id nr. **XS0270**) has been changed and the He leak test performed successfully (ref. to Test Report **Leak_test_2066.xls**)	
040305A	NC CERN 185 rev.1	**2070**	During electrical test performed before welding of end covers on **CM 2070**, a short circuit between temperature sensor **TT821** (serial nr. **CX_LS_X15949**) and ground has been detected.	The electrical circuit of the affected temperature sensor shall be left in place but the wires shall be cut to a reasonable length and their extremity properly insulated. A new temperature sensor shall be put in place, fixed to the end plate. ---------- ASG shall implement a stricter installation procedure to avoid the	

				problem in the future. It happens too often. --- A new temperature sensor (serial nr. **CX_LS_X15951**) has been installed on the end plate	
040317A	NC CERN 186	**2097**	During winding of outer layer **02E00389** regarding CM **2097**, the following problems have been detected on sc cable nr.**02B50435B**: a) wrong position of some strands in the Rutherford cable (cabling problems) b) damage of insulation (but no damage of the strands) maybe caused during wrapping process (see annexed photos on continuation page)	Item a): ASG propose to continue the winding operation and check the problem with CERN personnel on next visit in ASG workshop Item b): ASG propose to restore the insulation of the sc cable --- Control better the working parameters during the wrapping process at Selva. In particular apply the recommendations formulated in the visit report AT-MAS/GCS 7368 dated April 4, 2004, following the visit of CERN staff at Selva on the 29th of March and at Ansaldo on the 30th of March. Recommendations have been also formulated for what regards the winding conditions. CERN kindly ask Ansaldo to take these recommendations into considerations.	
040317B	NC CERN 187	**2095**	After curing of outer layer **02E00382** regarding CM **2095**, the following problems have been detected on sc cable nr.**02B50432A**: b) wrong position of some strands in the Rutherford cable (cabling problems) a) damage of the insulation of the first turn near the first end spacer on CS: this problem could be caused by the wrong position of that strand (see annexed photo nr. 1. on continuation page)	ASG propose to remove the first end spacer, check carefully the condition of the strand, under witness of CERN personnel (Mr. Spigo, Mr. Modena, Mr. Musso and Miss Bajko), try a re-positioning of that strand and restore the insulation. (see annexed photo nr. 2, 3 on continuation page) --- Repair has been made on 30/03/2004, according the following procedure: • Rutherford cable has been fixed inside the layer jump shaping tool in order to guarantee the right shape of the cable • strand out of position has been re-positioned inside the Rutherford cable • soldering process has been applied (the result of the repairing procedure is shown on the next pictures) • insulation of the cable	
040317C	NC CERN 188	**2096**	Just before winding, a visual check of **outer layer** sc cables for **CM 2096**, showed cabling problems: some strands are in wrong position in the Rutherford cable. Sc cables ref. nr. **02B50433A- 02B50433B – 02B50433C - 02B50433D** (see annexed photo on continuation page)	ASG didn't start winding of OL for CM 2096 and is asking for a careful check of that cables by CERN personnel. During the visits on the 29th of March at Selva and on the 30th of March at ASG, CERN staff has inspected the cable and given recommendations on how to handle the superconducting cable in such case (CERN brought to Selva a special tooling, "laminoir", which is preventing the cable to pop-out as reported in this NC). Please also refer to the visit report AT-MAS/GCS 7368 dated April 2004. CERN staff, including GC Spigo, has witnessed the winding operation of some of the affected cables.	
040319A	NC CERN 189	**2074**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2074**, showed defects as described on test reports Ansaldo-SIGE nr. **04052-246: nr.2 defects** on **W1 & nr.1 defect** on **W2.** ASG will proceed with these repairs.	Repair according to indications given in the above mentioned inspection report. Then, report on the final results.	
040316A	NC CERN 190	**S.s. collars** **MAL00164** **MAL00165** **MAL00166**	A dimensional test on different collars regarding batches nr. **MAL00164 – MAL00165 - MAL00166** has been performed. We found non-conforming values about the dimension of the upper slot, so the magnetic / austenitic inserts cannot be positioned into the slot. Measured value=**35.85 mm (**nom. value=**36 ±0.02 mm**) See also annexed photo on next page.	The collars affected by the defect described in this document shall be returned to Malvestiti for rework. CERN has given instructions to Malvestiti to repair the collars, which will then be cleaned before delivery to ASG.	

040330B	NC CERN 191	**S.s. collars MAL00232 to MAL00235** **MAL00244 to MAL00247** **MAL00252 to MAL00255**	A visual check of different collars regarding batches nr. **MAL00232 - MAL00235** showed a burr along the inner shape. See annexed photos on next page. ASG Quality Control personnel will perform careful checks on collars regarding others batches stored in Brandi Company. Following ASG control at Brandi Company, others collars regarding batches nr. • **MAL00233 - MAL00234** • **MAL00244-245-246-247** • **MAL00252-253-254-255** showed the same problems about burr along the inner shape. Total nr. of collar batches: 12	The batches of collars affected by these burrs shall be sent back to Malvestiti for rework. CERN has given instructions to Malvestiti to de-burr all the collars affected. The collars will be then cleaned again by Malvestiti before delivery.	
040331B	NC CERN 192	**2067**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2067**, showed defects as described on test reports Ansaldo-SIGE nr. **04052-247: nr.1 defect** on **W1 & NO defects** on **W2.** ASG will proceed with these repairs.	Repair according to indications given in the above mentioned inspection report. Then, report on the final results.	
040331A	NC CERN 193	**2078**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2078**, showed defects as described on test reports Ansaldo-SIGE nr. **04052-248: NO defects** on **W1 &** on **nr.1 defect W2.** ASG will proceed with these repairs.	Repair according to indications given in the above mentioned inspection report. Then, report on the final results.	
040407A	NC CERN 194	**2061**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2061**, showed defects as described on test reports Ansaldo-SIGE nr. **04052-253: nr.2 defects** on **W1 &** on **nr.4 defects** on **W2.** ASG will proceed with these repairs.	Repair according to indications given in the above mentioned inspection report. Then, report on the final results.	
	NC CERN 195	**2082**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2082**, showed defects as described on test reports Ansaldo-SIGE nr. **04052-254: nr.14 defects** on **W1 & nr.4 defects** on **W2.** ASG will proceed with these repairs.	Repair according to indications given in the above mentioned inspection report. Then, report on the final results.	
040415B	NC CERN 196	**2112 02B50250A**	During transportation of insulated sc cables from SELVA to ASG, a support of the coils broke: the outer layer cable nr. **02B50520A**, for **CM 2112**, was damaged by an iron nail of the wooden support (see annexed pictures). The damage is at 18m from the end of the cable (start of winding): usually the tail of others cable is about 16m. From a visual inspection the depth of the mark is less than 0.1mm and seems to affect only the outer surface of the strands (copper).	ASG suggests 3 different solutions: a) manually restore the insulation of the cable and use the cable; b) wind the cable on a second spool in order to put the damaged part in the internal part of the coil (end of winding of the layer); if the extra-length of the cable is enough the damaged portion will be cut out. c) reject the cable asking CERN for replacement The defect has been seen by F. Savary. Following our discussion at ASG premises on the 29th of May, CERN recommends the solution b) here above. In doing so, the defect will be cut off following the winding operation. --- The cable has been re-wound on a new spool: winding operation of O.L. **02E00449** has been completed successfully.	
040422A	NC CERN 197	**2062**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2062**, showed defects as described on test reports Ansaldo-SIGE nr. **04052-251: nr.1 defect** on **W1 & nr.1 defect** on **W2.** ASG will proceed with these repairs.	Repair according to indications given in the above mentioned inspection report. Then, report on the final results.	
040422B	NC CERN 198	**2076**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2076**, showed defects as described on test reports Ansaldo-SIGE nr. **04052-257: NO defect** on **W1 & nr.3 defect** on **W2.** ASG will proceed with these repairs.	Repair according to indications given in the above mentioned inspection report. Then, report on the final results.	

040507A	NC CERN 199 rev.1	**2059**	During electrical test performed before welding of end covers on **CM 2059**, a short circuit between temperature sensor **TT821** (serial nr. **CX_LS_X17226**) and ground has been detected.	The electrical circuit of the affected temperature sensor shall be left in place but the wires shall be cut to a reasonable length and their extremity properly insulated. A new temperature sensor shall be put in place, fixed to the end plate. --- A new temperature sensor (serial nr. **CX_LS_X17228**) has been installed on the end plate	
040629C	NC CERN 200 rev2	**Oxidated Cu wedges**	The following Cu wedges, listed in the next page, showed **hard oxidations.** See also annexed photos for details Outokumpu production date: 23/01/2004 and others. SELVA tried to remove these oxidations without any results, so, at the moment, the material is in "stand-by". CERN checked the material in ASG on July.	ASG, in agreement with CERN, rejected these material. The material will be sent to CERN for replacement.	**X**
040513A	NC CERN 201	**Yoke lamination** **EYA00100** **EYA00101** **EYA00102**	Yoke laminations (batch nr **EYA00100 - EYA00101 - EYA00102**) received at Ormet, showed dirty surfaces (see annexed photos). At the moment, the material is in "stand-by". Mr. Musso and Mr. Heer checked the material at Ormet and took away a lamination for visual inspection at CERN. ASG is asking CERN to check the material and take a decision about it.	OK accettati – firma di Savary	
040519A	NC CERN 202	**2073**	After collaring of **CC 2073**, HV electrical test showed a discharge (at 1kV) between **QH YT111** (serial nr. **ASGCICO-B0081**) and outer layer **02E00294** of pole **02P00291** (pos. **D1-lower**). The discharge occurred at about 13500mm from NCS.	The collared coils assembly cannot be used as is. The assembly shall be reworked so that all quench heaters are sound. The inspection of the coils and of the quench heaters before and during their assembly shall be reinforced. There might be a cleanliness issue playing a role in this case. We therefore recommend ASG improving cleaning, especially in the collared coils production area. This is not the first time we have to formulate this recommendation.	
040524B	NC CERN 203	**2104** **02I00418**	During curing of inner layer **02I00418** regarding **CM 2104**, the temperature of the mould reached 198 °C for about 3 min. (max. nom. T=190°C)	Knowing that the temperature of the cable during curing can exceed that of the mould by 10 °C to 15 °C (as demonstrated during the curing tests with instrumented dummy coils), the above means that the cable has seen locally temperature exceeding 200 °C that is the maximum allowable as stipulated in the Technical Specification (Section 6.2.4.2 of Rev. 2.0). Considering that this happened for a limited duration (3 min. as reported above), the layer can be used as is, under the responsibility of ASG. --- ASG shall improve the means to control the curing temperature. The operators shall pay more attention during the execution of the work. This is a quality issue to be checked by the QA-Manager.	
040524C	NC CERN 204	**2107** **02I00430**	During curing of inner layer **02I00430** regarding **CM 2107**, the temperature of the mould reached 193 °C for about 5 min. (max. nom. T=190°C)	Knowing that the temperature of the cable during curing can exceed that of the mould by 10 °C to 15 °C (as demonstrated during the curing tests with instrumented dummy coils), the above means that the cable has seen locally temperature exceeding 200 °C that is the maximum allowable as stipulated in the Technical Specification (Section 6.2.4.2 of Rev. 2.0). Considering that this happened for a limited duration (5 min. as reported above), the layer can be used as is, under the responsibility of ASG. --- ASG shall improve the means to control the curing temperature. The operators shall pay more attention during the execution of the work. This is a quality issue to be checked by the QA-Manager.	

040519B	NC CERN 205	**2079**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2079**, showed defects as described on test reports Ansaldo-SIGE nr. **04052-265: nr.2 defects** on **W1 & nr.5 defects** on **W2.** ASG will proceed with these repairs.		
040524A	NC CERN 206	**2031**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2031**, showed defects as described on test reports Ansaldo-SIGE nr. **04052-268: NO defects** on **W1 & nr.3 defects** on **W2.** ASG will proceed with these repairs.		
040608A	NC CERN 207	**2523**	Intermediate geometrical measurements performed on **CM 2523** (CM 2023 re-assembled) showed an out-of-tolerance about the distance between two holes, for the positioning of the corrector magnets, on support installed on LYRE SIDE (id. nr. 26 B): measured value=194.39mm (nom. value=194.52mm). Positions of corrector magnets are in tolerance.		**X**
040610A	NC CERN 208	**2101** **02P00403**	After collaring of **CC 2101**, electrical test showed a turn to turn short circuit on pole **02P00403** (pos. **D1-lower**).	The collared coils assembly cannot be used as is. The pole shall be repaired if possible. If repairing is not possible, then the pole shall be rejected. CERN suggested repeating the warm magnetic measurements (which, in case of sustained short, give key information for localizing better the short). These measurements have been carried out on the c.c. assembly being turned upside down and consequently the short has been seen in D2-Upper. --- Collared coils **CC 2101** have been dismantled. Electrical check has been performed on pole **02P00403** in order to find out the position of the short circuit. An interturn short circuit was found between 6th and 7th turn on I.L. **02I00406.** The layer has been repaired and electrical test performed with good result.	
/	NC CERN 209	**2523**	This document shall be used as a link to **NC CERN 81** about **CM 2023**. Please note that during re-collaring of poles into CC 2523, pole nr **02P00092** gas been installed in position **Aperture 1 – Upper Pole**.		
040610B	NC CERN 210	**2077**	Intermediate geometrical measurements performed on **CM 2077** showed an out-of-tolerance about the distance between two holes, for the positioning of the corrector magnets, on support installed on LYRE SIDE (id. nr. 29 A): measured value X(S3-S1)=194.49mm measured value X(S4-S2)=194.37mm (nom. value=194.52 ± 0.01mm). Positions of corrector magnets are in tolerance.	As the position of the corrector magnets is correct the cold mass can be used as is. --- CERN is asking ASG to make the necessary control of those components at their reception at ASG and notify their supplier about the non conformity. In case of necessity the fabrication process of the component should be revised.	
040611C	NC CERN 211	**2073**	During re-assembling of CM **2073**, we had to make an extra joint on the cable going to the bus bar (please ref. to e–mail sent by Mr.Gagliardi on 11/06/04). Joint length is 130mm about: see annexed photo and description on continuation page.	Ok for use with the extra joint. General remark: Please always remind that giving "ok" in such circumstances does not release ASG from its contractual responsibilities.	
040617A	NC CERN 212	**2085**	Intermediate geometrical measurements performed on **CM 2085** showed an out-of-tolerance about the distance between two holes, for	As the tolerance on the position of the corrector magnets is respected we propose to USE AS IS the cold mass.	

			the positioning of the corrector magnets, on support installed on LYRE SIDE (id. nr. 32 A): measured value X(S3-S1)=194.49mm measured value X(S4-S2)=194.43mm (nom. value=194.52 ± 0.01mm). Positions of corrector magnets are in tolerance.	---------- CERN ask ASG to revise the fabrication tolerances of the corrector support. Tolerances are allowed to be relaxed up to +/-0.04mm. The drawings before fabrication will be started should be submitted, as usual to approval to CERN.	
040611A	NC CERN 213	**2065**	Intermediate geometrical measurements performed on **CM 2065** showed an out-of-tolerance about the distance between two holes, for the positioning of the corrector magnets, on support installed on LYRE SIDE (id. nr. 27 A): measured value X(S4-S2)=194.48mm (nom. value=194.52 ± 0.01mm). Positions of corrector magnets are in tolerance.	As the position of the corrector magnets is correct the cold mass can be used as is.	
040629B	NC CERN 214	**2035**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2035**, showed defects as described on test reports Ansaldo-SIGE nr. **04052-268: nr.1 defect** on **W1 & nr.3 defects** on **W2.** ASG will proceed with these repairs.	Repair according to indications given in the above mentioned inspection report. Then, report on the final results.	
040629A	NC CERN 215	**2108**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2108**, showed defects as described on test reports Ansaldo-SIGE nr. **04052-285: nr.1 defect** on **W1 & NO defects** on **W2.** ASG will proceed with these repairs.	Repair according to indications given in the above mentioned inspection report. Then, report on the final results.	
040628A	NC CERN 216	**MCS-MA-E0156** **AT000156**	A visual check of MCS-sextupole corrector id. nr. **MCS-MA-E0156 (AT000156)** showed a defects on insulating material on inner surface. See annexed pictures on continuation page for details.		**X**
040628B	NC CERN 217	**2112** **02E00450**	During curing of **outer** layer **02E00450** regarding **CM 2112**, the temperature of the mould reached 196.3 °C for about 5 min. (nom. value T=192±3°C)	This can be accepted because the temperature exceeded nominal by only 1.3 °C for a very short time, 5 min. Nevertheless, the nominal temperature applies for the coil and not for the curing mould. ASG shall indicate the estimated temperature in the coil deducted from that measured in the mould. This should be possible using the data available from curing tests with the dummy coils. In reality the situation is likely worst than reported here above. ---------- This is a quality assurance issue! ASG shall reinforce and improve the control of the curing temperature.	
040628C	NC CERN 218	**2085**	Final electrical measurements performed on **CM 2085** showed a low insulation resistance between CM and ground: **R=150-200 MOhm** (nom. value R > 1000 MOhm).	After some tests, insulation problems have been detected on spool parts connections and diode. Following actions have been completed: 1) ISF capillary tube has been cut to check if low electrical resistance was caused by low insulation of wires: electrical insulation test gave us good results 2) diode box has been cut to check electrical resistance of the diode: electrical test showed a low electrical resistance of that component (id. nr. MDA0869). At the moment this diode is in stand-by and it shall be tested about insulation resistance. Diode has been changed with another one (id. nr. **MDA0891**) and diode box has been flowed with dry nitrogen to reduce the humidity rate (about 90% in the workshop) 3) Electrical insulation resistance test has been performed with good result (filename: ***CM_B_2085.xls***)	
040712A	NC CERN 219	**2091**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2091**, showed defects as described on test reports Ansaldo-SIGE nr.	Repair according to indications given in the above mentioned inspection report. Then, report on the final results.	

			04052-279: nr.1 defect on **W1 & nr.1 defect** on **W2.** ASG will proceed with these repairs.		
040712C	NC CERN 220	**MCDO-MA-I0186** **CG000186**	A visual check of MCDO-decapole corrector id. nr. **MCDO-MA-I186** showed a connecting wire cut. See annexed pictures on continuation page.		**X**
040712D	NC CERN 221	**S.s. collars** **MAL00296 – 297 – 298 - 299**	A dimensional test on different collars regarding batches nr. **MAL00296 –297 –298 -299** has been performed. About the thickness of these collars, we found values greater than usual ones: measured value=**3.21÷3.22 mm** & **3.19÷3.20 mm** on central part (theor. nom. value=**3 mm**) Then the total extra thickness of each collar pack is about **0.6÷0.8 mm**		**X**
040712B	NC CERN 222	**2084**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2084**, showed defects as described on test reports Ansaldo-SIGE nr. **04052-289: NO defects** on **W1 & nr.9 defects** on **W2.** ASG will proceed with these repairs.	Repair according to indications given in the above mentioned inspection report. Then, report on the final results.	
040708B	NC CERN 223	**2090**	Final electrical test performed on **CM 2090** showed a resistance value of Spools of Dipole D1 **886.44 mΩ** (ref. value **560÷590 mΩ**). This could be caused by a wrong connection of spools wires between M1 and M2 lines (wires inside the manifold) ---------- ASG proposal: 1) remove the manifold to check and solve the problem: in this case the length of the flange welded on the end cover will be reduced. 2) use as it is under ASG responsibility: please note that no electrical problems occurred during the test before welding of end cover, so connection of spools is correct. See also **NC CERN 140** for a similar problem and resolution.	Use as it is under ASG responsibility. CERN is asking ASG to reinforce the quality assurance and the quality control.	
040705B	NC CERN 224	**2092** **02E00369**	After collaring of **CC 2092**, electrical test showed a short circuit between **QH YT121** (serial nr. **ASGCICO-B0369**) and outer layer **02E00369** of pole **02P00367** (pos. **D1-upper**). The discharge occurred at about 2100mm from NCS.	De-collar and change the QH.	
040705A	NC CERN 225	**2073**	Final electrical measurements performed on **CM 2073** showed a short circuit between **QH YT121** and pole (pos. dipole **D1**). ASG will proceed to dismantle the cold mass and find out the problem: only after opening of CC, a precise check of the position of the QH and the pole involved will be possible.	As said above, the assembly shall be dismounted for investigations and repair. ASG shall then report on the position of the defect and describe the repairing procedure, including pictures if something is visible. ---------- ASG shall pay more attention during the reception tests of the quench heaters and during their installation in the magnet.	
040713A	NC CERN 226	**2096**	After collaring of **CC 2096**, a visual inspection of QH wires showed that QH nr. **ASGCICO-B0354** has 2 wires with wrong reference colour: wire **YT221 (+)** is **GREEN-GREY** (instead of yellow), wire **YT222 (+)** is **YELLOW** (instead of green-grey). However, the cabling (numbering and positioning) of the QH wires to the end connector has been properly made and all the required electrical check performed. Position of the QH: D2 – Upper – Right Side (CS view)	Can be used as is but there must be a warning at the beginning of the traveller and a sticker attached to the cold mass extremity to indicate clearly the mistake. **WARNING MESSAGE ON THE MAGNET**	

040804C	NC CERN 227	**2087**	Visual and dimensional check of bus bars installed on **CM 2087** showed that the bus-bar installed on M3 line (id. nr. **193 type B**) has a reduced length of the sc cable of about 10 mm (from 270 to **260 mm**). **This CM will be dismantled** **NCR to be cancelled and transferred to another CM that will be A-type !!!**	After circulation among responsible project engineers and users of the cold mass, the magnet can be used as is. There must be a clear warning/sticker on the cold mass itself to draw the attention of the user at CERN reception and further steps of the cryo-magnet preparation. --- Inform the manufacturer & supplier of the bus bars to eradicate this kind on non-conformity (action CERN project engineers). **WARNING MESSAGE ON THE MAGNET**	
040722A	NC CERN 228	**2075**	During operation of shipping of **CM 2075**, N-line tube (id. nr. **MB N-LINE 0002**) has been damaged. See annexed photos.	Exchange the N-line tube with a new one. Final pressure and leak test: shall be performed again after repairing. Electrical tests: the insulation to ground of the different circuits shall be verified (main magnet circuit, corrector magnets circuit and quench heaters circuit) after the pressure and leak test. --- New N-line tube has been installed (id.nr. **DM000510**) Leak test and final electrical test have been performed successfully after repairing.	
040804A	NC CERN 229	**2103**	Visual and dimensional check of bus bars installed on **CM 2103** showed that the bus-bar installed on M3 line (id. nr. **194 type B**) has a reduced length of the sc cable of about 10 mm (from 270 to **260 mm**).	After completion of the approval circuit of NC CERN 227 (that is exactly the same) among the responsible project engineers and users of the cold mass, we can conclude that this magnet can be used as is. There must be a clear warning/sticker on the cold mass itself to draw the attention of the user at CERN reception and at further steps of the cryo-magnet preparation. --- Inform the manufacturer & supplier of the bus bars to eradicate this kind on non-conformity (action CERN project engineers). **WARNING MESSAGE ON THE MAGNET**	
040724A	NC CERN 230	**2098** **02E00396**	After collaring of **CC 2098**, electrical test showed a short circuit between **QH YT221** (serial nr. **ASGCICO-B0382**) and outer layer **02E00396** of pole **02P00393** (pos. **D2-upper**). The discharge occurred at about 6200mm from NCS.	The assembly cannot be used as is. It shall be reworked. ASG shall describe in this document the actions undertaken to sort out the problem. --- As far as we could see during our visit at ASG in week 31, the origin of the problem may be foreign particles being trapped in between the different layers of ground insulation and quench-heaters. We strongly recommend ASG to pay more attention when mounting these quench-heaters. Once again, we shall insist on the necessity to attain and to maintain a sufficient level of cleanliness in the collared coils plant. This has been repeated on many occasions already but further efforts shall be done in this respect.	
040728A	NC CERN 231	**2087** **02P00348**	During electrical test, performed before welding of end covers on **CM 2087**, an interturn discharge occurred on pole **02P00348** (Dipole **D2-Upper**).	ASG will proceed to dismantle the CM active part and the Collared Coils. CERN shall be informed about the planning for these operations so that someone can witness and follow the inspection of the components, as deemed necessary.	
040809A	NC CERN 232	**2094**	During preparation of auxiliary bus-bars installed on M2-line, lyre side, of **CM 2094**, wire n.11 of has been cut at a reduced length of about 100 mm. See annexed pictures on continuation page.	A piece of auxiliary bus bar of the necessary length has to be added to extend the cut cable, preferably by ultrasonic welding. This repair will be carried out at CERN but ASG will have to bear the costs of it. Should the ultrasonic welding be impossible, then a conventional soldering will be done, which will affect the heat loads. ASG shall put a warning/sticker on the cold mass extremity to draw the attention of the cold mass users at CERN.	

				WARNING MESSAGE ON THE MAGNET	
040823B	NC CERN 233	**2103**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2103**, showed defects as described on test reports Ansaldo-SIGE nr. **04052-298: 3 defects** on **W1 & NO defects** on **W2.** ASG will proceed with these repairs.	Repair according to indications given in the above mentioned inspection report. Then, report on the final results.	
040823B	NC CERN 234	**2088**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2088**, showed defects as described on test reports Ansaldo-SIGE nr. **04052-305: NO defects** on **W1 & 1 defects** on **W2.** ASG will proceed with these repairs.	Repair according to indications given in the above mentioned inspection report. Then, report on the final results.	
040908A	NC CERN 235	**2092** **MCDO-MA-I0431**	During electrical test performed before welding of end covers on **CM 2092**, an discharge occurred between octupole/decapole corrector magnet (on Apt.1) and ground. Corrector magnet id nr. **MCDO-MA-I0431.**	Corrector magnet id nr. **MCDO-MA-I0431** has been dismantled from CM and will be sent to CERN for inspection. A new corrector magnet has been installed on **CM 2092**: id. nr. **MCDO-MA-I0427**	
040901A	NC CERN 236	**2125** **02E00502**	During curing of **outer** layer **02E00502** regarding **CM 2125**, the temperature of the mould reached **140°C** about , because of a general failure of the heating system (nominal value T=192±3°C).	A restart of the control system was necessary. ASG, in agreement with CERN, propose to cure again the outer layer.	
040914A	NC CERN 237	**2096**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2096**, showed defects as described on test reports Ansaldo-SIGE nr. **04052-302 & 306: nr.3 defects** on **W1 & NO defects** on **W2.** ASG will proceed with the repair.	Repair according to indications given in the above mentioned inspection report. Then, report on the final results.	
040916A	NC CERN 238	**2130**	After curing, a visual check of **inner layer** nr. **02I00524** for **CM 2130**, showed a piece polyimide foil, coming from protection sheet of winding mandrel, glued between the last turn and the end spacer on NCS. For details, please look at the annexed pictures on continuation page.	ASG propose to cut the extra material about this small piece of polyimide during finishing operation of coil heads.	
040917A	NC CERN 239	**2532 (2032)**	Cold mass **2032** has been rejected by CERN for inter-turn short circuit during the cold tests at CERN. **CC 2032** has been dismantled and electrical test performed on inner layer **02I00129** (dipole **D1** – Lower Pole **02P00126**) to find out the right position of the discharge (see attahed photos about the position simulated on a different layer). ASG, in agreement with CERN, decided to reject the defective pole 02P00126 and also pole 02P00128 for different defects. New layers manufactured: 02E0131, 02I0131, 02E0129 New poles installed on CM 2532: **02P30126** and **02P30128** This CM has been disassembled and re-assembled as **CM 2532**.	CC and CM re-assembling completed successfully.	
040920A	NC CERN 240	**2114**	During rotation of **CC 2114** on rotating bench, the CC felt down from the wheels to the bench plane. After a visual inspection, no evident damages have been detected. See annexed pictures.	ASG propose to perform electrical check, magnetic measurements and dimensional check of inner diameter of cold bore tubes with "go-no-go" gauge.	
040922A	NC CERN 241	**Cold bore tubes**	Dimensional measurements of cold bore tubes nr. **MB-CBT-1153 -1155 -1158 -1375 -1378 -1379 -1382 -1383 -1386 -1387 -1388 -1389 -1391 -1392 -1393 -1394 -1395** showed out of tolerance about inner diameter (nom. value **50.0 ± 0.35 mm**). The "go-no-go" gauge (**D=49.65mm, L=80mm**) cannot enter the c.b.t. for the whole length.	Repair according to indications given in the above mentioned inspection report. Then, report on the final results.	**X**
	NC CERN 242	**2109**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2109**, showed defects as described on test reports Ansaldo-SIGE nr. **04052-311: nr.2 defects** on **W1 & nr.2 defects** on **W2.** ASG will proceed with the repair.	Repair according to indications given in the above mentioned inspection report. Then, report on the final results.	

040927A	NC CERN 243	**2119**	After collaring of **CC 2119**, electrical test showed a short circuit between **QH YT121** (serial nr. **ASGCICO-A0423**) and outer layer **02E00478** of pole **02P00475** (pos. **D1-lower**). The discharge occurred at about 7200mm from NCS.	ASG will proceed to open the CC and to repair the QH insulation. --- ASG shall try to identify the cause of such failure because it is happening too frequently. • What about cleanliness in the collared coils assembly hall at ASG? • What about cleanliness at the premises of the manufacturer of the quench heaters? Could this be related to the production of the poles or ground insulation?	
040927B	NC CERN 244	**2124**	After collaring of **CC 2124**, electrical test showed a short circuit between **QH YT111** (serial nr. **ASGCICO-B0446**) and outer layer **02E00498** of pole **02P00495** (pos. **D1-lower**). The discharge occurred at about 6700mm from NCS.	The collared coils cannot be used as is. ASG shall proceed to opening of the C.C. and to repairing of the QH insulation. --- ASG shall try to identify the cause of such failure because it is happening too frequently. • What about cleanliness in the collared coils assembly hall at ASG? • What about cleanliness at the premises of the manufacturer of the quench heaters? Could this be related to the production of the poles or ground insulation?	
	NC CERN 245	**2111**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2111**, showed defects as described on test reports Ansaldo-SIGE nr. **04052-312: nr.4 defects** on **W1 & nr.4 defects** on **W2.** ASG will proceed with the repair.	Repair according to indications given in the above mentioned inspection report. Then, report on the final results.	
041004A	NC CERN 246 rev1	**2113**	During electrical test performed before welding of end covers on CM **2113**, an open circuit of temperature sensor **TT821** (serial nr. **CX_LS_X20770**) has been detected.	The electrical circuit of the affected temperature sensor shall be left in place but the wires shall be cut to reasonable length and their extremity properly insulated. A new temperature sensor shall be put in place, fixed to the end plate. One shall follow the instructions given by CERN when the same repair had to be done on the magnet 2006. --- CERN reminds ANSALDO to follow strictly the "Installation Procedure" entitled "Pre-series MBA – MBB Cold Mass Instrumentation", Rev.3 dated September 2002 (doc. Ref. LHC-MMS-GB/5837) by G.Brun. --- A new temperature sensor (serial nr. **CX_LS_X18432**) has been installed on the end plate	
	NC CERN 247	**2116**	During preparation of electrical connection on M3 line, regarding **CM 2116**, the sc cable has been cut at a reduced length of **20 mm**. See annexed pictures on continuation page.	ASG repairing proposal: a) move the stiffening Cu bar of 20 mm with respect to the standard position (inward the cold mass), in order to maintain the total length of the electrical connection (nom. 120 mm) b) soldering of electrical connection according to standard procedure See annexed pictures on continuation page and ASG proposal about repairing procedure. --- Repairing procedure accepted by CERN on the condition that the transposition pitch can be respected (the connection is temporary for the power tests at cold, then the connection will be de-soldered during the magnet stripping, meaning preparation for the interconnection in the tunnel).	

041005A	NC CERN 248	**2112 MCS-MA-E0081**	During electrical test performed before welding of end covers on **CM 2112**, a wrong value of the electrical resistance of sextupole corrector magnet has been measured (after HV test on cold mass). Corrector magnet id nr. **MCS-MA-E0081** (installed on Apt.1) Measured values: **R=181mΩ** with aux bus-bars connected (ref. value R=199mΩ on sextupole on Apt.2) R=**78mΩ** with AUX BUS BARS disconnected (ref. value R=m94Ω on acceptance test in ASG)	Corrector magnet id nr. **MCS-MA-E0081** has been dismantled from CM and will be sent to CERN for inspection. A new corrector magnet has been installed on **CM 2112**: id. nr. **MCS-MA-E0871**	
041011A	NC CERN 249	**2114**	During final electrical test performed at **1.5 kV** on **CM 2114**, a low insulation resistance value has been detected between **Bus Aux.+Spools** and **ground** (bus nr. 18 & 19): measured value **R=0.1 MOhm** at 0.1 kV (nom. R>1000 MOhm at 1.5 kV) In order to find out the cause of the problem, we disconnected aux. bus-bars nr. 17 & 20. A carefull check of all the connections, showed low insulation resistance between spool aux. bus-bars (**bus nr. 19/20** and **V-Tap EE931**) and ground Spool id. nr. **MCS-MA-E0102** installed on Apt.2	ASG propose to cut the weld of the capillary tube to detect exactly where is the weak point? This was done and it turned out that the problem is rather linked to the sextupole magnet. Therefore, the end cover shall be cut off for further investigations (change the corrector magnet if it is indeed the cause of the problem). CERN wants to be present during the execution of the tests after the end cover removal. ASG to notify CERN in due time for the travel organization.	
041009A	NC CERN 250	**2121**	After collaring of **CC 2121**, high energy discharge test on QHs burn a s.s. strip near the "omega" piece connection on NCS. Position: **D2-UPPER**, strip **YT221+** (QH id nr. **ASG-CICO-B0482**) See annexed photos.	After having informed CERN representatives, ASG proceeded with the repairing of the QH by soldering a new s.s. strip to the old one. Soldering deoxidizing agent: **FONTARGEN F600/611 COL** (non-corrosive agent) Soldering alloy**: Sn95-Ag5** A soldering test was performed before QH repairing: a peeling mechanical test has been performed with very good results and the sample of this test is available in ASG. Final contractual electrical test has been performed and discharge test repeated at 850V according to CERN specification. --- Proposal of ASG: After having informed CERN representatives, ASG proceeded with the repairing of the QH by soldering a new s.s. strip to the old one. Soldering deoxidizing agent: **FONTARGEN F600/611 COL** (non-corrosive agent) Soldering alloy**: Sn95-Ag5** A soldering test was performed before QH repairing: a peeling mechanical test has been performed with very good results and the sample of this test is available in ASG. Final contractual electrical test has been performed and discharge test repeated at 850V according to CERN specification. --- Final decision of CERN: Although the test results after the repair of the quench heater are satisfactory, the assembly cannot be used as is and shall be re-worked, meaning that the collared coils assembly shall be re-opened and the quench heaters replaced like it has been done so far in such case of failure. The quench heater is a key item: it protects the magnet during the machine operation at cold. Nothing proves that a repaired quench heater can do the job properly and can withstand the operating conditions (mechanical and electrical loads at cold, transients, …). A key parameter is also the electrical resistance of the quench heater circuit at cold. Comprehensive tests were carried out at CERN to qualify the raw	

				material for the metal strip (in particular the RRR is concerned). Nothing proves that an additional joint satisfies the requirements stipulated for the base metal. Therefore, the assembly shall be re-done!	
041014A	NC CERN 251	**S.s. collars MAL 00203**	A visual check of different collars regarding batches nr. **MAL00181 & MAL00203** showed burr along the inner shape. ASG decided not to use these collars and to reject them.		**X**
041018A	NC CERN 252	**2118 MCS-MA-E0324**	During electrical test at 1.5 kV, performed before welding of end covers on **CM 2118**, a low insulation resistance to ground has been measured on corrector magnet **MCS-MA-E0324.** Measured values: leakage current **I=10μA** (nom. value **2μA**) Corrector magnet has been disinstalled from CM and tested again: the same value of leakage current (10μA) was found. ---------- Corrector magnet id nr. **MCS-MA- E0324**has been dismantled from CM and will be sent to CERN for inspection. A new corrector magnet has been installed on **CM 2118** Apt.2: id. nr. **MCS-MA-E0709**	Corrector magnet id nr. **MCS-MA- E0324** has been dismantled from CM and will be sent to CERN for inspection. A new corrector magnet has been installed on **CM 2118** Apt.2: id. nr. **MCS-MA-E0709** **----------** CERN will make investigation on the problem together with our colleagues AT MEL.	
041025A	NC CERN 253	**2117 MCS-MA-E0297; MCS-MA-E0298; MCDO-MA-E0028**	During electrical test at 1.5 kV, performed before welding of end covers on **CM 2117**, a low insulation resistance to ground has been measured on different corrector magnets id nr. **MCS-MA-E0297; MCS-MA-E0298; MCDO-MA-E0028** Measured leakage current: **I=13μA** (nom. value **2μA**) Corrector magnet has been disinstalled from CM and tested again: the following values of leakage current have been found: ➢ **I=13.3 μA** on **MCS-MA-E0297** ➢ **I=8.6 μA** on **MCS-MA- E0298** ➢ **I=6.05 μA** on **MCDO-MA-E0028**	Corrector magnets dismantled from CM, will be sent to CERN for inspection. The following corrector magnets have been installed on **CM 2117**: **MCS-MA-E0812**; **MCS-MA-E0901**; **MCDO-MA-E0138** ---------- The insulation problem seems to be linked to the high rate of humidity in the assembly hole. A visit of MEL was effectuated in ASG to verify the measuring procedures. The magnets will be tested at CERN. Actions from MEL side are under study.	
041025B	NC CERN 254	**2124 MCDO-MA-E0059**	During electrical test at 1.5 kV, performed before welding of end covers on **CM 2124**, a low insulation resistance to ground has been measured on corrector magnet **MCDO-MA-E0059.** Measured values: leakage current **I=9 μA** (nom. value **2μA**) Corrector magnet has been disinstalled from CM and tested again: a leakage current of **6 μA** was found.	Corrector magnet id nr. **MCDO-MA-E0059** has been dismantled from CM and will be sent to CERN for inspection. A new corrector magnet has been installed on **CM 2124** Apt.1: id. nr. **MCDO-MA-E0142** **----------** The actions to be taken are under study at CERN (MEL) after the visit of MEL in ASG on week 44.	
041028A	NC CERN 255	**2118**	Final electrical measurements, performed on **CM 2118,** showed a short circuit between poles and ground during HV test at 1.5 kV ASG proceed to cut the capillary tube and separate the tube from cold mass to find out the problem: electrical test at 5 kV showed a short circuit between poles V-taps and capillary tube.	Capillary tube and wires will be cut and removed from cold mass. A new capillary tube with wires will be prepared and installed on CM. Connection of each wire will be made by soldering with 20mm of wire overlapping and wrapping with polyimide tape: a final protection of each connection will be made by a thermoplastic tube. Electrical test will be performed after assembling of capillary tube. ---------- ASG should document the results with electrical checks and photos showing the main stages of the repair. ASG can close the NC only having all this information attached to this document. A repair procedure should be made and send to CERN for approval. ---------- Repairing operations have been performed according to ASG doc. nr. 400RM10402 "*Procedura per la sostituzione del tubo capillare IFS*". Main items of that process are:	

				1) preparation of a new capillary tube with connecting wires inside 2) on each wire, insert of a connector using a special tool (courtesy CERN) 3) connection of the end of two wires (connectors) with a square cross-section connecting piece and soldering 4) insulation of the connection with a small polyimide tube and two thermoplastic tube 5) insert of wires through the polyethylene flange 6) shaping of capillary tube 7) welding of capillary tube on cold mass assembly Electrical test has been performed with good results.	
041105	NC CERN 256	**2134**	After collaring of **CC 2134**, electrical test showed a short circuit between • **QH YT221** (**ASGCICO-A0470**) and outer layer **02E00540** of pole **02P00537** (**D2-lower**) at 13477mm from NCS • **QH YT111** (**ASGCICO-A0490**) and outer layer **02E00538** of pole **02P00535** (**D1-lower**) at 3200mm from NCS	ASG will proceed to open the C.C. and change all the necessary components (quench heaters, coils protection sheets, ground insulation, cold bore tubes). --- Components changed: quench heaters, coils protection sheets, ground insulation Cold bore tubes has been checked with go-no-go gauge then not changed.	
041116B	NC CERN 257	**2136**	After curing, a visual check of **inner layer** nr. **02I00545** for **CM 2136**, showed a strand out of position in the Rutherford cable.	ASG proceeded to put the strand in the right position, after removing the G11 filler. ASG should document this repair action. --- Repair completed: electrical insulation test performed successfully. No pictures available.	
041116B	NC CERN 258	**2136**	After curing, a visual check of **inner layer** nr. **02I00546** for **CM 2136**, showed a strand out of position in the Rutherford cable. Cable id. nr. **01E00140A**	ASG proceeded to put the strand in the right position, after removing the G11 filler. ASG should document this repair action. --- Repair completed: electrical insulation test performed successfully. No pictures available.	
041116B	NC CERN 259	**2136**	After curing, a visual check of **inner layer** nr. **02I00547** for **CM 2136**, showed a strand out of position in the Rutherford cable, near NCS. Cable id. nr. **01E00140C**	ASG proceeded to put the strand in the right position, after removing the G11 filler. ASG should document this repair action. --- Repair completed: electrical insulation test performed successfully. No pictures available.	
041116B	NC CERN 260	**2136**	After curing, a visual check of **inner layer** nr. **02I00548** for **CM 2136**, showed a strand out of position in the Rutherford cable, near NCS. Cable id. nr. **01E00140B**	ASG proceeded to put the strand in the right position, after removing the G11 filler. ASG should document this repair action. --- Repair completed: electrical insulation test performed successfully. See pictures below for details.	
041116C	NC CERN 261	**2137**	After curing, a visual check of **inner layer** nr. **02I00551** for **CM 2137**, showed a strand out of position in the Rutherford cable, near NCS. Cable id. nr. **01E00146I**	ASG proceeded to put the strand in the right position, after removing the G11 filler.	
041116D	NC CERN 262	**2140**	After curing, a visual check of **inner layer** nr. **02I00562** for **CM 2140**, showed a strand out of position in the Rutherford cable, near NCS. Cable id. nr. **01E00076J**	ASG proceeded to put the strand in the right position, after removing the G11 filler. Please add pictures showing the defect before repair and then showing the affected zone after repair (if available). ASG shall reinforce attention and control during the winding operation, which is to be carried out with great care.	

041116E	NC CERN 263	**2143**	After curing, a visual check of **inner layer** nr. **02I00573** for **CM 2143**, showed a strand out of position in the Rutherford cable, near NCS. Cable id. nr. **01E00141D**	ASG proceeded to put the strand in the right position, after removing the G11 filler. Please add pictures if there are ones available.	
041117A	NC CERN 264	**2138**	During winding of **inner layer** nr. **02I00555** (sc cable nr. **01E00076C**) for **CM 2138**, a visual inspection showed two strands out of position in the Rutherford cable.	ASG put the strands in their right position and proceeded with winding operation. ASG put the strands in their right position and proceeded with winding operation. Please specify in the NCR the location of the problem/repair. ---------- Strands put in their right position (problem detected on NCS near end spacer)	
041116A	NC CERN 265	**2125**	Final electrical measurements, performed on **CM 2125,** showed low insulation resistance on correctors magnets (spools). Measured value: **R=40 MΩ** at V=1kV (nom. value R>1000 MΩ)	ASG decided to dismantle the manifold to separate the wires and find out the problem. The problem was probably caused by a bad insulation of a G11 piece: we cleaned this component and we re-assembled the manifold. Flanges on M-lines will be changed with new ones, taking care of aligning them properly. ---------- Final electrical test performed successfully. Remarks: the electrical problem wasn't related to low insulation resistance of corrector magnets, but to a possible low insulation of a G11 piece.	
041127C	NC CERN 266	**2130**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2130**, showed defects as described on test reports Ansaldo-SIGE nr. **04052-333: NO defects** on **W1 & n.1 defect** on **W2.** ASG will proceed with these repairs.	Repair according to indications given in the above mentioned inspection report. Then, report on the final results.	
041127A	NC CERN 267	**2137**	During electrical check of bus-bar nr. **B-360** (id. nr. **HCDCBHA056-BI000360**) just before longitudinal welding of **CM 2137**, a low insulation resistance has been found. Cause of this problem seems to be high humidity / water, get during transport of bus-bars. Same problem we found on bus bars regarding set nr. from A-336 to A-345 and from B-351 to B-360 (ref to NC CERN 268)	ASG proceed to dismantle the cold mass active part (not already welded)	
041127A	NC CERN 268	**bus-bars from nr. A-336 to A-345 and from nr. B-351 to B-360**	During incoming inspection of bus-bars **from nr. A-336 to A-345** and **from nr. B-351 to B-360**, we found water inside the bus bur assembly. Cause of this problem seems to be related to a bad storage or packaging during transport.		**X**
041202A	NC CERN 269	**2154 02I00617**	Electrical test after curing, performed on **inner layer** nr. **02I00617** for **CM 2154,** showed a short circuit between 1st and 2nd turns on NCS. A visual inspection of these turns showed that the problem was caused by a strand out of its position in the Rutherford cable (cable id. nr. **01E00127A**) Besides the sc cable was found very soft because of a low tension during cabling process. For details, please look at the annexed pictures on continuation page. Please note also the mark on the filler demonstrating that the strand wasn't damaged because it's harder that the filler material.	ASG is proposing to put the strand in the right position inside the Rutherford cable and restore the insulation. See annexed picture for details after re-positioning of that strand. ---------- ASG should make an effort to localise such problem during the winding or at least before the curing. The performance of the magnet: electrical or training, remains entirely responsibility of ASG.	

041207B	NC CERN 270	**2133**	During final assembling operation of **CM 2133**, wire regarding QH YT111+ showed a reduced length. This was found looking at he wires coming out of the cold head (extremity of the IFS line), after the insertion of all the wires inside the capillary tube.	In order to connect all the wires to the "flat" connector and to perform the final electrical test, ASG decided to increase the length of that wire by soldering a wire of the same type.	
041209A	NC CERN 271	**2148**	After collaring of **CC 2148**, a visual inspection of QH wires showed that QH nr. **ASGCICO-B0576** has 2 wires with wrong reference colour: wire **YT121 (+)** is **GREEN-GREY** (instead of yellow), wire **YT122 (+)** is **YELLOW** (instead of green-grey). However, the cabling (numbering and positioning) of the QH wires to the end connector has been properly made and all the required electrical check performed. Position of the QH: D1 – Upper – Right Side (CS view)	Can be used as is but there must be a warning at the beginning of the traveller and a sticker attached to the cold mass extremity to indicate clearly the mistake. ---------- ASG QC Team will push CICOREL and ASG personnel, involved in CC assembling, to pay more attention to prevent such a mistake.	
041209B	NC CERN 272	**2141**	During electrical test performed before welding of end covers on CM **2141**, an open circuit of temperature sensor **TT821** (serial nr. **CX_LS_X18445**) has been detected.	The electrical circuit of the affected temperature sensor shall be left in place but the wires shall be cut to reasonable length and their extremity properly insulated. A new temperature sensor shall be put in place, fixed to the end plate. One shall follow the instructions given by CERN about same repair already done on other magnets. Refer to "Installation Procedure" entitled "Pre-series MBA – MBB Cold Mass Instrumentation", Rev.3 dated September 2002 (doc. Ref. LHC-MMS-GB/5837) by G.Brun. ---------- A new temperature sensor (serial nr. **CX_LS_X18432**) has been installed on the end plate	
041214A	NC CERN 273	**2158** **02I00617**	During curing of **inner** layer **02I00634**regarding **CM 2158**, the temperature of the mould reached **160°C** about , because of a failure of a control valve of the heating system (nominal value T=192±3°C).	ASG proceeded to change the control valve and to restart the curing press. ASG, informed CERN, that they proceeded to cure again the inner layer. ---------- THE CONDITION TO BE RECURABLE THIS COIL WAS THAT the mould was closed when the curing was stopped. The responsibility of a good performance of the magnet that contains this layer remains entirely of ASG.	
041215A	NC CERN 274	**2148**	After collaring of **CC 2148**, electrical test showed a short circuit between **QH YT211** (**ASGCICO-B0572**) and outer layer **02E00596** of pole **02P00593** (**D2-lower**).	ASG will proceed to open the C.C. and change all the necessary components (quench heaters, coils protection sheets, ground insulation, cold bore tubes). ---------- All the necessary components have been changed. CC 2148 has been re-collared and electrical test performed successfully.	
041220A	NC CERN 275	**2140**	During electrical check of bus-bar nr. **B-358** (id. nr. **HCDCBHA056-BI000358**), before welding of end covers on **CM 2140**, a low insulation resistance between bars has been found. Measured insulation resistance **R=24M**□ (nom. value R>1000 M□) All the electrical tests performed before longitudinal welding were OK: measured insulation resistance better than 1000 M□□ On 09/12/04 CERN personnel, Mr. Perinet-Marquet and Mr. Urpin, made an adjustment of the ends of the bus-bars. On 17/12/04 the electrical check showed low insulation resistance between bars: this problem has been also checked by Mr. Perinet-Marquet and Mr. Urpin.	ASG action is to flow the bus-bars with dry nitrogen and heat that bars with electrical current, waiting for an increasing of the insulation resistance. ASG is also waiting for an alternative proposal from CERN. ---------- ASG should go ahead in case of good resistance after dry with nitrogen. ---------- Electrical test completed successfully: please refer to data file "CM_B_2140.xls"	

041222A	NC CERN 276	**2150**	After collaring of **CC 2150**, a visual inspection of QH wires showed that QH nr. **ASGCICO-B0563** has 2 wires with wrong reference colour: wire **YT121 (+)** is **GREEN-GREY** (instead of yellow), wire **YT122 (+)** is **YELLOW** (instead of green-grey). However, the cabling (numbering and positioning) of the QH wires to the end connector has been properly made and all the required electrical check performed.	Can be used as is but there must be a warning at the beginning of the traveller and a sticker attached to the cold mass extremity to indicate clearly the mistake. --- ASG QC Team will push CICOREL and ASG personnel, involved in CC assembling, to pay more attention to prevent such a mistake. **NC critical to be closed by CERN at reception**	
2005					
050103A	NC CERN 277	**2158**	Electrical test on **pole** nr. **02P00630** with ends under pressure (**CM 2158**), showed a short circuit between 3rd and 4th turns of inner layer nr. **02I00633** on NCS. A visual inspection of these turns showed that the problem was caused by a strand out of its position in the Rutherford cable (cable id. nr. **01E00163D**).	ASG tried to repair the fault, but a strand was damaged (see annexed picture on continuation page) Then ASG is proposing to reject the inner layer. A new layer will be manufactured using a new cable supplied by CERN. --- A new layer id. nr. **02I30633** has been manufactured (sc cable nr. **01E00198K**)	
050111B	NC CERN 278	**2145**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2145**, showed defects as described on test reports Ansaldo-SIGE nr. **04052-353: n.1 defect** on **W1 & n.1 defect** on **W2.** ASG will proceed with these repairs.	Repair according to indications given in the above mentioned inspection report. Then, report on the final results.	
050112A	NC CERN 279	**2156**	After collaring of **CC 2156**, a visual inspection of QH wires showed that QH nr. **ASGCICO-B0610** has 2 wires with wrong reference colour: wire **YT111 (-)** is **GREEN-GREY** (instead of yellow), wire **YT112 (-)** is **YELLOW** (instead of green-grey). However, the cabling (numbering and positioning) of the QH wires to the end connector has been properly made and all the required electrical check performed.	The magnet should be send with a clear indication of the NC and the Nc will be closed at CERN. --- ASG should check at the incoming of the QH the cabling and refuse the QH with this or other type of NC. **TO BE CLOSED AT CERN**	**?**
050224A	NC CERN 280	**2182** **02C0136A**	Just before winding of **inner layer** nr. **02E00731** (sc cable nr. **02C00136A**) for **CM 2182**, a visual inspection showed a strand out of its position in the Rutherford cable. This strand goes out every100mm along the first meter of the Rutherford cable and it shows a different colour w.r.t. the others. See annexed pictures.	ASG put the strands in their right position and proceeded with winding operation.	
050216A	NC CERN 281	**2178** **02C00168E**	During winding of **inner layer** nr. **02E00716** (sc cable nr. **02C00168E**) for **CM 2178**, a visual inspection showed some strands out of position in the Rutherford cable. We found these defects on the first 2m. of the cable and we cut it away: then we continued winding, but after 7 turns from start the defect occurred again.	The E-modulus measurements and the electrical measurements have not revealed anomalies. Therefore, one can proceed further with this layer 02E00716. Electrical integrity shall be checked carefully after collaring.	
050307A	NC CERN 282	**2153**	Final electrical measurements, performed on **CM 2153,** showed a short circuit between QH wire **YT221** and **ground** during HV test at **5 kV.** ASG proceed to cut the capillary tube and separate the tube from cold mass to find out the problem: electrical test with *Megger* instrument, showed a short circuit between QH connection and capillary tube.	Capillary tube and wires will be cut and removed from cold mass. A new capillary tube with wires will be prepared and installed on CM. Connection of each wire will be made by soldering with 20mm of wire overlapping and wrapping with polyimide tape: a final protection of each connection will be made by a thermoplastic tube. Electrical test will be performed after assembling of capillary tube.	
050307B	NC CERN 283 rev1	**2169**	During electrical test performed before welding of end covers on **CM 2169**, an open circuit of temperature sensor **TT821** (serial nr. **CX_LS_ X17154**) has been detected.	The electrical circuit of the affected temperature sensor shall be left in place but the wires shall be cut to reasonable length and their extremity properly insulated. A new temperature sensor shall be put in place, fixed to the end plate. One shall follow the instructions given by CERN about same repair	

				already done on other magnets. Refer to "Installation Procedure" entitled "Pre-series MBA – MBB Cold Mass Instrumentation", Rev.3 dated September 2002 (doc. Ref. LHC-MMS-GB/5837) by G. Brun. --- A new temperature sensor (serial nr. **CX_LS_ X20606**) has been installed on the end plate	
050203A	NC CERN 284	**2184** **02C00145A**	During winding of **outer layer** nr. **02E00740** (sc cable nr. **02C00145A**) for **CM 2184**, a visual inspection showed the cross-section of the Rutherford cable completely buckled, at about **500 m** from the start, on **400 mm** length, on 16th turn. This defect was already detected by SELVA during wrapping operation (In fact, during our meeting at ASG on March 1st 2005 in the morning, Mr. Chigorno could not really confirm whether the defect observed at Selva was exactly like what we could see in ASG: cable buckling, or whether it was simply strand pop-out. We asked Mr. Chigorno to check further the possible cause of this incident and the manufacturing step at which it has occurred).	In agreement with CERN, ASG decided to stop the winding operation and to rewind the cable on its spool. The cable is rejected and sent back to CERN. A replacement cable will be delivered to ASG.	
050316A	NC CERN 285 rev1	**2163**	During welding of flare diam=53 / 82 ("collarette" – dwg. nr. LHBMB__S0121 P.1) on c.b.t of **V1-line**, Lyre side, the weld passed through the c.b.t. See annexed picture, on continuation page, for details.	The cold mass was delivered to CERN on April 28th, 2005. Radiographs of the cold bore tube to collar flange fillet weld in V1 and V2 were carried out on May 12th, 2005. The test report "Affaire 3137" dated 20.05.05 entitled "Dipole Ansaldo A001/0200163" reports longitudinal, transversal and branching cracks. Because the radiologist of ASG (company SIGE Quality Service S.r.l.) did not agree on the interpretation of the com pany Control AJC International (AJC), we organized a visit at the Istituto Italiano Della Saldatura (IIS) in Genoa which acted as a third party to examine the radiographs. The experts of the IIS have interpreted the defects as follows (see also the test reports Job 11575 Film N° 163 W1-A, Film N° 163 W1-B, Film N° 163 W2-A and Film N° 163 W2-F): • W1-A: narrow elongated indication, transversal, in the heat affected zone; • W1-B: 2 narrow elongated parallel indications in the welded metal (of the order of 1 mm each as measured during the meeting at the IIS); • W2-B: narrow elongated indication, transversal, in the welded metal; • W2-F: narrow elongated indication, transversal, in the welded metal, close to a film defect. Although the interpretations are different (those of the IIS are certainly more cautious or prudent), the presence of the indications has been confirmed. Therefore, the welds cannot be accepted as is. The cold mass will be returned to ASG premises. The repair procedure shall be agreed upon together with CERN.	
030521A	NC CERN 286	**2159**	After using the expansion tooling to correct c.b.t. inner diameter on V1-line, a defect occurred on inner surface. Maybe this defect is related to the welding process or to a defect of	The cold mass was delivered to CERN on May 4th, 2005. Radiographs of the cold bore tube to collar flange fillet weld in V1 were carried out on May 11th, 2005.	

			base material on c.b.t. The defect was not visible immediately after welding and it could be later revealed by the mechanical action of the expansion tooling. See pictures, on continuation page, for details.	The test report "Affaire 3137" dated 20.05.05 entitled "Dipole Ansaldo A001/0200159" reports a longitudinal crack at the vicinity, i.e. just behind, of the defect visible on the internal surface. Because the radiologist of ASG (company SIGE Quality Service S.r.l.) did not agree on the interpretation of the company Control AJC International (AJC), we organized a visit at the Istituto Italiano Della Saldatura (IIS) in Genoa which acted as a third party to examine the radiographs. The experts of the IIS have interpreted the defect as an inclusion of oxides (see also the test report Job 11575 Film N° 159 A) rather than a crack. During the visit at the ISS we could measure the length of the defect with a lens and a micrometer: it is of the order of 2.2 mm. Whatever interpretation, crack or inclusion of oxides of 2.2 mm, the defect is not acceptable. Therefore, the cold bore tube to fillet weld of V1 shall be repaired. The cold mass will be sent back to ASG premises. The repair procedure shall be agreed upon together with CERN.	
050321B	NC CERN 287	**2160**	During leak test on **CM 2160**, a leak has been detected on a flange of the manifold M2-line. This was caused by a defect on the weld of the flange (weld id. nr. W38 - dwg. nr. LHCMB__S0268). Then the weld defect was removed, but the length of the flange was reduced to 6mm (nom. 9mm) See schematic dwg. on continuation page.	The cold mass cannot be delivered to CERN "as is". With the 6-mm remaining, the flange will be definitely too short after the cold mass stripping at CERN. A new flange shall be installed. Then, the cold mass shall be re-checked for pressure and leak tightness and the final electrical checks repeated. ASG shall communicate to CERN the repairing sequence including all steps of disassembly, reconstruction and testing prior to proceed with the execution of the work.	
050321C	NC CERN 288	**2198** **02I00796**	A visual inspection of sc cable nr. **01B10825A** for **CM 2198**, **inner layer 02I00796** showed a strand out of its position in the Rutherford cable. This strand goes out every100mm along first 2m of the Rutherford cable (see annexed pictures). We checked only end of cable and, at the moment, we cannot know the status of the whole length of the cable. it will be carefully checked during winding.	ASG will proceed with winding operation paying attention in winding, in particular during each turn of the layer.	
050322A	NC CERN 289	**2167**	During electrical test performed before welding of end covers on **CM 2167**, a swap of wires of V-taps has been detected. This means that wires about V-taps **EE012** & **EE013** have reversed colours: • wire about **EE012** is **BROWN** instead of red • wire about **EE013** is **RED** instead of brown However, the identification of wires is correct.	ASG should make more attention to avoid this type of errors. The quality control and maybe the quality assurance should be reviewed and reported the necessary changes to CERN. This NCR will be closed only after all electrical tests performed at CERN. ASG should clearly indicate that this magnet is non conform by a red sticker on the magnet. **CLOSED BY CERN AT RECEPTION**	
050325A	NC CERN 290	**2186**	Electrical test on **pole** nr. **02P00743** with ends under pressure (**CM 2186**), showed a short circuit between 7th and 8th turn of inner layer nr. **02I00746** on CS. Cable id. nr. **01B10811A.** See annexed pictures.	ASG is proposing to reject the inner layer. A new layer will be manufactured using a new cable supplied by CERN. --- New layer manufactured: **02I30746** (sc cable id. nr. **01B10893F**)	
050329B	NC CERN 291	**MCS-MA-E0264**	A visual check of MCS-sextupole corrector id. nr. **MCS-MA-E0264 (AT000264)** showed a defects on insulating material on inner surface. See annexed pictures on continuation page for details.		**X**

050406A	NC CERN 292	**2204**	During visual inspection (reception of cables from Selva) some strands showed low cabling tension on first meters: cable id. nr. **02C00182A** for **CM 2204.** We checked only the end of cable: so, at the moment, we cannot know the status along the whole length of the cable. It will be carefully checked during winding.	ASG will proceeded with winding operation paying attention in winding, in particular during each turn of the layer. Outer Layer id. nr. **02E00820**	
050406B	NC CERN 293	**2196**	During winding of **outer layer** nr. **02E00787** (sc cable nr. **02C00110B**) for **CM 2196**, a visual inspection showed a strand out of position in the Rutherford cable. (see annexed pictures)	Cable insulation has been removed and the strand re-positioned using proper tools made of nylon. Then insulation has been restored. ASG will proceed with winding operation paying attention in winding, in particular during each turn of the layer. CERN comment: repair carried out under the full responsibility of ASG.	
050413A	NC CERN 294	**2198**	At the end of winding of **inner layer** nr. **02I00794** (sc cable nr. **01B10828A**) for **CM 2198**, a visual inspection showed a strand cut and another one out of its position in the Rutherford cable. These defects are on CS. (see annexed pictures)	This layer has to be put aside for the time being. CERN personnel will inspect the cable during visit in ASG. --- New cable id. nr. = **01B10867A**. New I.L. id nr. = **02I30794**	
050419A	NC CERN 295	**2024**	At reception from CERN of **CM 2024**, final electrical measurements showed an open circuit on wiring of cryogenic heater (wire id. EH821).	The question has been checked with colleagues at CERN AT-ACR (please refer to the e-mail reproduced below). The cold mass can be used as is. It must be seen as an exceptional case. The description on the non conformity here above is not totally correct because the final electrical measurements were not carried out "at reception from CERN" but following months of storage in Genoa at ASG premises	
050426A	NC CERN 296	**2206**	During winding of **inner layer** nr. **02I00828** (sc cable nr. **01B10868B**) for **CM 2206**, a problem occurred on winding machine and the cable twisted along 12 m about. (see annexed pictures)	ASG personnel removed the very bad first 6.5 meters and tried to adjust the cable. Repair was successfully completed, but ASG was afraid to continue winding. Then we decided to send the cable back to Selva and to re-wind it so that the twisted cable will be out of the coil (or in the outlet part, depending from the total length of the cable). CERN comment: Action taken under the full responsibility of ASG. When closing the non-conformity, please indicate how the problem was finally sorted out. --- Selva re-wound the sc cable and sent it back to ASG. Winding operation has been completed successfully.	
050513A	NC CERN 297	**2202**	After collaring of **CC 2202**, electrical test showed an interturn short circuit on pole **02P00809** (**D2-lower, inner layer 02I00812**)**.**	The analysis of the warm magnetic measurements data has shown that the defect is localized as said above in D2-Lower, inner layer but more precisely on the connection side, position 1 of the warm magnetic measurements between the second and the third turns (turn 1 being the first turn of block number 6). --- Defect has been found where localized by CERN magnetic measurements and it was repaired. Re-collaring performed successfully.	
050520A	NC CERN 298	**2144**	Final geometrical measurements performed on CM **2144** showed out-of-tolerance of 2mm (N.C.S. direction) about the longitudinal positioning of the heat exchanger tube.	Cut the weld (do it very carefully in order not to remove base material of the heat exchanger tube), put the tube at the right place and weld again. Radiograph the new weld (add the results of the radiographic	

				examination when closing the NCR). See continuation pages for details.	
050520B	NC CERN 299	**2024**	Final visual inspection on **CM 2024** showed a deformation of flexible tube installed on N-line (id. nr. **NN0107**)	Change the damaged flexible tube with a new one. --- Damaged flexible tube has been changed with a new one (new id. nr. **NN 1227**)	
050427A	NC CERN 300 rev1	**2194**	After collaring of **CC 2194**, electrical test showed an interturn short circuit on **N.C.S.** head of pole **02P00777** (**D2-lower, inner layer 02E00780**).	ASG will proceed to open the C.C. and change all the necessary components (quench heaters, coils protection sheets, ground insulation, cold bore tubes). --- On **outer layer 02E00780** a short circuits has been detected between 3rd and 4th turn on NCS near end spacer. Turn insulation restored and electrical test performed successfully. Ground insulation and QHs have been changed. C.b.t. (**MB-CBT-1935 & MB-CBT-1924**) changed with new ones (**MB-CBT -1920 & MB-CBT-0956**) Recollaring and electrical test performed successfully.	
050531B	NC CERN 301	**2191**	**CM 2191**: during welding of flare diam.=53 / 82 ("collarette" – dwg. nr. LHBMB__S0121 P.1) on c.b.t of **V1-line**, Lyre side, (weld id. nr. W13-V1), the weld created an internal defect classified as "***scaled surface and temper coloration***" (ref. to group D on Test procedure LHC–MB–TP-0011 Rev. 1) Please find detail pictures on continuation page.	"Use-as-is" as the corrective action has been done already.	
050613A	NC CERN 302	**2186**	During electrical test performed before welding of end covers on **CM 2186**, an open circuit of temperature sensor **TT821** (serial nr. **CX_LS_X24361**) has been detected.	The electrical circuit of the affected temperature sensor shall be left in place but the wires shall be cut to reasonable length and their extremity properly insulated. A new temperature sensor shall be put in place, fixed to the end plate. One shall follow the instructions given by CERN about same repair already done on other magnets. Refer to "Installation Procedure" entitled "Pre-series MBA – MBB Cold Mass Instrumentation", Rev.3 dated September 2002 (doc. Ref. LHC-MMS-GB/5837) by G. Brun. --- A new temperature sensor (serial nr. **CX_LS_X24366**) has been installed on the end plate	
050616A	NC CERN 303	**2199**	**CM 2199**: during welding of flare diam.=53 / 82 ("collarette" – dwg. nr. LHBMB__S0121 P.1) on c.b.t of **V2-line**, Lyre side, (weld id. nr. W13-V2), the weld created an internal defect classified as "***scaled surface and temper coloration***" (ref. to group D on Test procedure LHC–MB–TP-0011 Rev. 1).	Brush the inside surface of the tube according to the procedure LHC-MB-TP-0011 EDMS doc. N° 591131. A picture of the tube inside before and after brushing should have been included. Please add them when closing the non-conformity report. --- Inside surface of the tube has been brushed according to the procedure LHC-MB-TP-0011 EDMS doc. N° 591131. Unfortunately no pictures are available: ASG apologize for this.	
050617A	NC CERN 304	**2210**	During electrical test performed before welding of end covers on **CM 2210**, an open circuit of temperature sensor **TT821** (serial nr. **CX_LS_X24365**) has been detected.	The electrical circuit of the affected temperature sensor shall be left in place but the wires shall be cut to reasonable length and their extremity properly insulated. A new temperature sensor shall be put in place, fixed to the end plate. One shall follow the instructions given by CERN about same repair already done on other magnets. Refer to "Installation Procedure" entitled "Pre-series MBA – MBB Cold Mass Instrumentation", Rev.3	

				dated September 2002 (doc. Ref. LHC-MMS-GB/5837) by G. Brun. --- A new temperature sensor (id. nr. **CX_LS_X _24476**) has been installed on the end plate of the active part assembly.	
050623A	NC CERN 305	**2197**	During final electrical test at 5 kV, performed on **CM 2197**, a low insulation resistance has been detected between bus-bars QF+QD and ground. Measured leakage current **I > 10 □A** (max acceptable value 10 □A)	In order to find the defect, we cut the two reusable pieces on CS and one on NCS. At the end we found that the defect was due to a dirty reusable vetronite . Now the vetronite is changed and the defect is disappeared. We re-welded the reusable pieces and performed again the vacuum/pressure test and the final electrical test.	
050801A	NC CERN 306	**2236**	During winding of **outer layer** nr. **02E00946** (sc cable nr. **02C00222A**) for **CM 2236**, a visual inspection showed the cross-section of the Rutherford cable completely buckled, at about **105 m** from the start, on 4th turn.	We removed the insulation and tried to repair the cable as shown in the attached pictures. After restarting the winding the cable collapsed again. In order not to stop the production we propose to rewind the cable on the spool and store for examination. --- Remark from CERN: the cable shall be returned to CERN. The fact that the disposition is "reject" and "return to supplier" does not mean the cable is wrong and the responsibility is on CERN side. The working conditions during the cable insulation and the winding conditions shall be checked again, in particular the control of the tension during these operations. --- A new cable has been used (id. nr. **02C00223D**) and winding operation of outer layer **02E00946** has been completed successfully. Damaged cable has been sent to CERN on 31/08/2005 for inspection.	
050701C	NC CERN 307	**2170**	**CM 2170**: during welding of flare diam.=53 / 82 ("collarette" – dwg. nr. LHBMB__S0121 P.1) on c.b.t of **V1-line**, Lyre side, (weld id. nr. W50-V1), the weld created an internal defect classified as "***scaled surface and temper coloration***" (ref. to group D on Test procedure LHC–MB–TP-0011 Rev. 1) Please find detail pictures on continuation page.	Brush the inside surface of the tube according to the procedure LHC-MB-TP-0011 EDMS doc. N° 591131. A picture of the tube inside before and after brushing should have been included. Please add them when closing the non-conformity report.	
050711A	NC CERN 308	**2177**	**CM 2177**: during welding of flare diam.=53 / 82 ("collarette" – dwg. nr. LHBMB__S0121 P.1) on c.b.t of **V1-line**, connection side, (weld id. nr. W50-V1), **V2-line**, connection side, (weld id. nr. W50-V2) , **V1-line**, lyra side, (weld id. nr. W13-V1) the weld created an internal defect classified as "***scaled surface and temper coloration***" (ref. to group D on Test procedure LHC–MB–TP-0011 Rev. 1)	Brush the inside surface of the tube according to the procedure LHC-MB-TP-0011 EDMS doc. N° 591131. A picture of the tube inside before and after brushing should have been included. Please add them when closing the non-conformity report.	
050720A	NC CERN 309	**2231**	After collaring of **CC 2231**, a visual inspection of QH wires showed that QH nr. **CIV-A0197** has 2 wires with wrong reference colour: wire **YT221 (+)** is **GREEN-GREY** (instead of yellow), wire **YT222 (+)** is **YELLOW** (instead of green-grey). However, the cabling (numbering and positioning) of the QH wires to the end connector has been properly made and all the required electrical check performed. Position of the QH: D2 – Upper – Right Side (CS view)	Can be used as is but there must be A WARNING AT THE BEGINNING OF THE TRAVELLER and a **STICKER ATTACHED TO THE COLD MASS EXTREMITY** to indicate clearly the mistake. ASG QC Team will push CICOREL and ASG personnel, involved in CC assembling, to pay more attention to prevent such a mistake.	
050720B	NC CERN 310	**2233**	After collaring of **CC 2233**, electrical test showed a short circuit between **QH YT222(+)** (id. nr. **CIV-01809**) and outer layer	Shorts as described above (provoked by a small metallic particle) can certainly be avoided by improving the cleanliness of the assembly hall	

			02E00935 of pole **02P00932** (**D2-upper**). We found the problem just after the collaring and with the c.c. still under the press we were able to localize where it was (180 mm from the C.S. on pole D2U). Then we removed the pins for about 700 mm and we went out. We found a very small metallic particle between q.h. and the turn 17th just at 180 mm from the C.S. We removed carefully the particle and verify the integrity of the insulation of the other turns closed to the 17th ; we put a piece of kapton in that region and recollared again. The electrical check done was ok.	and by taking grater care during the quench heater cleaning and preparation for assembly. --- Shorts as described above (provoked by a small metallic particle) can certainly be avoided by improving the cleanliness of the assembly hall and by taking grater care during the quench heater cleaning and preparation for assembly.	
050725A	NC CERN 311 rev.1	**2182**	**CM 2182**: during welding of flare diam.=53 / 82 ("collarette" – dwg. nr. LHBMB__S0121 P.1) on c.b.t of **V1-line** • on lyre side (weld id. nr. W13-V1) and • connection side (weld id. nr. W50-V1), the weld created an internal defect classified as "***scaled surface and temper coloration***" (ref. to group D on Test procedure LHC–MB–TP-0011 Rev. 1). Please find detail pictures on continuation page.	Brush the inside surface of the tube according to the procedure LHC-MB-TP-0011 EDMS doc. N° 591131. A picture of the tube inside before and after brushing should have been included. Please add them when closing the non-conformity report.	
050729A	NC CERN 312	**2240**	After collaring of **CC 2240**, a visual inspection of QH wires showed that QH nr. **ASGCICO-A0816** has 2 wires with wrong reference colour: wire **YT221 (-)** is **GREEN-GREY** (instead of yellow), wire **YT222 (-)** is **YELLOW** (instead of green-grey). However, the cabling (numbering and positioning) of the QH wires to the end connector has been properly made and all the required electrical check performed. Position of the QH: D2 – Lower – Right Side (CS view)	Can be used as is but there must be a warning at the beginning of the traveller and a sticker attached to the cold mass extremity to indicate clearly the mistake. ASG QC Team will push CICOREL and ASG personnel, involved in CC assembling, to pay more attention to prevent such a mistake.	
050803A	NC CERN 313	**2205**	Visual and dimensional check of bus bars installed on **CM 2205** showed that the bus-bar installed on M3 line (id. nr. **426 type A**) has a reduced length of the sc cable of about 10 mm (from 270 to **260 mm**). See attached pictures.	After completion of the approval circuit of NC CERN 227 (that is exactly the same) among the responsible project engineers and users of the cold mass, we can conclude that this magnet can be used as is. There must be a clear warning/sticker on the cold mass itself to draw the attention of the user at CERN reception and at further steps of the cryo-magnet preparation. --- Inform the manufacturer & supplier of the bus bars to eradicate this kind on non-conformity (action CERN project engineers). --- **A clear WARNING STICKER shall be put on the cold mass.**	
050803B	NC CERN 314	**2208**	**CM 2208**: during welding of flare diam.=53 / 82 ("collarette" – dwg. nr. LHBMB__S0121 P.1) on c.b.t of **V2-line**, Lyre side, (weld id. nr. W13-V2), the weld created an internal defect classified as "***scaled surface and temper coloration***" (ref. to group D on Test procedure LHC–MB–TP-0011 Rev. 1) Please find detail pictures on continuation page.	Brush the inside surface of the tube according to the procedure LHC-MB-TP-0011 EDMS doc. N° 591131. A picture of the tube inside before and after brushing should have been included. Please add them when closing the non-conformity report.	
050803C	NC CERN 315	**2200**	During He leak test of **CM 2200**, pressurized to 26 bar, an instability of the signal of leak detector installed on insulating vacuum has been detected(see annexed graph on continuation page). In particular two instabilities has been recorded quite the end of the pressure test, but after about 15min. of stable signal.	ASG will push the operator to pay more attention about LD signal and relevant graph on chart recorder. Operator has been informed that, in case of instabilities, the leak test shall be continued for at least 20 min. after these instabilities are reduced to background level.	**X**

050804A	NC CERN 316	**S.s. collars MAL00311 MAL00448 MAL00449**	A dimensional test on collars regarding different batches nr. **MAL00311 - MAL00448 - MAL00449** has been performed. We found non-conforming values about the planarity on both measuring conditions: "Free State" and "Restrained Condition" (CERN ref. dwg. LHCMB__A0100 rev.C). Please find annexed Test Reports nr. **MA053230** for details.	The batches shall be sent back to Malvestiti for correction. About batch nr. **MAL00449**, this has already been agreed at BRANDI Company between ASG, CERN and BRANDI (ref. to CERN Visit Report n. AT-MAS/MB/7748).	X
050811A	NC CERN 317	**2215**	**CM 2215**: during welding of flare diam.=53 / 82 ("collarette" – dwg. nr. LHBMB__S0121 P.1) on c.b.t of **V1-line** • on lyre side (weld id. nr. W13-V1) and • connection side (weld id. nr. W50-V1), the weld created an internal defect classified as "***scaled surface and temper coloration***" (ref. to group D on Test procedure LHC–MB–TP-0011 Rev. 1). Please find detail pictures on continuation page.	Brush the inside surface of the tube according to the procedure LHC-MB-TP-0011 EDMS doc. N° 591131. A picture of the tube inside before and after brushing should have been included. Please add them when closing the non-conformity report.	
050812A	NC CERN 318	**2214**	**CM 2214**: during welding of flare diam.=53 / 82 ("collarette" – dwg. nr. LHBMB__S0121 P.1) on c.b.t of **V1-line**, Connection side, (weld id. nr. W50-V1), the weld created an internal defect classified as "***scaled surface and temper coloration***" (ref. to group D on Test procedure LHC–MB–TP-0011 Rev. 1) Please find detail pictures on continuation page.	Brush the inside surface of the tube according to the procedure LHC-MB-TP-0011 EDMS doc. N° 591131. A picture of the tube inside before and after brushing should have been included. Please add them when closing the non-conformity report.	
050825A	NC CERN 319	**2214**	During the He leak test on **CM 2214**, pressurized to **5 bar**, a leak has been detected on the internal bellow of heat exchanger: leak rate **Q≈1E-6 mbar·l/s** (nom. value 1.0E-9 mbar·l/s max.) Please refer to annexed pictures about position of the leak.	ASG will proceed with repairing procedure as already done on CM 2043, 2046, 2066. X-line internal bellow will be changed with a new one. He leak test will be repeated.	
050901A	NC CERN 320	**2237**	During electrical test performed before welding of end covers on **CM 2237**, an open circuit of temperature sensor **TT821** (serial nr. **CX_LS_X24529**) has been detected.	The electrical circuit of the affected temperature sensor shall be left in place but the wires shall be cut to reasonable length and their extremity properly insulated. A new temperature sensor shall be put in place, fixed to the end plate. One shall follow the instructions given by CERN about same repair already done on other magnets. Refer to "Installation Procedure" entitled "Pre-series MBA – MBB Cold Mass Instrumentation", Rev.3 dated September 2002 (doc. Ref. LHC-MMS-GB/5837) by G. Brun. ---------- A new temperature sensor (id. nr. **CX_LS_X _24549**) has been installed on the end plate of the active part assembly	
050905A	NC CERN 321	**2229**	During final electrical test at 5 kV, performed on **CM 2229**, a low insulation resistance has been detected between bus-bars QF+QD and ground. Measured leakage current **I > 10 µA** (max acceptable value 10 µA)	In order to find the defect, we cut the two reusable pieces on CS and one on NCS. At the end we found that the defect was due to a dirty reusable vetronite (similar problem already occurred on CM 2197 – see doc. NC CERN 305). Vetronite pieces has been changed and the defect disappeared. As already done about CM 2197, we will proceed to re-weld the reusable pieces and to performed again the vacuum/pressure test and the final electrical test.	
050906A	NC CERN 322	**2202**	During electrical test performed before welding of end covers on **CM 2202**, a short circuit to ground of temperature sensor **TT821** (serial nr. **CX_LS_X24363**) has been detected. Insulating resistance measured value: 1.2 Ohm	The electrical circuit of the affected temperature sensor shall be left in place but the wires shall be cut to reasonable length and their extremity properly insulated. A new temperature sensor shall be put in place, fixed to the end plate. One shall follow the instructions given by CERN about same repair	

				already done on other magnets. Refer to "Installation Procedure" entitled "Pre-series MBA – MBB Cold Mass Instrumentation", Rev.3 dated September 2002 (doc. Ref. LHC-MMS-GB/5837) by G. Brun. --- A new temperature sensor (id. nr**. CX_LS_X24533**) has been installed on the end plate of the active part assembly.	
050907A	NC CERN 323	**2243**	After collaring of **CC 2243**, electrical test showed a short circuit between **QH YT111-** (serial nr. **ASGCICO-B0874**) and outer layer **02E00974** of pole **02P00971** (pos. **D1-lower**). The discharge occurred at about 3400 mm from NCS.	The collared coils cannot be used as is. ASG shall proceed to opening of the C.C. and to repairing of the QH insulation. --- One more time the cleanliness in the assembly hall is to be questioned! What about the carefulness taken by the operators during the quench heaters reception/inspection and later during their assembly with the coils? ASG shall investigate the possible cause(s) of this kind of problem, which happens too often.	
050913A	NC CERN 324	**MCS-MA-E-0475 (AT000475)**	During installation, MCS-sextupole corrector id. nr. **MCS-MA-E0475 (AT000475)** has been damaged. See annexed pictures on continuation page for details.		**X**
050915B	NC CERN 325	**2207**	Visual and dimensional check of bus bars installed on **CM 2207** showed that the bus-bar installed on M3 line (id. nr. **429 type A**) has a reduced length of the sc cable of about 15 mm (from 270 to **255 mm**). See attached pictures.	**NC closed by CERN directly on MTF (no signature)**	
050921A	NC CERN 326	**2221**	X-ray test of longitudinal welds **W1** & **W2** of shrinking cylinders on CM nr.**2221**, showed defects as described on test reports Ansaldo-SIGE nr. **04052-398: nr.4 defects** on **W1** and **nr.1 defect** on **W2.** ASG proceeds with these repairs.	X-ray check showed the following defects: • weld id. **W1** (4 defects): pos. 11-12 & 12-13 lack of fusion and undercut; pos. 29-30 & 30-31 undercut • weld id. **W2** (1 defect) : pos. 30-31 lack of fusion and undercut	
050922D	NC CERN 327	**2229**	According to CERN communication about defects on welds, at reception in ASG of **CM 2229**, a visual inspection of longitudinal welds showed some defects: n. 3 defects on W1, n. 1 defect on W2.	According to CERN communication about defects on welds, at reception in ASG of **CM 2229**, a visual inspection of longitudinal welds showed some defects: **n.3** defects on **W1**, **n.1** defect on **W2**. --- ASG shall inspect more carefully the welds before delivery to CERN.	
050922A	NC CERN 328	**2216**	During preparation of capillary tube of **CM 2216**, the wires (id. nr. YT111-; YT211+ end EE113) have been damaged. See annexed picture on continuation page.	ASG proceeded with the following repairing procedure. The three damaged wires have been cut and a connection of each wire has been made by soldering with 20mm of wire overlapping , then wrapping with polyimide tape: a final protection of each connection has been made by a thermoplastic tube. Electrical test will be performed after assembling of capillary tube. --- Damaged wires have been repaired and final electrical test performed successfully.	
050927A	NC CERN 329	**2211**	During electrical test performed before welding of end covers on **CM 2211**, an open circuit of temperature sensor **TT821** (serial nr. **CX_LS_X24470**) has been detected.	The electrical circuit of the affected temperature sensor shall be left in place but the wires shall be cut to reasonable length and their extremity properly insulated. A new temperature sensor shall be put in place, fixed to the end plate. One shall follow the instructions given by CERN about same repair already done on other magnets. Refer to "Installation Procedure" entitled "Pre-series MBA – MBB Cold Mass Instrumentation", Rev.3 dated September 2002 (doc. Ref. LHC-MMS-GB/5837) by G. Brun. --- A new temperature sensor (id. nr. **CX_LS_X _24546**) has been	

				installed on the end plate of the active part assembly	
051001A	NC CERN 330	**2257**	After collaring of **CC 2257**, electrical test showed a short circuit between **QH YT111-** (serial nr. **ASGCICO-B0918**) and outer layer **02E01030** of pole **02P01027** (pos. **D1-lower**). The discharge occurred at about 2100 mm from CS.	The collared coils cannot be used as is. ASG proceeded to opening of the C.C. and to repairing of the QH insulation. A visual inspection of the QH showed that the cause of the electrical discharge was a very small particle maybe made of epoxy resin. ---------- QH insulation has been repaired. Re-collaring and electrical test performed successfully.	
051003A	NC CERN 331	**2256**	After collaring and magnetic measurements of **CC 2243**, HV electrical test at 5 kV showed a low insulation resistance between pole **02P01024** (pos. **D2-upper**) and ground. Measured value: leakage current **I ≅ 130 uA** (nom. I > 20 uA)	The affected zone has been localized near the layer jump. ASG proceeded to open partially the CC: the zone with low insulation resistance has been found between the end of the layer jump spacer and the coil protection sheet. Cause of the low insulation resistance was a little burr on the edge of the protection sheet and a consequent reduction of thickness of the polyimide foil. ASG proceeded to restore the ground insulation. ---------- People involved in CC assembling have been pushed to inspect very carefully all the protection sheets before installation on coils.	
051003B	NC CERN 332	**2211**	Dimensional check of bus bars (id. nr. **432 type A**) installed on **M3** line of **CM 2211** showed a reduced length of the sc cable of about 12 mm (from 270 to **258 mm**).	After completion of the approval circuit of NC CERN 227 (that is exactly the same) among the responsible project engineers and users of the cold mass, we can conclude that this magnet can be used as is. There must be a clear warning/sticker on the cold mass itself to draw the attention of the user at CERN reception and at further steps of the cryo-magnet preparation.	
051006A	NC CERN 333	**2210**	Dimensional check of bus bar id. nr. **433** (**BI000433**) type A installed on M3 line of **CM 2210** showed a reduced length of the sc cable of about **17 mm** (from 270 to 253 mm). See annex pictures on continuation page.	Following circulation amongst interested staff at CERN: disposition "use as is" confirmed	
051006B	NC CERN 334	**MCS-MA-I0825**	During electrical acceptance test performed on sextupole corrector id. nr. **MCS-MA-I0825** a low coil resistance has been detected. Measured value: **0.028 Ohm** Reference value: 0.090 Ohm minimum	Return to CERN for further checking and repair.	
051017A	NC CERN 335	**2278** **02D00190G**	During wrapping operation at SELVA of sc cable nr. **02D00190G** for outer layer (**CM 2278**), the cross-section of the cable buckled at about **250 m** from the start, along **1m** of length. This damage occurred because the Apical tape, 11 mm wide, broke during wrapping: maybe the Apical tape wasn't stretch enough on the roll. SELVA personnel stopped wrapping immediately and tried to restore the cable, but without any success. Then the process re-started and SELVA operators completed the wrapping of the cable.	The cable will be sent to ASG for visual inspection and for a possible repair under witness of CERN people. A replacement cable will be sent to ASG with the next delivery in week 43. ---------- The cable will be sent back to ASG for visual inspection under witness of CERN people. A replacement cable will be sent to ASG with the next delivery in week 43. ---------- A new cable has been used (id. nr. **02D00191B**) and winding operation of outer layer **02E01116** has been completed successfully.	
051018A	NC CERN 336	**FSG493 (2311)** **FSG501 (2259)**	Yoke laminations regarding different batches received at ORMET from FSG, showed oxidation on the punched surface: • **FSG493-FSG501-FSG509-FSG510-FSG524** (already assembled in yoke packs) showed soft oxidation • **FSG530-FSG540-FSG549-FSG550** (already assembled in yoke	The lamination packs shall be cleaned in such a way the corrosion is totally removed from the visible/accessible surfaces (with Scotch-Brite and vacuum cleaning). For what regards the laminations, which are not yet stacked, it is proposed to assemble them "as is" and to clean the outer surfaces at	

		FSG509 (2325) **FSG510 (2256)** **FSG524 (2252)** **FSG530 (2265)** **FSG540 (2253)** **FSG549 (2276)** **FSG550 (2264)** **FSG502 (2247)** **FSG529 (2240)** **FSG522 (2350)** **FSG541 (2379)**	packs) showed <u>hard oxidation</u> • **FSG502-FSG529** showed <u>soft oxidation</u> • **FSG522-FSG541** in stand-by at ORMET, not already assembled in yoke paks, showed <u>hard oxidation</u> Please find some pictures on continuation page.	the final stage of assembly at ASG works when the packs are put together to make the ½ yokes. ---------- CERN recommends, compatibly with the necessity of having a sufficient buffer stock, to avoid long term storage for the yoke laminations/packs for all deliveries coming from FSG.	
051104A	NC CERN 337	**S.s. collars** **MAL00423** **MAL00450** **MAL00708** **MAL00709** **MAL00710** **MAL00712** **MAL00713**	A dimensional test on collars regarding different batches nr. **MAL00423 – MAL00450 – MAL00708 - MAL00709 – MAL00712 – MAL00713** has been performed. We found non-conforming values about the planarity on both measuring conditions: "Free State" and "Restrained Condition" (CERN ref. dwg. LHCMB__A0100 rev.C). Measured values: planarity error 0.4 ÷ 0.8 mm. About batch nr. **MAL00710**, collars have been already assembled in packs by Brandi. Planarity of the packs is not very bad, so ASG will complete the packing and will try to install them on a collared coil.	ASG propose to sent back to Malvestiti collars, regarding batches nr. **MAL00423 – MAL00450 – MAL00708 - MAL00709 – MAL00712 – MAL00713**, for correction.	**X**
050701A	NC CERN 338	**MCS-MA-E0423**	During electrical acceptance test performed on sextupole corrector id. nr. **MCS-MA-E0423** a low insulation resistance to ground has been detected. Measured value: **54.5 MOhm** at 1.5 KV Reference value: 500 MOhm minimum	Return to CERN for further checking and repair.	**X**

050518A	NC CERN 339	**MA4577**	During visual inspection of bellow for M1-M2-M3 line (id. n. **MA4577**), a small hole on the weld of the ring has been detected.	Return to CERN for further checking and repair.	**X**
051111A	NC CERN 340	**2275**	After collaring of **CC 2275**, electrical test showed a short circuit between **QH YT121-** (serial nr. **ASGCICO-A0944**) and outer layer **02E01102** of pole **02P01099** (pos. **D1-lower**). The discharge occurred at about 10250 mm from NCS.	The collared coils cannot be used as is. ASG proceeded to opening of the C.C. and to repairing of the QH insulation. --- A visual inspection of the QH showed that the cause of the electrical discharge was a very small non-metallic particle, maybe made of epoxy resin. QH insulation has been repaired. Re-collaring and electrical test performed successfully.	
051114A	NC CERN 341	**2223**	During capillary tube assembly, a visual inspection showed two QH wires damaged: id. nr. **YT221(+)**, **YT111(-)**.	ASG proceeded with the following repairing procedure. The two damaged wires have been cut and a connection of each wire has been made by soldering with 20 mm of wire overlapping, then wrapping with polyimide tape: a final protection of each connection has been made by a thermoplastic tube. Repair procedure has already been applied on other CMs (see NC CERN 225 and 328). Details about this procedure are available on continuation pages. Electrical test will be performed after assembling of capillary tube.	
051116A	NC CERN 342	**2265**	During electrical test performed before welding of end covers on **CM 2265**, a swap of wires of V-taps has been detected. This means that wires about V-taps **EE012** & **EE013** have reversed colours: • wire about **EE012** is **BROWN** instead of red • wire about **EE013** is **RED** instead of brown However, the identification of wires is correct.	This NCR will be closed only after all electrical tests performed at CERN. ASG should clearly indicate that this magnet is non conform by a red sticker on the magnet. **TO BE CLOSED BY CERN AT RECEPTION**	
051117A	NC CERN 343	**2264**	Visual check of bus bar id. nr. **184 type B** (**BI000184**) installed on M2 line of **CM 2264** showed a damage of the Cu conductor of a wire of auxiliary bus bar. See annex pictures on continuation page.	The auxiliary bus bar must be repaired, i.e. cut off to eliminate the defect then an extension should be brazed with an overlap of about 50 mm. This should be done in such a way the joint comes inside the cold mass (one must avoid having the joint in the interconnection zone, i.e. outside the cold mass)	
051121A	NC CERN 344	**2265**	Visual and dimensional check of bus bars installed on **CM 2265** showed that the bus-bar installed on M3 line (id. nr. **193 type B**) has a reduced length of the sc cable of about 10 mm (from 270 to **260 mm**). See attached pictures.	ASG will proceed with CM finishing.	
051122A	NC CERN 345	**2253**	The bus-bar id. Nr. **508 type A**, instead of type B, has been installed on M1 line of CM 2253 . This mistake occurred because of: 1) lack of attention, from our side, in looking only the number and not the type about M1 line bus-bar; 2) wrong position of the bus-bar in the rack; 3) numbering of type A and type B bus-bar was the same. This was an unfortunate case: it never happened before that two sets of bus-bars had the same number in the same rack.	ASG will proceed with CM finishing. Two auxiliary bus-bar wires (on CS and NCS) regarding octupole/decapole connection will be cut to adjust their length. --- Please add more precise information (e.g., give the reference number of the cables concerned, specify the length which has been cut off, …) including pictures to illustrate what has been done. One should also describe how bus bars of type B will be used for a cold mass of type A when the incomplete set of bus bars type A will be used. --- Some details about repairing / adapting procedure applied on bus bar installed on M1 line: • on CS, auxiliary bus bars cables nr. 1 and nr.3 have been cut to adjust their length	

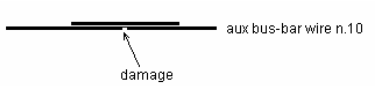
				• on NCS, auxiliary bus bars cables nr. 9 and nr. 10 have been put in straight position and cut to adjust their length for the connection to the sextupole corrector magnet Obviously, the correct numbering of cable has been respected for a right connection of spools outside the magnet. Sorry, no picture are available. About the bus bar of type B to be used for a cold mass of type A, this bus bar will be installed on CM 2269, in order to use the incomplete set of bus bar type A. A new NCR will be issued about CM 2269.	
051123A	NC CERN 346	**2278**	After collaring of **CC 2278**, electrical test showed an interturn short circuit on pole **02P01110** (**D1-upper**)	ASG has performed the warm magnetic measurement and CERN will analyse these to find the exact position of short circuit. ---------- ASG has performed the warm magnetic measurements and CERN will analyse these to find the exact position of short circuit. The results of CERN investigations to localize the short were communicated to ASG on November 28th (see copy of the message on the next page). During CERN visit on December 5th/6th, the layer that is concerned has been inspected carefully and electrical measurements under pressure have done, confirming the presence of the short. Please complete this NCR with the relevant information and pictures to illustrate the main steps of the repair. ---------- Interturn short circuit has been detected between 5th and 6th turn of outer layer nr. **02E01113** on NCS. Interturn insulation has been repaired (see pictures on next page) and the pole electrically tested under pressure: no short circuit has been detected.	
051125A	NC CERN 347	**2283**	After collaring of **CC 2283**, electrical test showed a short circuit between **QH YT112-**(serial nr. **ASGCICO-B01053**) and outer layer **02E01134** of pole **02P01131** (pos. **D1-lower**). The discharge occurred at about 110 mm from NCS.	The collared coils cannot be used as is. ASG proceeded to open of the C.C. and to repairing of the QH insulation. ---------- Please add information on what provoked (what is the cause of …) the short circuit, including pictures to illustrate the case. CERN would like to understand what actions ASG has planned to undertake to suppress (or at least to diminish the frequency of occurrence) this kind of electrical failure that is occurring too often. ---------- A visual inspection of the QH showed that the cause of the electrical discharge was a very small particle maybe made of epoxy resin. Personnel involved in CC assembly has been pushed to pay more attention during gluing operation of the ends of the QHs and to increase the cleaning process of all the components.	
051205A	NC CERN 348	**2263**	During electrical test performed after capillary tube assembly, an open circuit on v-tap id.nr. **E931** as been detected.	The cold mass cannot be used as is. The electrical circuit of the concerned voltage tap shall be re-done. Detailed information on the investigations carried out to localize the problem and on the actions proposed to rework the circuit shall be given in this document.	

				---------- Repair has been performed following the same procedure already applied to restore electrical connection of wires regarding the capillary tube. See next page for details.	
051207B	NC CERN 349	**2264**	During the He leak test on **CM 2264**, pressurized to **5 bar**, a leak has been detected on the internal bellow of heat exchanger. Leak rate **Q=1.07E-5 mbar·l/s** (nom. value 1.0E-9 mbar·l/s max.)	ASG will proceed with repairing procedure already applied on previous magnets with the same problem: see details of the procedure on continuation page. The defective X-line internal bellow (id. nr. **XS0806**) will be changed with a new one. He leak test will be repeated. ---------- **Leak detection** Leak test has been performed using the LD in "sniffer mode". The leak has been detected on the bellow and, according to our experience, it is on the weld between the bellow and the "right adaptor" ring diam. 64/100 (CERN dwg. LHCMB__A0087). As usual the defective bellow will be sent to CERN for further investigation. **Repairing Procedure** 1) Cutting of the weld between the X-line bellow and the end cover nozzle with a grinding/cutting disk (on the two sides, lyre and connection). This operation must be done manually with great care in order not to damage the nozzle of the end cover. 2) Then, use an orbital cutting machine to cut the fillet weld between the bellow sleeve and the heat exchanger tube (once again with great care). To do this, the heat exchanger tube is partially removed from the cold mass assembly. 3) Leaving then the heat exchanger tube in the cold mass assembly, restore the surfaces and chamfers wherever necessary. 4) Then, install a new bellow and re-weld the heat exchanger tube with its new bellow to the cold mass assembly. All these operation shall be carried out with great care.	
051212A	NC CERN 350	**2221**	During final check of traceability tables on traveller documents, we realized that diode having not modified screws has been installed on **CM 2221**.	As agreed with CERN, CM 2221 will be shipped to CERN as is. ASG personnel will come to CERN to do the reparation.	
051212B	NC CERN 351	**2263**	During final check of traceability tables on traveller documents, we realized that diode having not modified screws has been installed on **CM 2263**.	Diode will be changed with a new one having modified screws. Diode stack id. nr. **MDB1185** ---------- New diode id. nr. **MDB1185** installed and final electrical test performed successfully.	
051219C	NC CERN 352	**2278**	After **re-collaring** of **CC 2278**, electrical test showed **again** (see **NC CERN 346**) an interturn short circuit on pole **02P01110** (**D1-upper**). ASG propose to reject the outer layer, already repaired, and to rewind a	The layer that is concerned (cable id 02D00190H) shall be rejected definitely. The integrity of the cable insulation of the other layers/poles (those that	

			new layer. ASG is asking CERN to supply a new OL cable.	will be re-used) shall be inspected carefully (visual inspection) before re-construction.	
051219B	NC CERN 353	**2253**	During the He leak test on **CM 2253**, pressurized to **5 bar**, a leak has been detected on the internal bellow of heat exchanger. Leak rate **Q=4.4 E-5 mbar·l/s** (nom. value 1.0E-9 mbar·l/s max.) See details on continuation page.	ASG proceeded with repairing procedure already applied on previous magnets with the same problem: see details of the procedure and pictures on continuation page. The defective X-line internal bellow (id. nr. **XS0396 B**) will be changed with a new one. He leak test will be repeated. ---------- A new bellow (id. nr. **XS1347 B**) has been installed and the leak test repeated, but a leak has been detected again. So a new NCR will be issued (see **NC CERN 357**)	
051209A	NC CERN 354	**2304**	Because of a bad functioning of the counter of the turns installed on the winding machine CSA-1, outer layer **02E01218** has been wound with one turn less than nominal. Cold mass id. nr. **2304** - SC cable id. nr. **02D00209D** ASG has already asked for a soon intervention of Carpenteria S. Antonio to check the winding machine and solve the problem. Besides ASG pushed the operators to check twice the number of turns just before inserting the copper wedges and just before cutting the sc cable at the end of winding. ASG is kindly asking CERN to send a replacement cable for a new layer.	A replacement cable will be sent for rework. Its id number is not yet known. Please indicate it when closing the non conformity report. ---------- A new cable has been used (id. nr. **02D00149A**) and winding operation of outer layer **02E31218** has been completed successfully.	
051220A	NC CERN 355	**2274**	During the He leak test on **CM 2274**, pressurized to **5 bar**, a leak has been detected on the internal bellow of heat exchanger. Leak rate **Q=1.3 E-5 mbar·l/s** (nom. value 1.0E-9 mbar·l/s max.) See details on continuation page.	ASG proceeded with repairing procedure already applied on previous magnets with the same problem: see details of the procedure and pictures on continuation page. The defective X-line internal bellow (id. nr. **XS0374 B**) will be changed with a new one. He leak test will be repeated. ---------- A new bellow (id. nr. **XS0965 B**) has been installed and the leak test repeated successfully.	
051230A	NC CERN 356	**2282**	Just before connecting the wires to the correction coil, a visual check of bus bar id. nr. **509 type A** installed on M2 line of **CM 2282** (connection side) showed an inversion between wires 13 and 14 (auxiliary bus bars). See annex pictures on continuation page.	ASG will proceed to put The auxiliary bus bars 13 and 14 in the right position.	
051222A	NC CERN 357	**2253**	Following the change of the bellow on X line (see **NC CERN 353**), during the He leak test of **CM 2253**, pressurized to **20 bar**, a leak has been detected on the internal bellow of heat exchanger. Leak rate **Q=1.0 E-5 mbar·l/s** (nom. value 1.0E-9 mbar·l/s max.) See details and pictures on continuation page.	ASG will proceed to change the whole X-line with a new one. The defective X-line internal bellow (id. nr. **XS1347 B**) will be changed with a new one. He leak test will be repeated. ---------- Nota bene: The heat exchanger tube shall be sent back to CERN where it will be reworked for reuse. ---------- A new bellow (id. nr. **XS1359 B**) has been installed and the leak test repeated successfully.	
2006					

060112B	NC CERN 358	**2269**	The bus-bar id. Nr. **509 type B**, instead of type A, has been installed on M1 line of **CM 2269**. This change is related to the mistakes occurred on a previous cold mass (CM 2253 with bus-bar type B, instead of type A, installed – see NC CERN 345). This bus-bar has been properly modified to be installed on a CM type A. See details on continuation page. ---------- Some details about repairing / adapting procedure applied on bus bar installed on M1 line: • on CS, auxiliary bus bars cables nr. 1 and nr.3 have been cut to adjust their length for connection to octupole/decapole corrector magnets • on NCS, auxiliary bus bars cable nr. 9 has been cut to adjust its length for the connection to the sextupole corrector magnet, cable nr. 10 have been put in straight position. Obviously, the correct numbering of cable has been respected for a right connection of spools outside the magnet. See annexed picture here below.		
	NC CERN 359	**2270**	During electrical test at 5 kV, performed on **CM 2270** before welding of end covers, a low insulation resistance has been detected between dipole **D2-Lower** (id. nr. **02P01081**) and **ground**. Measured insulation resistance **R ≅ 80 MOhm** (Nom. value R > 1000 MOhm).	ASG will proceed to open the CM to find out the exact position of the problem. The number of cases, which necessitate cutting the shrinking cylinder, increases dramatically. Because the number of spare shells is limited and because the number of repairs approaches the total number of spares available, measures have to be taken to re-use the cut shells. From now on, we ask you to cut the shrinking cylinder in the base material, i.e. above the longitudinal weld (as far of it as possible), so that at least one shell can be reworked for possible re-use.	
060123A	NC CERN 360	**2300**	During electrical test performed before welding of end covers on **CM 2300**, an open circuit of temperature sensor **TT821** (serial nr. **CX_LS_X26586**) has been detected.	The electrical circuit of the affected temperature sensor shall be left in place but the wires shall be cut to reasonable length and their extremity properly insulated. A new temperature sensor shall be put in place, fixed to the end plate. One shall follow the instructions given by CERN about same repair already done on other magnets. Refer to "Installation Procedure" entitled "Pre-series MBA – MBB Cold Mass Instrumentation", Rev.3 dated September 2002 (doc. Ref. LHC-MMS-GB/5837) by G. Brun. ---------- A new temperature sensor (id. nr. **CX_LS_X26597**) has been installed on the end plate of the active part assembly	
060123B	NC CERN 361	**2316**	During visual inspection of inner layer **02I01268** regarding **CM 2316**, a large defect has been detected (see annexed pictures on continuation page). The damage has been caused by a pin detached from the tooling we are using for stiffening the coil end on the winding machine. The operator couldn't see that pin during winding because it was under the tool.	The damaged layer has been rejected: ASG put aside that layer for CERN inspection. ASG is also asking CERN for a new inner layer cable. ---------- The tooling used for stiffening the coil end has been checked carefully and all the pins have been fixed with glue. All the operators involved in winding process have been pushed to check very carefully all the tooling just before starting their work. ---------- New layer manufactured: **02I31268** (sc cable id. nr. **01E00347G**)	

060125A	NC CERN 362	**2325**	During wrapping operation, at SELVA, of sc cable nr. **02C91541D** for outer layer (**CM 2325**), the cross-section of the cable buckled along **1 m** of length. This damage occurred because the Apical tape, 11 mm wide, broke during wrapping: SELVA personnel stopped wrapping immediately. Besides two arm of the wrapping machine broke.: SELVA had to change the damaged parts in order to continue wrapping operation.	The cable will be sent back to ASG for visual inspection: then it will be sent to CERN. The defect apical spools will be at ASG on next Wednesday and it will be showed to Mr. Musso. ASG is asking CERN a replacement outer layer cable. --- As discussed during the visit at SELVA works on February 7th, a stopper shall be installed to prevent the Apical roll to fall out of position during wrapping. This must be the cause of the incident. We never observed problems of this type at BNN and Alstom, which receive the same Apical rolls from CERN. At the moment this NCR is completed, the solution was already implemented, see picture on next page. --- A new cable (id. nr. **02C91191C**) has been used as replacement of the damaged one. Winding operation of outer layer **02E01304** completed successfully	
060202A	NC CERN 363	**2290**	X-ray test of longitudinal welds W1 & W2 of shrinking cylinders on CM nr.2290, showed defects as described on test reports Ansaldo-SIGE nr. 06152-433 : nr.0 defects on W1 and nr.2 defects on W2. ASG proceeds with these repairs. See doc. on continuation page	All repairs completed successfully	
060208A	NC CERN 364	**2289**	Visual and dimensional check of bus bars installed on **CM 2289** showed that the bus-bar installed on **M3 line** (id. nr. **573 type B**) has a small deformation of the Cu box ("U" shaped) with the sc cable inside. See attached pictures.	This problem has been solved by the worker who had to re-shape the Cu box for the right positioning of the sc cable and Cu pressing bar, just before performing the brazing process. --- Problem solved by a re-shaping the Cu box: the sc cable and the Cu pressing bar have been positioned correctly, then the brazing process performed.	
060210B	NC CERN 365	**2324** **02I01300**	During winding of **inner layer** nr. **02I01300** (sc cable nr. **01E00351E**) for **CM 2324**, a crash of the winding mandrel caused the damage of the coil (see annexed picture on continuation page). This crash has been caused by a wrong clamping of the mandrel to the frame of the winding machine. All the personnel has been pushed to pay more attention in checking the tooling and the machine before starting winding process.	Inner layer **02I01300** shall be rejected. ASG is asking CERN a new inner layer cable. --- New layer manufactured: **02I31300** (sc cable id. nr. **01E00347H**)	
060210C	NC CERN 366	**2303**	Warm magnetic measurements carried out on the collared coils **2303** showed anomalies (yellow alarms) in high order multipoles **b8, b11, b12, a6, a9, a12, and a14** on **position #9** of the straigth part in **Aperture 2**. A second measurement with the short mole (0.125mm coil length) confirmed these results. **Aperture 1 is OK**. (ref. test report nr. **HCMB__A001-02000303_cc.xls**)	CERN personnel (Mr. E.Todesco and Ms. C.Vollinger) made further data analysis that indicated an inward movement of the inner layer cable of 1.1mm (Ap.2 – Upper pole). Then CERN asked ASG to open the collared coil to check the cable position. The collared coil has been opened on **February, 9th** under the witness of CERN people (Ms. Bajko, Mr. Musso and Ms. Vollinger) Dimensional check of cable position about inner layer **02I01215** showed an inward movement of 1st and 2nd turns of 1.1mm, at 1300mm from coil centre, toward CS (see annexed pictures on continuation page). However all the turns were perfectly glued to each other. --- Coils have been re-collared: electrical test and magnetic measurements performed successfully.	

060228A	NC CERN 367	**2291**	During the He leak test on **CM 2291**, pressurized to **26 bar**, a leak has been detected on the internal bellow of heat exchanger. Leak rate **Q=1.3 E-5 mbar ·l/s** (nom. value 1.0E-9 mbar·l/s max.) See details on continuation page.	ASG proceeded with repairing procedure already applied on previous magnets with the same problem: see details of the procedure and pictures on continuation page. The defective X-line internal bellow (id. nr. **XS1362**) will be changed with a new one. He leak test will be repeated. ---------- Central and side bellows have been changed with new ones, central bellow n. **XC1202**, side bellow n. **XS0517B**. Leak test performed again successfully.	
060302A	NC CERN 368	**2293**	During preparation of bus-bars installed on M1 line (id. nr. **520 type A** instead of type B) on **CM 2293**, 6 wires (nr. 1,2,3,4,5,6) of spools on Lira side have been cut at a reduced length of about 60 mm. See annexed pictures on continuation page.	Special mechanical interconnection between the bus bars wires should be done to make possible to perform the standard measurements of insulation of spools once the end cover is welded (as agreed during visit of CERN on the 7-8th of March 2006). To be documented with pictures of the connection. NCR to be CLOSED at CERN after the cold test!!!!!! **A clear WARNING STICKER shall be put on the cold mass** **IT WILL BE CLOSED BY CERN after REPAIR**	
060303A	NC CERN 369	**MAL00765**	A dimensional check of **collars A type 2** regarding batch nr. **MAL00765** has been performed. We found non-conforming values about the thickness of the laminations near the punching zone. Measured value: 0.31 mm (nom. value = 0.2 ± 0.03 mm) See also attached pictures on continuation pages. This creates dimensional problems during assembling of collars pack.	ASG is proposing to sent back to Malvestiti all the collars regarding batch nr. **MAL00765** .	**X**
060308A	NC CERN 370	**2321**	After collaring of **CC 2321**, electrical test showed a short circuit on **outer layer 02E01288** (cable id. nr. **02C91461E**). Magnetic measurements have been performed and the results sent to CERN, for analysis, in order to detect the position of the short circuit. Collared coils have been dismantled and pole disassembled. Another electrical test with the pole under pressure has been made to check the position of the short circuit: then a visual inspection showed that the short was caused by a strand out of position in the Rutherford cable, at **1980mm** from NCS, between 4th and 5th turn, for 40mm of length. See pictures on continuation page.	CERN people (Mr. F. Savary and Ms. M. Bajko) checked very carefully the layer during their visit on 08-03-2006. ASG made a repair of the layer putting the strand in the right position and restoring the insulation. But finally, CERN decided to put aside this layer and recommended ASG to re-do a new one. CERN will decide later if the outer layer **02E01288** can be used for a spare coil. ASG to keep this layer on stock until a final decision is taken. Please indicate the id of the replacement cable when closing the NCR.--- ---------- A new cable has been used (id. nr. **02C91891A**) and winding operation of outer layer **02E31288** has been completed successfully. Electrical test performed again and pole assembling completed.	
060309A	NC CERN 371	**2307**	During finishing of electrical connections on **CM 2307**, a damaged wire (wire n.10) of auxiliary bus bars installed on M1 line C.S., has been found.	According to CERN decision (Mr. Savary e-mail dated 14/03/2006), ASG performed the following repairing procedure: a) removal of aux bus-bar insulation b) soldering, by using Sn95-Ag5 alloy, of a wire on the damaged one with an overlapping of 60mm (see schematic dwg.)  	

				c) restoring of polyimide insulation (Apical tape) d) restoring of tubular glass cloth insulation	
060320A	NC CERN 372 rev.1	**2303**	After re-collaring of **CC 2303**, high energy discharge test, at 850V, on QHs, showed anomalies of the discharge curve. CC has been de-collared, then a visual check showed a s.s. strip burnt near the "omega" piece connection on NCS. Position: **D1-UPPER**, strip id. **YT121+**; QH id. nr. **ASG-CICO-B01128**)	After re-collaring of **CC 2303**, high energy discharge test, at 850V, on QHs, showed anomalies of the discharge curve. See attached pictures of results, the strange behaviour clearly indicated with a normal curve as reference added!!!! CC has been de-collared, then a visual check showed a s.s. strip burnt near the "omega" piece connection on NCS. Position: **D1-UPPER**, strip id. **YT121+**; QH id. nr. **ASG-CICO-B01128**) --- ASG proceed to open the CC and change all the necessary components (quench heaters, coils protection sheets, ground insulation, cold bore tubes) --- Cold bore tubes (MB-CBT-2062 & MB-CBT-2058) have been changed with new ones (**MB-CBT-0817 & MB-CBT-0813**) Re-collaring and acceptance tests completed successfully.	
060324B	NC CERN 373	**2314**	During handling of **CM 2314**, diode container and relevant components have been damaged. See annexed photos.	ASG will proceed with dismantle of the diode container. Diode container, "T" connecting piece and all other damaged components will be rejected and changed with new ones or repaired with a slightly different geometry in order to compensate the length of the cut pieces. (see attached picture 4-6/6 showing the piece as is ordered. This will be then adapted to the real dimensions on site). The diode will be dismantled and sent back to CERN for inspection. Geometrical check, electrical test and leak detection will be performed again after the rework. ASG will keep informed CERN about re-assembling operations. --- Rework completed: modified "T" piece and new diode container installed. Diode installed (MDB0333) has been dismantled and will be send to CERN for electrical check. A new diode has been installed (**MDB00821**). Final electrical measurements performed again, leak test completed successfully. 10/10/2006	
060330A	NC CERN 374	**2298**	During the He leak test on **CM 2298**, pressurized to **26 bar**, a leak has been detected on the internal bellow of heat exchanger. Leak rate **Q=1.35 E-5 mbar ·l/s** (nom. value 1.0E-9 mbar·l/s max.) See pictures and details on continuation page.	ASG will proceed with repairing procedure already applied on previous magnets with the same problem: see details of the procedure continuation page. The defective X-line internal bellow (id. nr. **XS0557**) will be changed with a new one. He leak test will be repeated. --- Side bellow has been changed with new one: id nr. **XS0525B**. Leak test performed again successfully.	
060412A	NC CERN 375	**2342**	After collaring of **CC 2342**, electrical test at high voltage (V=4 kV) showed an interturn short circuit on **lower pole** id. nr. **02P01367** of **Aperture 1** (**D1 – Lower**). Magnetic measurements will be performed and the results sent to CERN for analysis, in order to detect the position of the short circuit.	CERN analysis for the localization of the short gave the following information: **Aperture 1, Lower pole, Outer Layer.** **Longitudinal position: most probably on the CS** (within 1280 mm from the pole end - the head and a straight part position included).	**X**

				Again, as for the previous localization, **another possible position** is given: **NCS** (within 1280 mm from the pole end - the head and a straight part position included) Cables involved: short between the cable 24-25 counting from the mid-plane (the last two cables of block 2) --- CC has been de-collared and the short circuit detected on outer layer **02E01370**. Damaged outer layer has been changed with a new one id. nr. **02E31370** (cable **02C91141D**). Electrical test performed successfully.	
060414A	NC CERN 376	**2320**	During the He leak test on **CM 2320**, pressurized to **26 bar**, a leak has been detected on the internal bellow of heat exchanger. Leak rate **Q=1.2 E-5 mbar ·l/s** (nom. value 1.0E-9 mbar·l/s max.)	ASG will leave the cold mass concerned pending • until CERN can organize a visit to repeat the test with CERN experts in vacuum OR • until CERN authorization to proceed with the repairing procedure already applied on previous magnets with the same problem. See details of the procedure on continuation page. --- You can go on with the replacement of the defective bellow. Please take great care when cutting/removing it. We shall give it to our colleagues for further investigations. (*ref. e-mail of Mr. Savary dated 19/04/2006*) --- Central bellow, defective component (id. n. XC1869) and side bellow (XS0398) have been changed with new ones. New components identification: central bellow n. **XC1893**, side bellow n. **XS0823B**. Leak test performed again successfully.	
060427A	NC CERN 377	**2318**	During final electrical test performed on **CM 2318**, after discharge test at HV, a temperature sensor **TT821** (serial nr. **CX_LS_26747**) showed anomalies about electrical resistance: measured value **R=385 kOhm** (4-wire test) – (ref. value Rnom ≈ 65 Ohm) See annexed tables, on continuation pages, for details about measured values. ASG states that all the operations have been performed according to CERN tecn. spec. **LHC-MMS/98-198 rev. 2.0** and Installation Procedure LHC-MB-IP-0001 rev. 1.0 "Series MBA-MBB cold mass instrumentation" In particular all the wires regarding temperature sensor have been connected to ground during HV test, discharge test and insulation test.	**A clear WARNING STICKER shall be put on the cold mass.** **This NCR will be closed by CERN after cold test.** To be closed only after slot allocation is made at CERN.	
060502B	NC-CERN378_rev 3_closed.doc	**FSG00485 (2344)** **FSG00494 (2356)** **FSG00497(2346)** **FSG00500 (2354)** **FSG00495 (2355)**	Yoke laminations regarding different batches received at ORMET from FSG, showed oxidation on the punched surface. Bathes id nr. **FSG00485 / FSG00494** **(*) FSG00497 / FSG00500** **(**) FSG00495 / FSG00496 / FSG00499** **(***) FSG00498 / FSG00522 / FSG00523 / FSG00526** Please find some pictures on continuation page. Remarks: list and NCR updated on: 08/05/06 (*) - 22/05/06 (**) - 31/05/06 (***)	***We shall proceed as we did in the past, i.e. clean off the rust at the latest stage*** (from e-mail dated 28/04/2006 by Mr. F. Savary) This means that the laminations, not yet stacked, shall be assembled "as is" and the outer surfaces cleaned at the final stage of assembly at ASG works when the packs are put together to make the ½ yokes. All the lamination packs shall be cleaned in such a way the corrosion is totally removed from the visible/accessible surfaces (with Scotch-Brite and vacuum cleaning).	

		FSG00496 (2336) **FSG00499 (2364)** **FSG00498 (2362)** **FSG00522 (2350)** **FSG00523 (2376)** **FSG00526 (2360)**			
060503A	NC CERN 379	**2340** **End-cover HCMB_S008–MP001542**	During geometrical measurements of end cover nr. **MPCS1542**, just before spot welding on a CM, we found problems about alignment. End cover has been dismantled from the CM and the centring ring detached from the end cover by grinding the spot welds already done. We checked dimensions D9-D10-D11 on a test bench and we found the following results as sketched on continuation page. ASG is asking how to proceed about this component.	Description of proposed action (use continuation page if necessary) According to e-mail dated 03/05/2006 (Ms. Bajko), ASG has to perform the following items: *1. check the planarity of the end cover on the side where the end cover has to be welded to the half cylinders* *2. check again the altitudes mentioned in the NCR* *If the difference is still there, use shims of 0.25 mm to get the D points in the same plane, BUT discount that from the overall length* ASG shall also indicate clearly on the outside of the cold mass which shim has to be kept in place for any further measurements at CERN (e-mail dated 16/05/2006) --- Here is a summary of all the operations performed by ASG to solve the situation: 1. end cover has been dismantled from CM and the centring ring detached from the end cover by grinding the spot welds already done 2. geometrical measurements performed on a test bench (see Fig. 1/1) 3. the end cover has been installed on another cold mass (**CM 2340***)*: as the difference between D10 and D9-D11 was still there, we used n°2 shims of **0.2 mm** each to get the D9 and D11 points in the same plane of D10 4. final geometrical measurements on CM have been performed successfully	
060317A	NC CERN 380	**2330**	After collaring of **CC 2330**, electrical test showed a short circuit on **Aperture 1 – Upper Pole 02P01318** - **Outer layer 02E01321** (cable id. nr. **02C91641E**). Magnetic measurements have been performed and the results sent to CERN, for analysis, in order to detect the position of the short circuit. See results of CERN analysis on continuation page. Collared coils have been dismantled and pole disassembled. Another electrical test with the pole under pressure has been made to check the position of the short circuit: then, a visual inspection showed that the short was caused by a strand out of position in the Rutherford	CERN people (Mr. F. Savary and Ms. M. Bajko) checked very carefully the layer during their visit on 29 & 30-03-2006. ASG made a repair of the layer putting the strand in the right position and restoring the insulation. But finally, CERN decided to put aside this layer and recommended ASG to re-do a new one. CERN will decide later if the outer layer **02E01321** can be used for a spare coil. ASG to keep this layer on stock until a final decision is taken. --- A new cable has been used (id. nr. **02C90764A**) and winding	

			cable, at **2150mm** from NCS, between 4th and 5th turn.	operation of outer layer **02E31321** has been completed successfully. Electrical test performed again and pole assembling completed.	
060510A	NC CERN 381	**2329**	During final geometrical measurements performed on **CM 2329** we found a shape problem regarding end cover position. Both the end covers were positioned referring to a wrong *CORDSYS*: this created a wrong angle with respect to the nominal value. The middle plan between the two cold bore tubes, together with measurements of reference points on extremity flanges of the collared coils, establishes a theoretical *CORDSYS* we refer to, for others positioning. For unknown reasons, the *CORDSYS* that we used to align the end cover was affected to an angle error: the value of this error is about 0.032 rad. So the end cover was welded in a wrong position. However V1 and V2 flanges respect the tolerance, also because the radius between the centre of end cover (the origin of *CORDSYS*) and the centre of each cbt is short. M1, M2, M3 and X-line flanges were re-measured to ensure that their centre respect the reference tolerance (please note this tolerance has been re-defined in agreement with CERN). By refining the CM positioning on the alignment bench, we get the right position the centre of each lines, except M1-line on end cover on Lyre Side, out-of-tolerance however accepted by CERN.	Following discussion at CERN the magnet is accepted to be uses as is. The eventual bad position of the correctors can be also accepted.	
060511A	NC CERN 382	**2334**	During the He leak test on **CM 2334**, pressurized to **26 bar**, a leak has been detected: leak rate **Q ≈ 5.0 E-6 mbar·l/s** (nom. value 1.0E-9 mbar·l/s max.) Using a special tool supplied by CERN, an extra test has been performed on the CM out of the vacuum vessel (see attached picture on continuation page). This test showed that the leak was on the internal bellow of heat exchanger: measured values are Q=3.17 E-6 mbar·l/s at P=20 bar; Q=4.10 E-6 mbar·l/s at P=26 bar Defective bellow id. nr. **XS0380 B** (X-line side bellow)	ASG will leave the cold mass concerned pending • until CERN can organize a visit to repeat the test with CERN experts in vacuum OR • until CERN authorization to proceed with the repairing procedure already applied on previous magnets with the same problem. See details of the procedure on continuation page. --- Side bellow (defective component id. n. XS0380B) and Central bellow (XC11764) have been changed with new ones. New components identification: side bellow n. **XS0397**, central bellow n **XC1776** Leak test performed again successfully: see attached data on continuation page.	
060515A	NC CERN 383	**2329**	During the He leak test on **CM 2329**, pressurized to **26 bar**, a leak has been detected on the internal bellow of heat exchanger. Leak rate **Q=1.1 E-5 mbar ·l/s** (nom. value 1.0E-9 mbar·l/s max.) Defective bellow id. nr. **XS0381 B** (X-line side bellow) See details on continuation page.	ASG will leave the cold mass concerned pending • until CERN can organize a visit to repeat the test with CERN experts in vacuum OR • until CERN authorization to proceed with the repairing procedure already applied on previous magnets with the same problem. See details of the procedure on continuation page. --- Side bellow (defective component id. n. XS0381B) and Central bellow (XC1753) have been changed with new ones. New components identification: side bellow n. **XS0818 B,** central bellow n **XC1778** Leak test performed again successfully: see attached data on continuation page.	

060615A	NC CERN 384	**2355**	During electrical test performed before welding of end covers on **CM 2355**, a short circuit has been detected between auxiliary bus bars n.18 & 19 installed on M2-line. We are asking CERN how to proceed.	**TO BE CLOSED BY CERN AT RECEPTION** **Status: action underway** **Disposition Pending**	**X**
060612C	NC CERN 385	**2334**	During the He leak test on **CM 2334**, pressurized to **26 bar**, a leak has been detected. Further test, on the CM out of the vacuum vessel, showed that the leak was near the weld of the N-line tube to the flange (on C.S.). The exact position of the leak was on a defect between the weld and the base material. N-line tube id. nr. **DM000734** ASG proceeded with the repair of the weld.	**ASG ASKED CERN TO LOAD AND CLOSE THIS NCR ON MTF (MTF is closed to ASG access !!!)**	**X**
060612E	NC CERN 386	**2348**	During the He leak test on **CM 2348**, pressurized to **26 bar**, a leak has been detected. Further test, on the CM out of the vacuum vessel, showed that the leak was near the weld of the N-line tube to the flange (on C.S.). The exact position of the leak was on a linear indication of about 5 mm length, half on the weld and half on the base material. N-line tube id. nr. **DM000871** ASG proceeded with the repair of the weld. Please find here after some pictures after repair.	**CLOSED BY CERN directly on MTF** The extremity of the tubes where trace of welding spots are observed has to be cut before the N line mounted on the cold mass. (List of suspicious N lines have been given to ASG by CERN)	
060612D	NC CERN 387	**2324**	During the He leak test on **CM 2324**, pressurized to **26 bar**, a leak has been detected. Further test, on the CM out of the vacuum vessel, showed that the leak was near the weld of the N-line tube to the flange (on C.S.). The exact position of the leak was just at the limit of the weld on base material along few mm. N-line tube id. nr. **DM000702** ASG proceeded with the repair of the weld. Please find here after some pictures after repair.	The N line tubes has to be cut on the extremity before mounting on the cold mass where trace of spot weld is observed.	
060612B	NC CERN 388 rev.1	**2363**	After collaring of **CC 2363**, electrical test at high voltage (V=4 kV) showed an interturn short circuit on **Upper pole** id. nr. **02P01452 of Aperture 2** (**D2 – Upper**)**.**	The responsibility of the long term electrical integrity of the coil is of ASG Superconduttori. --- **CC 2363** has been de-collared and the short circuit has been detected between 5ht and 6th turn. C.b.t. (**MB-CBT-2431 & MB-CBT-2422**) have been changed with new ones (**MB-CBT -2485 & MB-CBT-2488**) Interturn insulation has been restored. Electrical test performed successfully. See annexed picture about repair.	
060516A	NC CERN 389	**DM010998** **DM011019** **DM011001**	Visual check of cold bore tubes id. nr. **DM010998**, **DM011019** and **DM011001** showed a) traces of metal oxide (maybe coming from outside, then not hard oxidation of the material) b) scratches on the inner surface of these tubes See attached pictures.	At the moment we decided to put aside these c.b.t. ASG is asking CERN how to proceed.	**X**
060620B	NC CERN 390	**2356**	During the He leak test on **CM 2356**, pressurized to **26 bar**, a leak has been detected on the internal bellow of heat exchanger. Leak rate **Q ≈ 2.0 E-5 mbar ·l/s** (nom. value 1.0E-9 mbar·l/s max.)	ASG will leave the cold mass concerned pending • until CERN can organize a visit to repeat the test with CERN experts in vacuum	

			Defective bellow id. nr. **XS0978 B** (X-line side bellow) See details on continuation page.	OR • until CERN authorization to proceed with the repairing procedure already applied on previous magnets with the same problem. See details of the procedure on continuation page.	
060620C	NC CERN 391	**2325**	During the movement of the **CM 2325** we have slightly damaged the nitrogen tube (N-line tube id. nr. **DM000843**) with the cotton rope. The depth of the damage is about 3 mm in the maximum point (see attached pictures).	*I'm afraid we cannot accept this kind of damage. Indeed, we must insert in this tube a set of auxiliary bus bars. This is done during the installation of the magnets in the tunnel.* *The damage you are describing makes a restriction of the area cross-section of the tube that would give us great difficulties, if not make it impossible, to put the cables inside.* (from e-mail dated 19/06/2006 by Mr. Savary) --- A new nitrogen tube (id.nr. **DM000892**) has been installed.	
060619A	NC CERN 392	**2382**	During handling of **outer layer** nr. **02E01531** with the lifting tool, an accident occurred: layer and mandrel felt down. The winding mandrel has been put aside and the layer was heavily damaged. Reference **CM 2382**, **outer layer** id. nr. **02E01531**, **sc cable** id. nr. **2C91241C**. ASG is asking CERN for a replacement cable	New outer layer manufactured: **02E31531** (sc cable id. nr. **02C91362A**)	
060704A	NC CERN 393	**FSG00532 (2367)** **FSG00525 (2365)** **FSG00536 (2366)** **FSG00534 (2370)** **FSG00531 (2372)** **FSG00535 (2441)** **FSG00527 (2380)**	Yoke laminations regarding different batches received at ORMET from FSG, showed oxidation on the punched surface. Bathes id nr. **HCMB__A133-** **FSG00532 / FSG00525 / FSG00536 / FSG00534 / FSG00531 / FSG00535 / FSG00527** Please find here some pictures.	***We shall proceed as we did in the past, i.e. clean off the rust at the latest stage*** (from e-mail dated 28/04/2006 by Mr. F. Savary) This means that the laminations, not yet stacked, shall be assembled "as is" and the outer surfaces cleaned at the final stage of assembly at ASG works when the packs are put together to make the ½ yokes. All the lamination packs shall be cleaned in such a way the corrosion is totally removed from the visible/accessible surfaces (with Scotch-Brite and vacuum cleaning).	
060619A	NC CERN 394	**2351**	During the He leak test on **CM 2351**, pressurized to **26 bar**, a leak has been detected on the internal bellow of heat exchanger. Leak rate **Q ≈ 1.0 E-5 mbar ·l/s** (nom. value 1.0E-9 mbar·l/s max.) Defective bellow id. nr. **XS1844** (X-line side bellow) See details on continuation page.	ASG will leave the cold mass concerned pending • until CERN can organize a visit to repeat the test with CERN experts in vacuum OR • until CERN authorization to proceed with the repairing procedure already applied on previous magnets with the same problem. See details of the procedure on continuation page. --- Repair should be done as described below. --- Side bellow (defective component id. n. XS1844) and Central bellow	

				(XC1761) have been changed with new ones. New components identification: side bellow n. **XS0969 B,** central bellow n. **XC1819.** Leak test performed again successfully: see test report "**Leak_test_2351.xls**".	
060626B	NC CERN 395	**2325**	During final electrical test performed on **CM 2325**, a short circuit of a wire of **V-tap EE831** to ground has been detected. See sketch on continuation page. **ANNULLATA / CANCELLED**	The V tap should be insulated w.r. t. ground. The magnet can be delivered then and used as is. **ANNULLATA / CANCELLED**	
060712A	NC CERN 396	**2336**	During the He leak test on **CM 2336**, pressurized to **26 bar**, a leak has been detected. Further test, on the CM out of the vacuum vessel, showed that the leak was near the weld of the N-line tube to the flexible line end (N.C.S.). The exact position of the leak is on heat affected zone (HAZ) of base material of the N-line tube. N-line tube id. nr. **DM000844** ASG proceeded with the repair of the weld. Please find here after some pictures. ASG will perform mechanical test and chemical analysis on a sample (base material + HAZ) regarding this N-line tube to check its properties.	**Closed by CERN (M. Bajko) directly on MTF**	
060714A	NC CERN 397	**2362**	During the He leak test on **CM 2362**, pressurized to **26 bar**, a leak has been detected. Further test, on the CM out of the vacuum vessel, showed that the leak was near the weld of the N-line tube to the flexible line end (N.C.S.). The exact position of the leak is just at the limit of the weld on base material along few mm N-line tube id. nr. **DM000852** ASG proceeded with the repair of the weld. Please find a picture here after. A sample of the tube will be given to CERN people for test.	**Closed by CERN (M. Bajko) directly on MTF**	
060717A	NC CERN 398	**2333**	During the He leak test on **CM 2333**, pressurized to **26 bar**, a leak has been detected on the internal bellow of heat exchanger. Leak rate **Q ≈ 1.0 E-5 mbar ·l/s** (nom. value 1.0E-9 mbar·l/s max.) Defective bellow id. nr. **XS0964** (X-line side bellow) See details on continuation page.	ASG will leave the cold mass concerned pending • until CERN can organize a visit to repeat the test with CERN experts in vacuum OR • until CERN authorization to proceed with the repairing procedure already applied on previous magnets with the same problem. See details of the procedure on continuation page. ---------- Side bellow (defective component id. n. **XS0964 B**) and Central bellow (**XC1821**) have been changed with new ones. New components identification: side bellow n. **XS0774 B,** central bellow n. **XC1860.** Leak test performed again successfully: see test report "**Leak_test_2333.xls**".	
060720A	NC CERN 399	**FSG00533 (2405)** **FSG00552 (2377)** **FSG00548 (2384)**	Yoke laminations regarding different batches received at ORMET from FSG, showed oxidation on the punched surface. Bathes id nr. **HCMB__A133-** **FSG00533 / FSG00552 / FSG00548 / FSG00546 / FSG00544 / FSG00543 / FSG00542 / FSG00539** Please find here some pictures.	***We shall proceed as we did in the past, i.e. clean off the rust at the latest stage*** (from e-mail dated 28/04/2006 by Mr. F. Savary) This means that the laminations, not yet stacked, shall be assembled "as is" and the outer surfaces cleaned at the final stage of assembly at ASG works when the packs are put together to make the ½ yokes. All the lamination packs shall be cleaned in such a way the corrosion is totally removed from the visible/accessible surfaces (with Scotch-Brite	

		FSG00546 (2383) **FSG00544 (2375)** **FSG00543 (2357)** **FSG00542 (2406)** **FSG00539 (2386)**		and vacuum cleaning).	
060810A	NC CERN 400	**2382**	After collaring of **CC 2382**, high energy discharge test on QHs, damaged QH id. nr. **ASG-CICO-A01406** near N.C.S. Details: position **D1-UPPER** (N.C.S.), pole **02P01526**, outer layer **02E01529**, QH id. nr. **ASG-CICO-A01406**, strip **YT111+.** Details about test results and actions on continuation pages.	Collared coil has been dismantled, c.b.t. (MB-CBT-2344 & 2389) has been changed with new ones (MB-CBT-2397 & 2398). After re-collaring electrical test has been performed successfully.	
060824A	NC CERN 401	**2401**	After curing, a visual check of **outer layer** nr. **02E01608** for **CM 2401**, showed a damage of cable insulation on 1st turn along 200mm about, on NCS. For details, please look at the annexed pictures on continuation page.	ASG will proceed to restore the insulation.	
060824B	NC CERN 402	**2400**	After curing, a visual check of **outer layer** nr. **02E01601** for **CM 2400**, showed a displacement of 0.5mm between 2nd and 3rd turn at 200 mm from NCS.	ASG is proposing to use-as-is. As magnetic measurements did not show any anomaly and the badly positioned turne was well glued, the coil can be used as is. (all status of magnetic measurements are OK; no alarmes!)	
060824C	NC CERN 403	**2401**	After curing, a visual check of **outer layer** nr. **02E01605** for **CM 2401**, showed a displacement of 0.5mm between 1st & 2nd turn and between 4th & 5rd turn at 200 mm from NCS.	ASG is proposing to use-as-is. As magnetic measurements did not show any anomaly and the badly positioned turne was well glued, the coil can be used as is. (all status of magnetic measurements are OK; no alarmes!)	
060906A	NC CERN 404	**FSG00551 (_____)** **FSG00553 (2391)** **FSG00559 (2392)** **FSG00547 (2389)** **FSG00573 (2397)**	Yoke laminations regarding different batches received at ORMET from FSG, showed oxidation on the punched surface. Bathes id nr. **HCMB__A133- FSG00551 / FSG00553 / FSG00559 / FSG00547 / FSG00573**	***We shall proceed as we did in the past, i.e. clean off the rust at the latest stage*** (from e-mail dated 28/04/2006 by Mr. F. Savary) This means that the laminations, not yet stacked, shall be assembled "as is" and the outer surfaces cleaned at the final stage of assembly at ASG works when the packs are put together to make the ½ yokes. All the lamination packs shall be cleaned in such a way the corrosion is totally removed from the visible/accessible surfaces (with Scotch-Brite and vacuum cleaning).	
060907A	NC CERN 405	**2385**	During the He leak test on **CM 2385**, pressurized to **26 bar**, a leak has been detected on a bellow of heat exchanger. Leak rate **Q ≈ 1.0 E-5 mbar ·l/s** (nom. value 1.0E-9 mbar·l/s max.) Defective bellow id. nr. **XS0768 B** (X-line side bellow) See details on continuation page.	ASG will leave the cold mass concerned pending • until CERN can organize a visit to repeat the test with CERN experts in vacuum OR • until CERN authorization to proceed with the repairing procedure already applied on previous magnets with the same problem. See details of the procedure on continuation page.	

				---------- Side bellow (defective component id. n. XS0768B) and Central bellow (XC1805) have been changed with new ones. New components identification: side bellow n. **XS1396 B**, central bellow n. **XC1807.** Leak test performed again successfully: see test report "**Leak_test_2385.xls**".	
060912A	NC CERN 406	**2395**	After collaring of **CC 2395**, HV electrical test at 5 kV showed a low insulation resistance between pole **02P01580** (pos. **D2-upper**) and ground. Measured leakage current **I ≅ 150 uA** (nom. I > 20 uA)	The zone affected by low insulation resistance has been localized near the layer jump. ASG proceeded to open partially this CC. The low insulation zone has been found between the end of the layer jump spacer and the coil protection sheet: the problem has been caused by a little burr on the edge of the protection sheet and a consequent reduction of thickness of the polyimide foil. ASG proceeded to restore the ground insulation: insulation of QH has been also checked. ---------- ASG personnel involved in CC assembling have been pushed to pay more attention in checking all the protection sheets before their installation on CC. ---------- The responsibility for the electrical integrity of the cold mass it will remain for long term of ASG.	
060919A	NC CERN 407	**2391**	During finishing of electrical connections on **CM 2391**, we found some damaged strands on CS bus-bar end (M3-line). We didn't see the problem before longitudinal welding because we mount the bus bars with their caps on the extremities. See annexed pictures.	The damaged strands have been put in the right position and Rutherford cable restored about its dimension (soldering process). See annexed pictures on continuation pages.	
060922A	NC CERN 408	**2403**	Visual check of cold bore tubes installed on **CC 2403** showed scratches on the inner surface of the tubes, mostly on the ends. A lot of dust and metal particles have been found also. See attached pictures. C.b.t. id. nr. **MB-CBT-1006; MB-CBT-1018**	ASG proceeded with cleaning of these tubes and removing scratches before passing the go-no-go gauge. In agreement with CERN, ASG proceeded with collaring. Tubes will be submitted to CERN personnel for visual inspection (Mr. Musso visit on Sept. 25th)	
	NC CERN 409	**Bus-bars**	Last bus-bars, delivered from ALSTOM to in ASG on 30-08-2006, are wet by water. Even the outer surface of the packaging seems to be dry, inside the nylon bags there is water as it can be seen from annexed pictures.	ASG will proceed by removing from the rack the upper layer in order to inspect the lower one. We will open the nylon protection in order to dry the bus-bars. After drying, electrical insulation test will be performed on each bus-bar.	**X**
061006A	NC CERN 410	**FSG00561 (2270)** **FSG00564 (2398)** **FSG00572 (2411)** **FSG00575 (2395)**	Yoke laminations regarding different batches received at ORMET from FSG, showed oxidation on the punched surface. Bathes id nr. **HCMB__A133- FSG00561 / FSG00564 / FSG00572 / FSG00575**	***We shall proceed as we did in the past, i.e. clean off the rust at the latest stage*** (from e-mail dated 28/04/2006 by Mr. F. Savary) This means that the laminations, not yet stacked, shall be assembled "as is" and the outer surfaces cleaned at the final stage of assembly at ASG works when the packs are put together to make the ½ yokes. All the lamination packs shall be cleaned in such a way the corrosion is totally removed from the visible/accessible surfaces (with Scotch-Brite and vacuum cleaning).	
061004A	NC CERN 411	**C.b.t. MB-CBT-1013 –**	Visual inspection of different cold bore tubes showed scratches along the whole inner surface. **MB-CBT- 1013 – 1005 – 1020 – 1003 – 0999 – 1001 – 0998 –**	In agreement with CERN all the cold bore tubes will be cleaned very carefully to remove dust and metal particles and will be installed on different CC.	

		1005 – 1020 – 1003 – 0999 – 1001 – 0998 – 1019 – 0905 – 1006 – 1008 – 1012 – 1014 – 1016 – 1017 – 2472 – 2473 – 2474 – 2475 – 2476 – 2477 – 2478 – 2479 – 2480 – 2481 – 2483 – 2484 – 2487 – 2489 – 2490 – 2491 – 2492 – 2493 – 2494 – 2495 -	**1019 – 0905 – 1006 – 1008 – 1012 – 1014 – 1016 – 1017 – 2472 – 2473 – 2474 – 2475 – 2476 – 2477 – 2478 – 2479 – 2480 – 2481 – 2483 – 2484 – 2487 – 2489 – 2490 – 2491 – 2492 – 2493 – 2494 - 2495** See annexed pictures.	Please refer to traceability table of each single collared coils for details about id. number of installed cold bore tubes.	
061009A	NC CERN 412	**2325**	With reference to doc. nr. **NC CERN 395**, further electrical check showed that the problem was on insulation of the **sextupole nr. MCS-MA-I1167**. This sextupole magnet has been dismantled and it will be rejected. ASG is asking a replacement component.	According to CERN the relevant component (**sextupole nr. MCS-MA-I1167**) will be returned to supplier	
061010C	NC CERN 413	**C.b.t. MB-CBT-0905**	Visual inspection of cold bore tube nr. **MB-CBT-0905** showed damaged insulation.	In agreement with CERN this c.b.t. will be sent to CERN for repair and test.	
061010A	NC CERN 414	**Diode MDA0506**	After dismounting of diode **MDA0506** from **CM 2049,** low insulation resistance has been detected.	In agreement with CERN this diode will be sent to CERN for repair and test.	
061010B	NC CERN 415	**Sextupole MCS-MA-I1167**	Incoming inspection of sextupole nr. **MCS-MA-I1167** showed low insulation resistance. Measured R to gnd = **700 MOhm**	In agreement with CERN this sextupole will be sent to CERN for repair and test.	
061012A	NC CERN 416	**2325**	With reference to NC CERN 412, after cutting of end cover, change of sextupole magnet and re-welding of end-cover on NCS, geometrical maesurements showed an out-of-tolerance of -0.35 mm (total L = 15155.65 mm). Please note that flanges diam=53 / 82 ("collarette" – dwg. nr. LHBMB__S0121 P.1) has been machined to a reduced length (-2mm)		

061011A	NC CERN 417	**2363**	After collaring of **CC 2363**, a dimensional check of cold bore tubes showed that inner diameters are out-of-tolerance. After several trials of enlarging the tube, that behavs elastically it was decided to leave as is. Resuming the situation: a) go-no-go gauge (D=49.65 mm) doesn't pass inside the tubes, at the level of the splice b) the magnetic measurement mole and the beam screen sample of a length of 1 m is passing easily This situation has been checked also by Ms. Bajko and Mr. Heer		
061011B	NC CERN 418	**2398**	During electrical test performed before welding of end covers on **CM 2398**, a low insulation resistance has been detected between bus-bar B-type n. **623** (installed on M3 line) and ground. Measured values: R=312 MOhm between this bar and ground R=770 MOhm between bars	Electrical test performed on CM gave following result about insulation resistance: ➢ Magnet+QH+bus MB to GROUND = 9.1 GOhm (nom. > 1 GOhm) ➢ bus QF + QD to GROUND = 41.6 GOhm (nom. > 1 GOhm) ➢ circuit spools (bus 18/19) to GROUND 47.8 GOhm (nom. > 1 GOhm) ➢ bus (11/12) to GROUND = 169 GOhm (nom. > 1 GOhm)	
061012B	NC CERN 419	**2399**	Before installation of bus bar B-type n. **624** on **CM 2399,** a low insulation resistance has been detected between the two bars. Measured value (bar-to-bar): R=700 MOhm This bus-bar has been installed on M3 line.		
061018B	NC CERN 420	**2398**	During the He leak test on **CM 2398**, pressurized to **20 bar**, a leak has been detected. Leak rate **Q ≈ 4 E-3 mbar·l/s** (nom. value 1.0E-9 mbar·l/s max.) Further test, on the CM out of the vacuum vessel, showed that the leak was near the weld of the N-line tube to the flange of flexible line (on N.C.S.). The exact position of the leak was on a defect between the weld and the base material. See annexed picture about bubble test, on continuation page. N-line tube id. nr. **DM000732**	According to CERN (M. Bajko, during visit in ASG on 17.10.06) ASG will proceed with repair of the weld. He leak test will be repeated. ---------- Weld of N-line tube has been repaired (see picture on continuation page). Leak test performed successfully (ref. to Test Report **Leak_test_2398.xls)**	
061019B	NC CERN 421	**2790 (2290)**	During cold test at CERN of CM 2290, a fault of QH YT 122 has been detected and CM sent back to ASG for inspection. On 2006 October, 17th CC has been decollered and inspected under the witness of CERN people. (M. Bajko, G. Molinari). Visual inspection showed a damage of the QH strip YT 122 on pole **02P01158** (Ap.1 – Upper pole) caused by an overlapping of s.s. coil protection sheets near NCS end. Outer layer **02E01161** showed little marks on sc cable (see pictures).	According to CERN people, ASG proceeded with restoring cable insulation (see pictures) After electrical test pole **02P01158** will be re-installed on collared coil renamed to **CC 2790** **----------** **CC 2790** has been collared and electrical test performed succsefully (see test report "**Collared Coils 2790.xls**" sent to CERN on 06.11.2006	
061023A	NC CERN 422	**2401**	During the He leak test on **CM 2401**, pressurized to **20 bar**, a leak has been detected. Leak rate **Q ≈ 1 E-3 mbar·l/s** (nom. value 1.0E-9 mbar·l/s max.) Further test, on the CM out of the vacuum vessel, showed that the leak was near the weld of the N-line tube to the flange of flexible line (on N.C.S.). The exact position of the leak was on a defect between the weld and the base material. See annexed picture about bubble test, on continuation page. N-line tube id. nr. **DM000859**	ASG will proceed with repair of the weld. He leak test will be repeated.	

061025A	NC CERN 423	**2404**	During geometrical measurements of **CM 2404**, a failure of the hard disk installed on PC id. nr. LHC-100 occurred. Then all the data files regarding geometrical measurements of the position of decapole were missing. Nevertheless all the measures are OK and the position of the decapole respects the tolerances.	Due to the fact that the PC can not be recovered the measurements data are lost. During the whole production no one case was detected with MCD magnets out of the tolerance therefore the cut of the end cover to measure the correctors (of 120 working hours) is not justified. Moreover the operators and their responsible guaranteed that the measurements were showing a good position of the correctors.	
061026A	NC CERN 424	**2401**	Final check of c.b.t. installed on **CM 2401** showed a very small reduction of inner diameter of **V1-line** cold bore tube. Beam screen sample of a length of 1 m is passing easily, but go-no-go gauge showed that the diameter is a little less than 49.65 mm.2401		
061106A	NC CERN 425	**ULTEM spacers**	After winding, visual inspection of different of **outer layers** showed that sometimes the ULTEM spacer is out of its geometrical position. Further checks showed that the ULTEM spacer is well positioned between turns and it covers the width of the sc cable. However turns are well supported. The problem seems to be related to a lightly big dimension of that component and to the fact that during winding operation sometimes it is put with a slight lower angle.		
061106B	NC CERN 426	**Cu wedge to end-spacer air gap**	After winding, visual inspection of different of **outer layers** showed that sometimes the air gap between the Cu wedge and the end-spacer is bigger than nominal The problem seems to be related to the functioning of the CTE winding machine only.	Operators should pay special attention when winding on the mentioned machine and correct when is possible.	
061107C	NC CERN 427	**2412**	During longitudinal welding of **CM 2412** the welding process has been stopped because of an accidental stop of the gas shielding trailer. ASG proceeded with the repair of the weld (1st pass) with the cold mass under the press and using proper gas protection.	ASG will perform an X-ray examination of the longitudinal weld only on the repaired part. Results of X-ray test will be added to this NCR. ---------- ASG performed an X-ray examination of the longitudinal weld only on the repaired part. Please find the results of X-ray test on continuation page. No critical defects are detected on the repaired zone, only small porosities: result acceptable.	
061107D	NC CERN 428	**2410**	During the He leak test on **CM 2410**, pressurized to **20 bar**, a leak has been detected. Leak rate **Q ≈ 2 E-3 mbar·l/s** (nom. value 1.0E-9 mbar·l/s max.) Further test, on the CM out of the vacuum vessel, showed that the leak was near the weld of the N-line tube to the flange of flexible line (on N.C.S.). The exact position of the leak was on a defect between the weld and the base material. N-line tube id. nr. **DM000874**	ASG proceeded with repair of the weld. He leak test will be performed again. ---------- Weld repaired, leak test performed successfully. See test report "**Leak_test_2410.xls**".	
061108A	NC CERN 429	**2411**	During electrical test performed before welding of end covers on CM **2411**, an open circuit of temperature sensor **TT821** (serial nr. **CX_LS_X26467**) has been detected.	The electrical circuit of the affected temperature sensor shall be left in place but the wires shall be cut to reasonable length and their extremity properly insulated. A new temperature sensor shall be put in place, fixed to the end plate. One shall follow the instructions given by CERN when the same repair had to be done on the magnet 2006. ---------- CERN reminds ANSALDO to follow strictly the "Installation Procedure"	

				entitled "Pre-series MBA – MBB Cold Mass Instrumentation", Rev.3 dated September 2002 (doc. Ref. LHC-MMS-GB/5837) by G.Brun. --- A new temperature sensor (id. nr. **CX_LS_X26634**) has been installed on the end plate of the active part assembly	
061109B	NC CERN 430	**2409**	During the He leak test on **CM 2409**, pressurized to **20 bar**, a leak has been detected. Leak rate **Q ≈ 5 E-3 mbar·l/s** (nom. value 1.0E-9 mbar·l/s max.) Further test, on the CM out of the vacuum vessel, showed that the leak was near the weld of the N-line tube to the flange of flexible line (on N.C.S.). The exact position of the leak was on a defect between the weld and the base material. N-line tube id. nr. **DM000711**	ASG proceeded with repair of the weld. He leak test will be performed again. --- Leak test performed successfully. See test report "**Leak_test_2409.xls**" sent by e-mail to CERN on 09/11/2006	
061114A	NC CERN 431	**2412**	During the He leak test on **CM 2412**, pressurized to **20 bar**, a leak has been detected. Leak rate **Q ≈ 5 E-3 mbar·l/s** (nom. value 1.0E-9 mbar·l/s max.) Further test, on the CM out of the vacuum vessel, showed that the leak was near the weld of the N-line tube to the flange of flexible line (on N.C.S.). The exact position of the leak was on a defect between the weld and the base material. N-line tube id. nr. **DM000737**	ASG proceeded with dismantling the N-line tube from its supports in order to check if it was possible to repair the weld, but after that, ASG, in agreement with CERN, decided to change the N-line tube and flexible line. Defective N-line tube (DM000737) with flexible line (NN1795) have been changed with a new one: N-line tube id. nr. **DM000261**, flexible line id. nr. **NN0926** Defective components are put aside for further inspection by CERN personnel.	
061115A	NC CERN 432	**2402**	During the He leak test on **CM 2402**, pressurized to **20 bar**, a leak has been detected. Leak rate **Q ≈ 1 E-3 mbar·l/s** (nom. value 1.0E-9 mbar·l/s max.) Further test, on the CM out of the vacuum vessel, showed that the leak was near the weld of the N-line tube to the flange of flexible line (on N.C.S.). The exact position of the leak was on a defect between the weld and the base material. N-line tube id. nr. **DM000878**	Leak test performed successfully. See test report "**Leak_test_2409.xls**" sent by e-mail to CERN on 16.11.2006	
061120A	NC CERN 433	**2422**	After collaring of **CC 2422**, a visual inspection of QH wires showed that: • QH nr. **CIV-A0413** has 2 wires with wrong reference colour: wire **YT111 (+)** is **GREEN-GREY** (instead of yellow), wire **YT112 (+)** is **YELLOW** (instead of green-grey) Position of the QH: D1 – Upper – Left Side (CS view) • QH nr. **CIV-A0414** has 2 wires with wrong reference colour: wire **YT211 (+)** is **GREEN-GREY** (instead of yellow), wire **YT212 (+)** is **YELLOW** (instead of green-grey) Position of the QH: D2 – Upper – Left Side (CS view). However, the cabling (numbering and positioning) of the QH wires to the end connector has been properly made and all the required electrical checks performed.	Can be used as is but there must be a warning at the beginning of the traveller and a sticker attached to the cold mass extremity to indicate clearly the mistake. **A clear WARNING STICKER shall be put on the cold mass**	
061127B	NC CERN 434	**2431**	During winding of the last turn of **inner layer** nr. **02I01725** (sc cable nr. **01B11029E**) for **CM 2431**, a malfunctioning of the winding machine Spirex 1500 caused a damage of the sc cable (see annexed picture on continuation page). This damage has been probably caused by a failure of the sensor of the tension of the cable.	Inner layer **02I01725** shall be rejected. ASG is asking CERN a new inner layer cable on ASG expense. --- A new layer has been manufactured: **02I31725** (sc cable id. nr. **01B11046A**)	

061127C	NC CERN 435	**2429**	During winding of **outer layer** nr. **02E01719** (sc cable nr. **02B50831C**) for **CM 2429**, a visual inspection showed the cross-section of the Rutherford cable completely buckled, at about **490 m** from the start, on **200 mm** length, on 16th turn. This defect was already detected by SELVA during wrapping operation, but they could confirm if the cable can be used or not, that means if the cable simply had some strands out-of-position or if it was cable buckled	ASG had to stop the winding operation and to rewind the cable on its spool. The cable is rejected and sent back to CERN. ASG is asking CERN a replacement cable. ---------- A new layer has been manufactured: **02E01719** (sc cable nr. **02B50705D**)	
061128C	NC CERN 436	**2430**	During winding of **inner layer** nr. **02I01724** (sc cable nr. **01B11029A**) for **CM 2430**, a visual inspection showed different damages of insulation starting from the end of the cable. The operator made the necessary repairs of the insulation and continued winding. At about 180 m from the beginning, the cable showed a critical damage of the superconductor (see annexed picture), then ASG decided to stop winding.	ASG had to stop the winding operation and to rewind the cable on its spool. At the moment ASG decided to keep the relevant sc cable in ASG for further inspection by Selva and CERN personnel. The cable (id. nr. **01B11029A**) is rejected and sent back to CERN. ASG is asking CERN a replacement cable. ---------- Visit at Selva, with CERN personnel, was on January, 17th: responsibility seem to be of ASG, not Selva, nor CERN (M. Bajko, 18.01.2007) A new layer has been manufactured: **02I31724** (sc cable nr. **01B11029F**)	
061129A	NC CERN 437	**2421**	Warm magnetic measurements carried out on the collared coils **2421** showed anomalies of 10-15 units in multipoles **a2, a3 and b3** on **all positions** of the straigth part in **Aperture 1**. (ref. test report nr. **HCMB__A001-02000421_CC.xls**)	CERN personnel (Mr. E. Todesco and Ms. C. Vollinger) made further data analysis that indicated these anomalies on **Aperture 1 – Upper Pole – 1st quadrant** (0-90 deg. from CS view) caused by a probable movement of the inner layer of about 0.5 mm. CERN asked ASG to open the collared coil. The collared coil has been opened on **November 28th** under the witness of CERN people (Ms. Bajko and Mr. Todesco). After dismantling of collared coils, a visual inspection showed that during winding of inner layer **02I01685** a wrong Cu wedge type 4-5 has been used instead of type 3-4. This damage is only on one side of the layer as you can see on annexed pictures. ASG is asking CERN for a replacement cable. Following the study made at CERN, (MCS-MA section), the conclusion to change also the LOWER INNER pole of the Aperture 1 of magnet nr. 2421 was taken. This layer due to the extra dimensions of the upper inner layer (wound with the wrong Cu wedge of 2 mm thicker then nominal), during collaring has seen approximately 200 MPa in addition to the normal pre-stress. At this level of pre-stress the properties of the SC and of the insulation are not anymore guaranteed. (*e-mail by M. Bajko dated 09.12.2006*) ---------- Damaged layers a) 02I01685 (sc cable nr. 01B11021A) - upper inner layer of Aperture 1 b) 02I01686 (sc cable nr. 01B11021B) - lower inner layer of Aperture 1 have been changed with new ones a) **02I31685** (sc cable nr. **01B11046C**)	

				b) **02I31686** (sc cable nr. **01B10867B**) F. Terzi - 26.01.2007	
2007					
070109C	NC CERN 438	**2426**	During preparation of bus-bars installed on M2 line (id. nr. **639 type B**) on **CM 2426**, wire nr. 11 of spools on Lyra side have been cut at a reduced length of about 60 mm. See annexed picture on continuation page.	Special mechanical interconnection between the bus bars wires should be done to make possible to perform the standard measurements of insulation of spools once the end cover is welded. To be documented with pictures of the connection.	
070118A	NC CERN 439	**FSG00545 (2690)** **FSG00557 (2445)** **FSG00613 (2412)** **FSG00636 (2422)**	Yoke laminations regarding different batches received at ORMET from FSG, showed oxidation on the punched surface. Bathes id nr. **HCMB__A133-FSG00545 / FSG00557 / FSG00613 / FSG00636**	***We shall proceed as we did in the past, i.e. clean off the rust at the latest stage*** (from e-mail dated 28/04/2006 by Mr. F. Savary) This means that the laminations, not yet stacked, shall be assembled "as is" and the outer surfaces cleaned at the final stage of assembly at ASG works when the packs are put together to make the ½ yokes. All the lamination packs shall be cleaned in such a way the corrosion is totally removed from the visible/accessible surfaces (with Scotch-Brite and vacuum cleaning). --- Action performed: all yoke packs have been properly brushed and oxidation removed.	
070202A	NC CERN 440	**2551**	During final electrical test performed on **CM 2551**, a short circuit between V-tap wire (E014) and ground has been detected.	ASG proceeded opening the diode box and found that the end of the wire wasn't well insulated (wire not connected to diode because no diode has been installed on this CM) The wire has been properly insulated and the diode box cover re-welded. Leak test and final electrical test will be performed again. --- Leak test (ref. dc. " Leak_test_2551.xls ") and final electrical test (ref. doc. "CM_A_2551_final.xls") performed successfully.	
070112A	NC CERN 441	**2427**	During electrical test performed before welding of end covers on CM **2427**, an open circuit of temperature sensor **TT821** (serial nr. **CX_LS_X26719**) has been detected.	The electrical circuit of the affected temperature sensor shall be left in place but the wires shall be cut to reasonable length and their extremity properly insulated. A new temperature sensor shall be put in place, fixed to the end plate. One shall follow the instructions given by CERN when the same repair had to be done on the magnet 2006. CERN reminds ANSALDO to follow strictly the "Installation Procedure" entitled "Pre-series MBA – MBB Cold Mass Instrumentation", Rev.3 dated September 2002 (doc. Ref. LHC-MMS-GB/5837) by G.Brun. --- A new temperature sensor (id. nr. **CX_LS_X26705**) has been installed on the end plate of the active part assembly	
070223A	NC CERN 442	**TT 821**	The following temperature sensors TT 821 has been removed from rejected CMs, so wires cut at reduced length: • CX_LS_X08779 (CM 2013) • CX_LS_X13726 (CM 2023) • CX_LS_X14240 (CM 2032) • CX_LS_X15919 (CM 2049) • CX_LS_X20810 (CM 2051) • CX_LS_X15926 (CM 2069) • CX_LS_X20764 (CM 2098) • CX_LS_X20778 (CM 2124)	All mentioned TT 821 sensors will be sent back to CERN.	

			• CX_LS_X23054 (CM 2190) • CX_LS_X24537 (CM 2239) • CX_LS_X26582 (CM 2290) • CX_LS_X25895 (CM 2368)		
070220A	NC CERN 443	**2421**	During final electrical test of **CM 2421** a swap of wires nr.12 & 13 about auxiliary bus-bars installed on M1-line has been detected. This problem is related to a manufacturing error of the supplier of the bus-bars and cannot be solved by ASG because the auxiliary bus bars are joined together by resin and the swap of the wires is inside of the CM.	ASG solved this problem by re-numbering the wires (n.12 & 13) on CS and by swapping the relevant wires inside the manifold M1-M2-N-lines. So the identification of wires nr.12 & 13 is correct on both sides, but wires nr.12 & 13 are in reversed position on CS. Please refer to the attached sketch and pictures about the connections on next page.	
070313A	NC CERN 444	**2430**	The end-covers installed on **CM 2430** have been re-machined because they were dismantled from a rejected CM: • id. nr. MP000460 (on Connection Side) • id. nr. MP000115 (on Lyre Side) Both end-covers have nominal reference length L=184 mm (Ref. dwg. LHCMB__S0007 rev.F & LHCMB__S0008 rev.F)	Geometrical measurements performed without any problems (see test report "ITP20-HCMBB-2430.xls")	
070227A	NC CERN 445	**2430**	Final electrical measurements, performed on **CM 2430,** showed a short circuit between **poles** and **ground** during HV test at **5 kV.** Further tests showed that the problem was inside the capillary tube.	Capillary tube and wires will be cut and removed from cold mass. A new capillary tube with wires will be prepared and installed on CM. All repairing operations will be performed according to ASG doc. nr. 400RM10402 rev.0 "*Procedura per la sostituzione del tubo capillare IFS*". Electrical test will be performed after assembling of capillary tube.	
070314B	NC CERN 446	**2431**	The end-covers installed on **CM 2431** have been re-machined because they were dismantled from a rejected CM: • id. nr. **MP000134** (on Connection Side) • id. nr. **MP000079** (on Lyre Side) Both end-covers have nominal reference length L=184 mm (Ref. dwg. LHCMB__S0007 rev.F & LHCMB__S0008 rev.F)	Geometrical measurements performed without any problems (see test report "ITP20-HCMBB-2431.xls")	
070314C	NC CERN 447	**2441**	The end-covers installed on **CM 2441** have been re-machined because they were dismantled from a rejected CM: • id. nr. **MP000098**, on Connection Side, has nominal reference length L=184 mm • id. nr. **MP000851** , on Lyre Side, has reduced length L=183 mm. As consequence the CM cylinder has been cut 1 mm longer to compensate the reduced length of the end cover on Lyre Side. (Ref. dwg. LHCMB__S0007 rev.F & LHCMB__S0008 rev.F)	Geometrical measurements completed without any problem (see test report "ITP20-HCMBB-2441.xls")	
070314D	NC CERN 448	**2442**	The end-covers installed on **CM 2442** have been re-machined because they were dismantled from a rejected CM: • id. nr. **MP001592**, on Connection Side, has reduced length L=176 mm • id. nr. **MP001417** , on Lyre Side, has reduced length L=179 mm. As consequence the CM cylinder has been cut 8 mm longer on Connection Side and 5 mm longer on Lyre Side to compensate the reduced length of the end covers. (Ref. dwg. LHCMB__S0007 rev.F & LHCMB__S0008 rev.F)	Geometrical measurements completed without any problem (see test report "ITP20-HCMBB-2442.xls")	
070315A	NC CERN 449	**2435**	The end-covers installed on **CM 2435** have been re-machined because they were dismantled from a rejected CM: • id. nr. **MP000539**, on Connection Side, has nominal reference length L=184 mm • id. nr. **MP000809** , on Lyre Side, has reduced length L=174 mm. As consequence the CM cylinder has been cut 10 mm longer on Lyre	Geometrical measurements completed without any problem (see test report "ITP20-HCMBB-2435.xls")	

			Side to compensate the reduced length of the end cover. (Ref. dwg. LHCMB__S0007 rev.F & LHCMB__S0008 rev.F)		
070346A	NC CERN 450	**2446**	After collaring of **CC 2446**, electrical test at high voltage showed an interturn short circuit on **upper pole** id. nr. **02P01784** of **Aperture 2** (**D2 – Upper**), **outer layer 02E01787** After opening of collared coils, the short circuit has been detected between 18th and 19th turn at 8250 mm from CS. See annexed pictures for details.	ASG will proceed to restore the interturn insulation between 18th and 19th turn in the affected zone. Re-collaring of CC 2446 will be performed again. --- Interturn insulation has been restored. CC 2446 has been re-collared and electrical test performed successfully (see test report "***Collared Coils 2446.xls***")	
	NC CERN 451	**2436**	The end-covers installed on **CM 2436** have been re-machined because they were dismantled from a rejected CM: • id. nr. **MP000640** (on Connection Side) • id. nr. **MP001103** (on Lyre Side) Both end-covers have nominal reference length **L=184 mm** (Ref. dwg. LHCMB__S0007 rev.F & LHCMB__S0008 rev.F)	Geometrical measurements performed without any problems (see test report "ITP20-HCMBB-2436.xls")	
	NC CERN 452	**X-line bellow** **(CS-central bellow)** **HCQBBIX 001**	This **X - line bellow** (CS - central bellow) has been removed from a rejected CM. Remark: this document is a general NCR attached to different scrapped component on MTF		
	NC CERN 453	**X-line bellow** **(NCS-side bellow)** **HCQBBIX 002**	This **X - line bellow** (NCS - side bellow) has been removed from a rejected CM. Remark: this document is a general NCR attached to different scrapped component on MTF		
	NC CERN 454	**M-line bellow** **HCQBBIM 001**	This **M - line bellow** has been removed from a rejected CM, that means cut from an end-cover to be re-machined, or it was rejected as non-conforming component before assembling. The component will be sent back to CERN. Remark: this document is a general NCR attached to different scrapped component on MTF		
	NC CERN 455	**Convex shell** **HCMB__S 143**	This **Convex shell** has been cut from a rejected CM. Please note that many components of the series (except the last ones) have been used for the manufacturing of CM feet. Remark: this document is a general NCR attached to different scrapped component on MTF		
	NC CERN 456	**Concave shell**	This **Concave shell** has been cut from a rejected CM. Please note that many components of the series (except the last ones)		

		HCMB__S 142	have been used for the manufacturing of CM feet. Remark: this document is a general NCR attached to different scrapped component on MTF		
	NC CERN 457	**Heat exchanger tube** **HCQHBB P004**	This **Heat Exchanger tube** has been removed from a rejected CM. Remark: this document is a general NCR attached to different scrapped component on MTF		
	NC CERN 458	**2437**	The end-covers installed on **CM 2437** have been re-machined because they were dismantled from a rejected CM: • id. nr. **MP000182** (on Connection Side) • id. nr. **MP001290** (on Lyre Side) Both end-covers have nominal reference length **L=184 mm** (Ref. dwg. LHCMB__S0007 rev.F & LHCMB__S0008 rev.F)	Geometrical measurements performed without any problems (see test report "***ITP20-HCMBA-2437.xls***")	
	NC CERN 459	**2513 (2013)**	**CM 2013** has been rejected by CERN, after cold test, because of low performance. This CM has been disassembled and re-assembled as **CM 2513**. After de-collaring, the problem has been detected on poles: extra thickness of shims caused some cracks and delaminations of end-spacers on both ends. Please find, on continuation pages, pictures explaining the defects.	Measurements of pole dimension have been performed again and shims thickness re-calculated. CC and CM re-assembling completed successfully.	
	NC CERN 460	**2523 (2023)**	**CM 2023** has been rejected by CERN, after cold test, because of low performance. This CM has been disassembled and re-assembled as **CM 2523**. After de-collaring, the problem has been detected on pole ends: the problem seemed to come from ends not pre-stressed enough. In particular, visual inspection of poles, under the witness of CERN personnel, showed non-uniform marks on the polyimide of the shims installed on ends. Please find, on continuation pages, pictures explaining the problem.	Measurements of pole dimension have been performed again and shims thickness re-calculated. CC and CM re-assembling completed successfully.	
	NC CERN 461	**2549 (2049)**	**CM 2049** has been rejected by CERN, after cold test, because of insulation fault between QH YT211 and coil / ground. This CM has been disassembled and re-assembled as **CM 2549**. After de-collaring, that QH was found completely burnt just under the edge of the omega piece used for electrical connection. Please find, on continuation pages, pictures explaining the problem.	CC and CM re-assembling completed successfully	
	NC CERN 462	**2444**	The end-covers installed on **CM 2444** have been re-machined because they were dismantled from a rejected CM: • id. nr. **MP001279** (on Connection Side) • id. nr. **MP000635** (on Lyre Side) Both end-covers have nominal reference length **L=184 mm** (Ref. dwg. LHCMB__S0007 rev.F & LHCMB__S0008 rev.F)	Geometrical measurements performed without any problems (see test report "***ITP20-HCMBA-2444.xls***")	
	NC CERN 463	**2443**	The end-covers installed on **CM 2443** have been re-machined because they were dismantled from a rejected CM: • id. nr. **MP001226** (on Connection Side) • id. nr. **MP000408** (on Lyre Side) Both end-covers have nominal reference length **L=184 mm** (Ref. dwg. LHCMB__S0007 rev.F & LHCMB__S0008 rev.F)	Geometrical measurements performed without any problems (see test report "***ITP20-HCMBA-2443.xls***")	

	NC CERN 464	**2739**	The end-covers installed on **CM 2739** have been re-machined because they were dismantled from a rejected CM: • id. nr. **MP001463** (on Connection Side) • id. nr. **MP000724** (on Lyre Side) Both end-covers have nominal reference length **L=184 mm** (Ref. dwg. LHCMB__S0007 rev.F & LHCMB__S0008 rev.F)	Geometrical measurements performed without any problems (see test report "***ITP20-HCMBA-2739.xls***")	
	NC CERN 465	**2551** **(2051)**	**CM 2051** has been rejected by CERN, after cold test, because of low performance. This CM has been disassembled and re-assembled as **CM 2551**. Please refer to **NC CERN 169** for details about the problem of shim thickness.	Measurements of pole dimension have been performed again and shims thickness re-calculated. CC and CM re-assembling completed successfully.	
	NC CERN 466	**2569** **(2069)**	**CM 2069** has been rejected by CERN, after cold test, because of low performance. This CM has been disassembled and re-assembled as **CM 2569**. After de-collaring, no visible problem has been detected. Please find, on continuation pages, some pictures. According to CERN, ASG decided to change pole installed on Apt. 2	New poles **02P30275** and **02P30277** has been manufactured. Measurements of pole dimension have been performed again and shims thickness re-calculated. CC and CM re-assembling completed successfully.	
	NC CERN 467	**2598** **(2098)**	**CM 2098** has been rejected by CERN, after cold test, because of low performance: in particular a very weak point has been detected on D2 Upper, on non-connection side This CM has been disassembled and re-assembled as **CM 2598**. After de-collaring, no visible problem has been detected. No pictures available. According to CERN, ASG decided to change pole **02P00393** installed on Apt. 2	A new pole **02P30393** has been manufactured. Measurements of pole dimension have been performed again and shims thickness re-calculated. CC and CM re-assembling completed successfully.	
	NC CERN 468	**2624** **(2124)**	**CM 2124** has been rejected by CERN before cold testing "***because of an electrical insulation fault, which was detected during the quench heater discharge at warm (YT211 with respect to ground, final investigations will be performed after removal of the magnet from the bench***" (from CERN e-mail dated 7th Dec. 2004). This CM has been disassembled and re-assembled as **CM 2624**. Please find here attached some pictures explaining the fault: the QH has been found burnt near the connection of the s.s. strip to the omega piece.	All relevant components have been changed. CC and CM re-assembling completed successfully.	
	NC CERN 469	**2690** **(2190)**	**CM 2190** has been rejected by CERN before cold testing because of a"***quench heater failure that is once again concerning the heater YT211"*** (from CERN e-mail dated 16/08/2005). This CM has been disassembled and re-assembled as **CM 2690**. Please find here attached some pictures explaining the fault: the QH has been found burnt just under the omega piece.	All relevant components have been changed. CC and CM re-assembling completed successfully.	
	NC CERN 470	**2739** **(2239)**	**CM 2239** has been rejected by CERN because "***this magnet exhibits a behavior compatible with an inter-turn short after the 1st quench at 10'700 A.*** ***A discharge test at 3KV after the 1st quench was done. It did not confirm the above.*** ***The test sequence went on as follows:*** • ***Provoked quench at 3 KA, then discharge test: normal***	A new pole **02P00956** has been manufactured. All acceptance test have been performed again. CC and CM re-assembling completed successfully.	

			response. • ***Provoked quench 6 KA, then discharge test: normal response.*** • ***Provoked quench 9 KA, then discharge test: response compatible with an inter-turn short.*** • ***Warm-up quench 6 KA, then discharge test: response compatible with an inter-turn short.*** ***The magnet has been rinsed with nitrogen.*** ***Discharge tests at room temperature will be carried out (as of this Monday 12th) step by step at increasing voltage: 600 V (holding point for checking results and see whether it is necessary to go ahead), 1 KV (holding point for checking results and see whether it is necessary to go ahead), 2 KV (holding point for checking results and see whether it is necessary to go ahead) and 3 KV.*** ***The pole D2 Upper is concerned.***" (from CERN e-mail dated 12/12/2005). Then ***The inter-turn short is confirmed at warm by a discharge test at 600 V*** (from CERN e-mail dated 13/12/2005). Visual inspection of the coils showed D2-Upper pole (**02P00956**) burnt This CM has been disassembled and re-assembled as **CM 2739**. Please find here attached some pictures explaining the fault.		
	NC CERN 471	**2868 (2368)**	**CM 2368** has been rejected by CERN because of a "***detection at warm (and before the cooling of that magnet) of a defect of the quench heater***" **YT221** (from CERN e-mail dated 10/08/2006). This CM has been disassembled and re-assembled as **CM 2868**. Please find here attached some pictures explaining the fault: the QH s.s. strip has been found cut and burnt near the the omega piece maybe caused by a longitudinal force along the QH.	All relevant components have been changed. CC and CM re-assembling completed successfully.	
	NC CERN 472	**2868**	During the assembling of **CM 2368** a misalignment of the upper and the lower half shell has been detected. The two half shells, joined together with screws before longitudinal welding, showed an air gap in the centre of the CM greater than 10 mm. Half shell L532 seems to be deformed, so alignment and longitudinal welding cannot be performed. We have to remove the half shell and the lower half yoke from the conveyor , then we have to rotate them and finally change the lower half shell with a new one and rotate again: then we can go on conveyor for the alignment. Half shells U664 and L532 have been put aside and changed with **U2684** and **L2584**.	Defective half shells changed with **U2684** and **L2584** Cold mass welded without any problem.	
	NC CERN 473	**2445**	The end-covers installed on **CM 2445** have been re-machined because they were dismantled from a rejected CM: • id. nr. **MP001377**, on Connection Side, has reduced length	Geometrical measurements completed without any problem (see test report "***ITP20-HCMBA-2445.xls***")	

			L=179.5 mm • id. nr. **MP000301** , on Lyre Side, has nominal reference length L=184 mm. As consequence the CM cylinder has been cut 3.5 mm longer to compensate the reduced length of the end cover on Connection Side. (Ref. dwg. LHCMB__S0007 rev.F & LHCMB__S0008 rev.F)		
	NC CERN 474	**2446**	The end-covers installed on **CM 2446** have been re-machined because they were dismantled from a rejected CM: • id. nr. **MP000880**, on Connection Side, has reduced length L=181 mm. • id. nr. **MP001488**, on Lyre Side, has nominal reference length L=184 mm As consequence the CM cylinder has been cut 3 mm longer to compensate the reduced length of the end cover on Connection Side. (Ref. dwg. LHCMB__S0007 rev.F & LHCMB__S0008 rev.F)	Geometrical measurements completed without any problem (see test report "ITP20-HCMBA-2446.xls")	
	NC CERN 475	**2690**	The end-covers installed on **CM 2690** have been re-machined because they were dismantled from a rejected CM: • id. nr. **MP000671**, on Connection Side, has nominal reference length L=184 mm • id. nr. **MP000425**, on Lyre Side, has reduced length L=181 mm As consequence the CM cylinder has been cut 3 mm longer to compensate the reduced length of the end cover on Lyre Side. (Ref. dwg. LHCMB__S0007 rev.F & LHCMB__S0008 rev.F)	Geometrical measurements completed without any problem (see test report "ITP20-HCMBA-2690")	
	NC CERN 476	**2868**	During the He leak test on **CM 2868**, pressurized to **20 bar**, a leak has been detected. Leak rate **Q ≈ 1 E-3 mbar·l/s** (nom. value 1.0E-9 mbar·l/s max.) Further test, on the CM out of the vacuum vessel, showed that the leak was on a weld of a flange of M1-line (on NCS)	ASG proceeded with repair of the weld. He leak test will be performed again.	