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| Traveler Title | LCLSII HOM BLA incoming inspection, assembly, and testing  |
| Traveler Abstract | Covers LCLSII HOM BLA incoming inspection, cleaning, assembly and final checks  |
| Traveler ID | L2PRD-CM-INSP-BLA |
| Traveler Revision  | R2 |
| Traveler Author | HyeKyoung Park |
| Traveler Date | 13-Aug-2019 |
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| Approval Names | HyeKyoung Park | Tony Reilly | Edward Daly |  |
| Approval Signatures |  |  |  |  |
| Approval Dates |  |  |  |  |
| Approval Title | Author/SOTR | Production manager | Project Engineer |  |

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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. |
| [Statement of Work for LCLS-II HOM Beam Line Absorber:MEG SPECIFICATION NO.:MEG0002016-S001](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-165011/BLA%20SOW%20rev-D%20final.pdf) | [Particle\_Free Engineering Specifications LCLSII-1.1-ES-0476-R1](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-165012/Particle_Free_Engineering_Specifications.pdf) | CP-LCLSII- cleaning copper plated parts for UHV SRF application. | CP-L2PRD-CM-BLAVVMetal valve incoming leak check procedure | CP-L2PRD- BLA-assyBLA cleanroom assembly procedure |
| [CP-LCLS-II VACUUM LEAK and RGA checks (DESY specifications or leak check per spec 11141S0029)](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-165037/Vacuum_005_DESY_UHV_guidelines_1-5_final_stamp%20Mircea.pdf) | [Experience with and Preparation of the XFEL HOM Beam Line Absorbers - Lutz Lilje DESY 21.1.2016](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-165014/Experience%20with%20and%20Preparation%20of%20XFEL%20BLA.pdf) | [Comments to the production and cleaning of Beam Line Absorbers – Jacek Sekutowicz, Appendix to the FDR Interconnect meeting 07/29/2015](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-165015/2015-08-04-BLA%20-%20Procedure.docx) | [FNAL F10080259 drawing ”Kit, BLA Assembly”](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-165016/F10080259-B-DWG1%2019%20Jul%202018.pdf) |  |
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| Revision Note |  |
| R1 | Initial release of this Traveler.Note: Previous data under L2PRD-CAV-INSP-BLA moved to this traveler |
| R2 | Added step 0, visual inspection for bellows.  |

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| Step No. | Instructions | Data Input |
|  | ***INSPECTION*** |  |
| 0 | ***Incoming visual inspection***This step is added to inspect the bellows before the full visual inspection. The inspection can take place either at the inventory area or at the CMM room. Any location that can minimize the handling is recommended. Remove the BLA from packaging and record the serial numbers.Record date and inspector name.Inspect the bellows. Do not disassemble the unit. Is bellows condition acceptable? Follow the beam line bellows criteria.Upload pictures of all blemishes. Provide comment if any.  | [[BLAHSN]] <<BLAHSN>>[[BLASN]] <<BLASN>>[[Bel\_Vis\_date]] <<TIMESTAMP>>[[BV\_Operator]] <<SRF>>[[Bel\_Acct]] <<YESNO>>[[Bel\_Vis\_Pics]] <<FILEUPLOAD>>[[Bel\_Vis\_comment]] <<COMMENT>> |
|  | ***CMA-LEAK*** |  |
| 1 | ***Incoming leak check.***This leak check is performed with Inficon leak detector at the high bay area.The bellows are very thin. Please be cautious while handling. Replace the shipping caps with beam line blank flanges and diamond metal seals. Torque at least in three steps, starting in star pattern, from 20, 25 and 31 ft. lbs. These values are the same as the assembly torque values.Do not open the large knife edge flange. Record BLA Serial numbers: BLAH for housing and BLAA for absorberEnter date and name.Is the unit leak tight?Upload the strip chart. Please provide comment if any.When the leak check is complete, move units to CMM room for visual inspection. |  [[Leakcheck\_date]] <<TIMESTAMP>>[[LC\_Operator]] <<SRF>>[[Leakcheck\_Pass]] <<YESNO>>[[In\_LC\_chart]] <<FILEUPLOAD>>[[In\_LC\_comment]] <<COMMENT>> |
|  | INSPECTION AGAIN (CAN BE SAME TRAVELER AS ABOVE) |  |
| 2 | Disassemble ceramic absorber from housing. Keep hardware separately. New hardware will be issued for clean room assembly. C-channels will be anodized and G-10 retainers will be replaced by stainless steel retainer. Keep G-10 retainers.Enter inspection date and name.***Magnetic field check***Perform BLA magnetic field test. IF permeability is below the threshold specifications (0.5 mGauss) record YES. If higher, document in the comment box and generate **NCR**. ***Flanges***Visually check integrity of the BLA flanges (sealing surfaces, knives). IF everything OK record YES. If damage present, document with relevant photos, comments and generate **NCR**.***Bellows***Inspect integrity of both small and large bellows. IF everything OK record YES. If damage present, document with relevant photos, specify whether it’s large or small bellows, comments and generate **NCR**.***Copper plating***Inspect the quality of copper plating. IF everything OK record YES. If damage present, document with relevant photos, specify location, comments and generate **NCR**.***Ceramic brazing***Visually check integrity of the BLA copper-stub brazing. IF everything OK record YES. Count the number of not brazed pins. If damage present, or the number of **non-brazed pins is GREATER THAN 20** document with relevant photos, comments and generate **NCR**.When visual inspection is complete, move the units to Chemroom for cleaning. Leave the housing and absorber disassembled. | [[BLAVisADate]] <<TIMESTAMP>>[[VisInspector]] <<SRF>>[[BLAPerm]] <<YESNO>>[[BLAFlanges]] <<YESNO>>[[BLABellows]] <<YESNO>>[[BLACopperBL]] <<YESNO>>[[BLACopperStub]] <<YESNO>>[[NoBrazePins]] <<INTEGER>>[[Visual\_Comm]] <<COMMENT>> [[Visual\_pics]] <<FILEUPLOAD>> |
|  | ***CHEMISTRY*** |  |
| 3A | ***Cleaning***Record date of cleaning and technician name.Clean both housing and absorber per LCLSII Copper plated bellows cleaning procedure. After the cleaning dry the parts under laminar flow. When they are dry close them in the cleanroom bag and send to furnace room.If any damage or anomaly is found, upload pictures and provide comments. | [[AbsCleaningDate]] <<TIMESTAMP>>[[CleaningOperators1]] <<SRF>>[[Cleaning\_pics]] <<FILEUPLOAD>>[[Cleaning\_comment]] <<COMMENT>> |
|  | ***FURNANCE*** |  |
| 3B | ***Ceramic absorber Bake***Record technician name, date of the bake operation. Effective bake time for ***ceramic absorber***: 6 hours at 600 CUpload RGA file taken during bake if applicable.Provide comments if any. If any issues during high temperature bake, generate **NCR**.***Housing bake***Effective bake time for ***housing***: 6 hours at 300 C Record name, date and upload RGA file if applicable. Provide comment if any.After baking, move ceramic absorber and housing to chem room. | [[AbsBakeDate]] <<TIMESTAMP>>[[AnsBakeOperators]] <<SRF>>[[AbsRGA]]<<FILEUPLOAD>>[[CommAbsBake]] <<COMMENT>> **NCR.**[[HousingBakeDate]] <<TIMESTAMP>>[[HousingBakeOperators]] <<SRF>>[[HousingRGA]]<<FILEUPLOAD>>[[CommHousingBake]] <<COMMENT>> **NCR.** |
|  | CHEMISTRY |  |
| 3C | At chem room, place ceramic absorber in clean room passthru. Do not re-clean. Clean housing following LCLS-II post-bake copper plated bellows cleaning procedure. Dry and place in the clean room passthru.Communicate with clean room staff to move the parts in to the nitrogen cabinet as soon as possible. | [[PassthruDate\_absorber]] <<TIMESTAMP>>[[PassthruDate\_housing]] <<TIMESTAMP>> |
|  | ***CLEAN ROOM*** |  |
| 4 | ***Clean room assembly***Record assembly date and clean room operator(s) name.Before assembly, inspect units. If any damage or anomaly not noted in earlier steps of this traveler, generate NCR. BLA and hardware preparation: spray with dry filtered N2 gas in front of a particulate counter until particle count is zero. Enter serial number of vacuum valve (4 digit, usually start with 8) used in this assembly.Leak check strip chart will be uploaded by a responsible engineer. Assemble BLA following the assembly procedure linked above.The general assembly order is:1. Valve installation. Follow the valve angle per drawing.

1. Ceramic absorber: torque value 15 ft-lbs
2. Beam line blanks: torque in 3 steps with increasing torque value of 20, 25 and 31 ft-lbs.

Spray after each installation. Final vacuum leak check and mass spectrum checkPerform vacuum leak check (plastic bag at least 30 minutes) and select leak check result.After leak check, change RGA setting to histogram scan and change the amu range up to 100 and wait till the scan is stabilized.Record total pressure from pressure gage NOT from RGA software.Upload rga file of the histogram scan.Responsible engineer will review the histogram and clear the hold point.Record sum of each pressure peaks of amu from 45 up to 100. If this sum is more than 1/1000 of total pressure, the unit has to be re-processed. **Slow Bleed up**When the unit meets the mass spectrum requirement, bleed the unit using cavity slow-bleed system.BaggingAfter bleeding, double bag the unit filled up with nitrogen and record time. Communicate with other work centers for storage options. Leave the bagged unit in clean room cabinet or passthru depending on the expected shipping.Record clean room exit date.When the unit exits clean room, proper information (status change and etc) will be recorded in Pansophy inventory system.  | [[CleanRoomDate]] <<TIMESTAMP>>[[AssyOperators3]] <<SRF>>[[AV15SN]] <<AV15SN>>[[VV\_leak\_Chart]] <<FILEUPLOAD>>[[Final\_LeakCheck\_pass]] <<YESNO>>[[Total\_pressure]] <<FLOAT>> mbar[[HistogramScan]]<<FILEUPLOAD>>[[Sum\_45to100]] <<FLOAT>> mbar[[HP1]] {{hkpark,edaly,scott}} <<HOLDPOINT>>[[BLABagDate]] <<TIMESTAMP>>[[Cleanroom\_exit\_date]] <<TIMESTAMP>> |
| 5 | Final review and production releaseIs the unit released for production?Provide comment on this unit if any. | Stop[[Reviewer]] <<SRF>>[[Prod\_release]] <<YESNO>>[[Final\_comment]] <<COMMENT>> |