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| Traveler Title | L2HE cold FPC incoming inspection |
| Traveler Abstract | Covers L2HE cold FPC part incoming inspections and acceptance tests at JLAB |
| Traveler ID | L2HE-CAV-INSP-cFPC |
| Traveler Revision  | R1 |
| Traveler Author | M. Stirbet |
| Traveler Date | 13-May-2021 |
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| Approval Names | Mircea Stirbet | Tony Reilly | Danny Forehand | Naeem Huque |
| Approval Signatures |  |  |  |  |
| Approval Dates |  |  |  |  |
| Approval Title | Author | Reviewer | Reviewer | Reviewer |

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| References | List and Hyperlink all documents related to this traveler. This includes, but is not limited to: safety (THAs, SOPs, etc), drawings, procedures, and facility related documents. |
| SOW-FPC-LCLSII-4.5-SW-0236-R2 | ESD-FPC-LCLSII-4.5-ES-0055-R1 | LCLS-II-4 5-EN-0272 Metrology inspection Report- Cold Assembly | ES&H Manual 6106 Appendix T3 Risk Assessment and Safety Controls for Safe Lifting<https://www.jlab.org/ehs/ehsmanual/6106T3.htm> | CP-L2PRO-cFPC-INPREP |
| ICD-FPC-LCLSII-4.5-IC-0237 | LCLSII-FPC-Acceptance report | LCLS-II-4 5-EN-0273 Metrology Inspection Report- Warm Assembly  | **CP-LCLSII-FPC-incoming inspection procedure** | **CP-LCLSII-FPC-EVACUATION, VACUUM LEAK and RGA checks (DESY specifications or leak check per spec 11141S0029)** |
| **BOM FPC cold**  | **BOM FPC warm** | **BOM FPC waveguide** | **BOM FPC accessories (cryo-module related)** | **Drawings-links** |

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| Revision Note |  |
| R1 | Initial release of this Traveler. |

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| Step No. | Instructions | Data Input |
| 1 | The L2HE FPC cold part would arrive in pair, under vacuum assembled on a waveguide. The test stand with couplers is shipped in double metallized plastic bags, backfilled with filtered Nitrogen, thermally sealed.The clean room technicians performing cold FPC part incoming inspections have to:* 1. Record inspection date
	2. Record technician(s) names performing incoming inspection
	3. Check and record cFPC vendor name
	4. Check availability of documentation related with the cFPCs: vendor’s Acceptance reports. If documentation exists, select YES and upload the documentation. If the documentation is missing, comment and generate **NCR**.
	5. Record FPC pair number (the FPC pair refers to the test stand with waveguide onto which: two cold FPC parts, test frame, right angle valve, hardware to protect ceramics, cold restrains).
	6. Visually check the integrity of plastic bags for test stand with two FPC colds. If the plastic bags are not damaged, select YES. If not, use the comment box to record findings and generate NCR.
	7. Record the first cold FPC serial number (the FPC cold refers to the cold FPC parts, hardware to protect ceramics and bellows during transport).
	8. Record the second cold FPC serial number (the FPC cold refers to the cold FPC parts, hardware to protect ceramics and bellows during transport).
 | [[InspectionDate]] <<TIMESTAMP>>[[Operators]] <<USERNAME>>[[VendorName]] {{CPI, RI-Thales}} <<SELECT>>[[AcceptanceReportOK]] <<YESNO>>[[Upload**LINK**Acceptance reports]] <<FILEUPLOAD>>[[CommAcceptanceReport]] <<COMMENT>>[[FPCSN]] <<FPCSN>>[[PlasticBagColdsOK]] <<YESNO>>[[PlasticBagColdsComm ]] <<COMMENT>>[[cFPCSN1]] <<cFPCCSN>>[[cFPCSN2]] <<cFPCSN>> |
| 2 | Transfer two cold FPCs assembled on the test box on a test cart from JLAB’s receiving (Annex) area to the chemistry area. |  |
| 3 | 3.1 Record preparation date for clean room admission | [[PrepCleanDate]] <<TIMESTAMP>> |
| 3.2 Record technician(s) names performing preparation for clean room admission | [[PrepCleanOperators]] <<USERNAME>> |
| 3.3 In the chem room, clean/wipe the first plastic bag containing the test stand with the two cold FPCs. |  |
| 3.4 Remove the first plastic, wipe clean the second plastic bag and transfer the test stand with the two cold FPCs on a clean room wire cart in the pass-through to the main clean room.  |  |
| 3.5 In the clean room, the second plastic bag will be used to perform vacuum leak checks. Record date of test stand admission to the clean room class 10. | [[CleanRoomTestDate]] <<TIMESTAMP>> |
| 4 | Record technician(s) names performing vacuum leak checks | [[VacuumOperators]] <<USERNAME>> |
| 5 | Record date of vacuum leak checks and RGA data collection | [[LeakRGATestDate]] <<TIMESTAMP>> |
| 6 | Tear down the plastic bag:6.1. In front of the right-angle valve, remove hardware and the 2 ¼ blank protecting the right-angle port, control for particulate control for this area then connect the test stand with cold couplers to the clean room UHV pumping system.6.2 In front of each N2 valve on cold ceramic protection, completely open the N2 valve, then seal the cut with clean room tape. |  |
| 7 | With right angle valve closed, check and record test box connection to the pumping system. Upload the 2 ¾ inch flange connection leak test. | [[TestConnection]] <<FILEUPLOAD>> |
| 8 | Perform vacuum leak check (plastic bag check 30 minutes) and upload relevant data file8.1 Is vacuum leak bag check conform specifications? If vacuum leak check is OK, record YES, and upload the analog file. 8.2. If the plastic bag test indicates a leak, select in SpreyLeakTest YES, tear down the plastic bag and identify leak location, by spraying He tests, document leak and generate **NCR.** | [[BagLeakTest]] <<FILEUPLOAD>>[[BagLeakTestOK]] <<YESNO>>[[AnalogLeakTest]] <<COMMENT>>[[SprayLeakTest]] <<YESNO>>[[CommSprayLeakTest]] <<COMMENT>> |
| 9 | If no leak is detected, collect atomic mass data and upload the RGA data file (histogram). If RGA spectra are conforming specification select OK. If RGA spectra are not conforming to specification, document findings in the allocated comment space and generate **NCR.** | [[RGAdata]] <<YESNO>>[[UploadRGAData]] <<FILEUPLOAD>>[[CommRGAdata]] <<COMMENT |
| 10 | Tear down the plastic bag, visually inspect the test stand with cold couplers. |  |
| 11 | Check instrumentation:11.1 Using a multimeter, check if instrumentation electron probe for the first and second FPC cold is properly installed (in resistor mode the multimeter should read infinity). If everything OK record YES. If the electron probe is missing or reading is inadequate, generate **NCR**.11.2 Visually inspect hole pattern on the back of CF100 flange (threaded holes and the two holes for temperature sensors, conform Drawing…). If everything is OK, record YES for each cold coupler. If any issues comment findings and generate **NCR**. | [[InstrColdFPC1OK]] <<YESNO>>[[InstrColdFPC2OK]] <<YESNO>>[[InstrColdsFPCComm]] <<COMMENT>>[[HolesColdFPC1OK]] <<YESNO>>[[HolesColdFPC2OK]] <<YESNO>>[[HolesColdsFPCComm]] <<COMMENT>> |
| 12 | Remove 8 M8 25 mm Nitronic bolts used for cold ceramic protection cup assemble, as well as restraining the cold couplers to the test stand frame. Leave the cold ceramic protection cups in place. Comment and generate **NCR** if any problems with Nitronic bolt removal during this step. | [[M8NitronicBoltsIssues]] <<COMMENT>> |
| 13 | Prepare the cold coupler for visual inspections, particulate counts. This step should be done one coupler after the other, starting with external surfaces, followed by internal surfaces, then the cold ceramic area. |  |
| 14  | Visually inspect the first FPC cold ceramic. The color should be uniform, slightly yellow. If ceramic has scratches, chips, dark spots or a smoky external surface, document and generate **NCR.** | [[FPCCCeramicFirst]] <<COMMENT>>[[FPCCCeramicFirstIssues]] <<COMMENT>>NCR. |
| 15 | Visually inspect the second FPC cold ceramic. The color should be slightly yellow. If ceramic has scratches, chips, dark spots or a smoky external surface, document and generate **NCR.** | [[FPCCCeramicSecond]] <<COMMENT>>[[FPCCCeramicSecondIssues]] <<COMMENT>>NCR. |
| 16 | Visually inspect the CF100 knife on the first FPC (cold ceramic side). If any dents, scratches, copper plating deposits, document and generate **NCR.** | [[FPCCF100KnifeFirst]] <<YESNO>>[[FPCCF100KnifeFirstComm]] <<COMMENT>>NCR. |
| 17 | Visually inspect the CF100 knife on the second FPC (cold ceramic side). If any dents, scratches, copper plating deposits, document and generate **NCR.** | [[FPCCF100KnifeSecond]] <<YESNO>>[[FPCCF100KnifeSecondComm]] <<COMMENT>>NCR. |
| 18 | Visually inspect copper plating on the first cold FPC CF100 flange: should be uniform, without pits, scratches, peeling off, blisters and should stop at ~3 mm from the Conflat flange knife. There should be No Viton residues on copper. If any issues are found, document findings and generate **NCR.** | [[FPCCF100PlatingFirst]] <<YESNO>>[[FPCCF100PlatingFirstComm]] <<COMMENT>>NCR. |
| 19 | Visually inspect copper plating on the second cold FPC CF100 flange: should be uniform, without pits, scratches, peeling off, blisters and should stop at ~3 mm from the Conflat flange knife. There should be No Viton residues on copper. If any issues are found, document findings and generate **NCR.** | [[FPCCF100PlatingSecond]] <<YESNO>>[[FPCCF100PlatingSecondComm]] <<COMMENT>>NCR. |
| 20 | Visually inspect the first cold FPC RF sealing surface (on top of the cold ceramic). Should be smooth, without scratches. If any issues are found, document and generate **NCR.** | [[FPCRFSealingFirst]] <<YESNO>>[[FPCRFSealingFirstComm]] <<COMMENT>>NCR. |
| 21 | Visually inspect the second cold FPC RF sealing surface (on top of the cold ceramic). Should be smooth, without scratches. If any issues are found, document and generate **NCR.** | [[FPCRFSealingSecond]] <<YESNO>>[[FPCRFSealingSecondComm]] <<COMMENT>>NCR. |
| 22 | Visually inspect the bolting hole for the first cold FPC (on the top of the cold ceramic). Should be clean, with good looking threads. If any issues, document and generate **NCR.** | [[FPCBoltHoleFirst]] <<YESNO>>[[FPCBoltHoleFirstComm]] <<COMMENT>>NCR. |
| 23 | Visually inspect the bolting hole for the second cold FPC (on the top of the cold ceramic). Should be clean, with good looking threads. If any issues, document and generate **NCR.** | [[FPCBoltHoleSecond]] <<YESNO>>[[FPCBoltHoleSecondComm]] <<COMMENT>>NCR. |
| 24 | Visually inspect the first cold FPC bellows. Should be smooth, without dents. If any issues are found, document and generate **NCR.** | [[FPCBellowsFirst]] <<YESNO>>[[FPCBellowsFirstComm]] <<COMMENT>>NCR. |
| 25 | Visually inspect the second cold FPC bellows. Should be smooth, without dents. If any issues are found, document and generate **NCR.** | [[FPCBellowsSecond]] <<YESNO>>[[FPCBellowsSecondComm]] <<COMMENT>>NCR. |
| 26 | Record and save particulate counts on the internal volume of the first cold FPC. If particulate counts are greater than 100 for 0.3 particles size or is not reaching 10 counts in about 10 minutes of nitrogen spraying, record data, comment and generate **NCR**. | [[FPCCPartCountFirst]] <<YESNO>>[[FPCCPartCountFirstComm]] <<COMMENT>>NCR. |
| 27 | Record and save particulate counts on the internal volume of the second cold FPC. If particulate counts is greater than 5000 for 0.3 particles size or is not reaching 10 counts in about 10 minutes of nitrogen spraying, record data, comment and generate **NCR**. | [[FPCCPartCountSecond]] <<YESNO>>[[FPCCPartCountSecondComm]] <<COMMENT>>NCR. |
| 28 | Visually inspect sealing surface cavity flange first cold FPC. Should be free of AlMg traces, scratches, and chemical residues. If any issues are found, document and generate **NCR**.  | [[FPCCCavFlangeFirst]] <<YESNO>>[[FPCCCavFlangeFirstComm]] <<COMMENT>>NCR. |
| 29 | Visually inspect sealing surface cavity flange second cold FPC. Should be free of AlMg traces, scratches, chemical residues. If any issues are found, document and generate **NCR**.  | [[FPCCCavFlangeSecond]] <<YESNO>>[[FPCCCavFlangeSecondComm]] <<COMMENT>>NCR. |
| 30 | Visually inspect the copper plated internal surface of the first cold FPC. Should be free of scratches, pits, blisters, embedded particulates, chemical stains. If any issues are identified, document and generate **NCR**. | [[FPCCCuPlatedFirst]] <<YESNO>>[[FPCCCuPlatedComm]] <<COMMENT>>NCR. |
| 31 | Visually inspect the copper plated internal surface of the second cold FPC. Should be free of scratches, pits, blisters, embedded particulates, chemical stains. If any issues are identified, document and generate **NCR**. | [[FPCCCuPlatedSecond]] <<YESNO>>[[FPCCCuPlatedSecondComm]] <<COMMENT>>NCR. |
| 32 | Visually inspect the first cold antenna. It should be free of scratches, chemical residues, erosion spots or mechanical cleaning marks. If any issues are identified, document and generate **NCR**. | [[FPCCAntennaFirst]] <<YESNO>>[[FPCCAntennaFirstComm]] <<COMMENT>>NCR. |
| 33 | Visually inspect the second cold antenna. It should be free of scratches, chemical residues, erosion spots or mechanical cleaning marks. If any issues are identified, document and generate **NCR**. | [[FPCCAntennaSecond]] <<YESNO>>[[FPCCAntennaSecondComm]] <<COMMENT>>NCR. |
| 34  | Select long term storage of the cold FPC parts and record storage date. Use the N2 Storage comment box for any issues during CFPC preparation for long term storage.34.1 Two cold couplers under Nitrogen on the tests waveguide 34.1.1. Place each cFPC on the test waveguide, use the old AlMg seals, and secure the cFPC with 4 M8 washers and nuts. 34.1.2. Reinstall Pongy bolts, cold ceramic protection cups and tighten to about 10 Nm 8 short M8 Nitronic bolts on each CF100 flange. 34.1.3. Using a N2 manifold, back fill with filtered N2 each cold ceramic protection cup and the test waveguide.  34.1.4. Place the test stand with the 2 accepted couplers in double plastic bags (if the test stand with couplers is taken out of the clean room).34.2 Individual cold FPC in the clean room N2 storage cabinet. 34.2.1. Store the cold ceramic protection cup, 8 M8 Nitronic bolts and Pongy bolt in clean room plastic bags. Leave the cold bellows SS restrain in place. 34.2.2. Place the cFPC on the shelf of the N2 cabinet, sitting on the cold RF contact, with antenna pointing up. 34.2.3. Protect the antenna with a glass beaker. 34.2.4. Before cFPC string installation, remove the cold part form the N2 cabinet, inspect the internal volume, check for particulates, place the cFPC on the test waveguide, install Pongy bolt and cold ceramic protection cup using 8 M8 short Nitronic bolts and, using the N2 manifold, back fill with dry, filtered N2 the cold ceramic volume. | [[N2StorageDate]] <<TIMESTAMP>>[[N2StorageType]] {{N2TestStand, N2Cabinet}} <<SELECT>>[[N2StorageComm]] <<COMMENT>> |
| 35 | Is everything as specified at pct. 1-33 OK and all NCR disposed If Yes close traveler. | [[CloseTraveler]] <<CHECKBOX>> |