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| Traveler Title | Harmonic Kicker Cavity Fabrication Traveler |
| Traveler Abstract | This traveler records the steps to complete Harmonic Kicker Cavity fabrication. |
| Traveler ID | STP-FAB-HRMKICK |
| Traveler Revision  | R1 |
| Traveler Author | S.Solomon |
| Traveler Date | 9-Jun-20 |
| NCR Informative Emails | gpark |
| NCR Dispositioners | sarahann,haipeng |
| D3 Emails | sarahann,haipeng,gpark |
| Approval Names | S. Solomon | G. Park | H. Wang | R. Rimmer |
| Approval Signatures |  |  |  |  |
| Approval Dates |  |  |  |  |
| Approval Title | Author | Reviewer | Reviewer | Project Manager |

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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. |
| [..\Drawing Larry Version\March2020 Updated Drawings\Updated Kicker Drawings 11March2020.pdf](file:///C%3A%5CUsers%5Cbookwalt%5CAppData%5CLocal%5CMicrosoft%5CWindows%5CINetCache%5CContent.Outlook%5CDrawing%20Larry%20Version%5CMarch2020%20Updated%20Drawings%5CUpdated%20Kicker%20Drawings%2011March2020.pdf) | [..\Drawing Larry Version\Welding Practice Drawings\RevisedA\_Kicker Sample Parts\_for welding\_ Dec 11 2019\_Sarah Solomon.pdf](file:///C%3A%5CUsers%5Cbookwalt%5CAppData%5CLocal%5CMicrosoft%5CWindows%5CINetCache%5CContent.Outlook%5CDrawing%20Larry%20Version%5CWelding%20Practice%20Drawings%5CRevisedA_Kicker%20Sample%20Parts_for%20welding_%20Dec%2011%202019_Sarah%20Solomon.pdf) |  |  |  |
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| Revision Note |  |
| R1 | Initial revision of this Traveler. |

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| Step No. | Instructions | Data Input |
| Identify | Identify key information for this fabrication work:  | [[FabTaskRequestor]] <<SRF>>[[ProjSN]] <<PROJSN>>[[ProjName]] <<TEXT>>[[FabTaskSubDate]] <<TIMESTAMP>>Record the cavity SN/cavity name [[CAVSN]] <<CAVSN>>[[CavName]]<<TEXT>> |
| ELECTRON BEAM WELDING |
| 1 | Electron Beam Welding Sample PartsRecord your nameRecord the Start Date[[EBWInstructions]] <<COMMENT>>EBW INSTRUCTIONS COMMENTS (To be inserted after the webpage is created)Sample copper parts and a hard copy of the drawings will be delivered to the EBW shop. These parts have been cleaned and bagged, please wear gloves when handling them at all times. Measure the thickness and diameter of the copper parts before and after welding to understand the welding shrinkage of the parts and any changes to the diameter of the parts. Record the Data. The purpose in welding these parts are to establish the welding parameters for a future welding of the copper kicker cavity. These parts represent the diameter of the body of the cavity. In addition to all standard EBW parameters, please provide pictures and record the following: any welding irregularities, circumference and thickness shrinkage (measure at least four locations along the circumference), unequal welding shrinkage. Please record any deviation from the standard procedure for this task (i.e. different EBW parameters for EBW task) in the comment box.If the task has a separate traveler associated to it, please select traveler and sequence number.Record the END Date | Person performing this task:[[EBWTech]] <<SRF>>[[SampleEBW\_StartDate]] <<TIMESTAMP>>Describe work, notable events, describe any deviations from the instructions, and upload all associated data files.[[SampleEBWDeviations]] <<YESNO>>[[SampleEBWcomments]] <<COMMENT>>[[SampleEBWupload]] <<FILEUPLOAD>>[[SampleEBWupload]] <<FILEUPLOAD>>[[SampleEBWupload]] <<FILEUPLOAD>>[[SampleEBWupload]] <<FILEUPLOAD>>Traveler associated with this step:[[TravelerId1]] <<TEXT>>[[TravelerSeqNum1]] <<INTEGER>>[[Put link to traveler]] <<NOTE>>[[SampleEBW\_EndDate]] <<TIMESTAMP>> |

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| Step No. | Instructions | Data Input |
| QA MEASUREMENTS |
| 2 | Once the machined parts are delivered to Jefferson Lab, perform visual inspection and any further QA including especially the tuner port tolerance held (with the laser scanner) and the roundness of the kicker body. Before passing the parts to chemistry for cleaning, allow the brazing and EBW techs the opportunity to handle the parts so that a plan is in place for any additional fixtures needed to perform their tasks. | Persons performing this task:[[QAStaffNames]] <<SRF>>[[QAStartDate]] <<TIMESTAMP>>Describe work, notable events, describe any deviations from the instructions, and upload all associated data files.[[QADeviations]] <<YESNO>>[[QAComments]] <<COMMENT>>[[QAFilesUpload]] <<FILEUPLOAD>>[[QAEndDate]] <<TIMESTAMP>> |
| CHEMISTRY CLEANING |
| 3 | Chemistry/ Cleaning of Copper Parts and Stainless Steel Flanges[[CleaningInstructions]] <<COMMENT>>INSTRUCTIONS COMMENTS (To be inserted after the webpage is created)Follow all standard cleaning procedures for copper (copper bright) and stainless steel parts in preparation for the parts for brazing and electron beam welding. For the stainless steel flanges, please be careful not to damage the knife edges of these parts. Record all notable events in the comment section. All parts will be delivered to the chemistry department and picked up.  | Persons performing this task:[[ChemStaffNames]] <<SRF>>[[CleaningStartDate]] <<TIMESTAMP>>Describe work, notable events, describe any deviations from the instructions, and upload all associated data files.[[ChemDeviations]] <<YESNO>>[[ChemTechComments]] <<COMMENT>>[[ChemFilesUpload]] <<FILEUPLOAD>>[[CleaningEndDate]] <<TIMESTAMP>> |

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| Step No. | Instructions | Data Input |
| BRAZING |
| 4 | Brazing Kicker Cavity[[BrazingInstructions]] <<COMMENT>>INSTRUCTIONS COMMENTS (To be inserted after the webpage is created)These instructions can be modified based on your best judgement. Please record any changes in these instructions in the comment section. Also please record if the bake cycle is interrupted or off Set up: Apply the brace to the body of the cavity. Ensure that the brace will be removable after the bake using whatever lubricant or foil needed between the foil and brace. Record the lubricant/foil used.First Run: Braze all stainless steel flanges to copper nipples with 65/35 Cu Ag alloy. If using a different alloy, please record in the comment section. Rig all nipples (if possible) to the body with threaded rod. Second Run: Braze the 10’’ Flange to the body with 65/35 Cu Ag. If using a different alloy, please record in the comment section.Third Run: Braze all nipples to the body with 72/28 Ag Cu. If using a different alloy, please record in the comment section. If not possible to rig a nipples to the body, follow steps three and four below.Third Run: Braze 4 Tuner Ports to the Body and Coupler Port.Fourth Run: Braze Port Tube, Beam Pipes and Tuner Port to the Body.Please record any deviation from the standard procedure for this task in the comment box.If the task has a separate traveler associated to it, please select traveler and sequence number.Record the END Date | Person performing this task:[[BrazingTech]] <<SRF>>[[Brazing1StartDate]] <<TIMESTAMP>>Describe work, notable events, describe any deviations from the instructions, any need for patch work, unexpected results, and upload all associated data files.[[Brazing1Deviations]] <<YESNO>>[[Brazing1comments]] <<COMMENT>>[[Brazing1upload]] <<FILEUPLOAD>>Record any need for leak check[[LeakCheck]] <<YESNO>>Record Leak Check Results[[LeakCheckComments]] <<COMMENT>>[[LeakCheckFileUpload]] <<FILEUPLOAD>>Persons performing this task:[[LeakCheckTech]] <<SRF>>[[LeakCheckStartDate]] <<TIMESTAMP>>[[LeakCheckEndDate]] <<TIMESTAMP>>Traveler associated with this step:[[TravelerId1]] <<TEXT>>[[TravelerSeqNum1]] <<INTEGER>>[[Put link to traveler]] <<NOTE>>[[Brazing1ENDDate]] <<TIMESTAMP>> |

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| Step No. | Instructions | Data Input |
| ELECTRON BEAM WELDING |
| 5  | Electron Beam Welding Inner Conductor Parts[[EBWTask5Instructions]] <<COMMENT>>EBW INSTRUCTIONS COMMENTS (To be inserted after the webpage is created)EBW full penetration vacuum tight according to details B and D on the END CAP/ INNER CONDUCTOR ASSY drawing JL0078759.Copper parts and a hard copy of the drawings will be delivered to the EBW shop. These parts have been cleaned and bagged, please wear gloves when handling them at all times. Measure the parts need for recording the weld shrinkage before and after welding and record the data. In addition to all standard EBW parameters, please provide pictures and record your setup for this task.Please record any deviation from the standard procedure for this task (i.e. different EBW parameters for EBW task) in the comment box.If the task has a separate traveler associated to it, please select traveler and sequence number. | Person performing this task:[[EBW5Tech]] <<SRF>>[[SampleEBW5\_StartDate]] <<TIMESTAMP>>Describe work, notable events, describe any deviations from the instructions, and upload all associated data files.[[EBW5Deviations]] <<YESNO>>[[EBW5comments]] <<COMMENT>>[[EBW5upload]] <<FILEUPLOAD>>Traveler associated with this step:[[TravelerId]] <<TEXT>>[[TravelerSeqNum]] <<INTEGER>>[[Put link to traveler]] <<NOTE>>[[SampleEBW5\_EndDate]] <<TIMESTAMP>> |

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| Step No. | Instructions | Data Input |
| 6  | Additional cleaning prior to first frequency check? To remove EBW and Brazing residue.  | Comments?? |
| FREQUENCY MEASUREMENT |
| 7 | First frequency check and cavity tuningFollow the procedure outlined in: [**..\..\Travelers\STP-MEAS-HRMKICK-R1.docx**](file:///C%3A%5CUsers%5Cbookwalt%5CAppData%5CLocal%5CMicrosoft%5CWindows%5CINetCache%5CTravelers%5CSTP-MEAS-HRMKICK-R1.docx)If any additional trimming is needed, please make a note in the comment section and upload any relevant files. | [[BenchRF1Tech]] <<SRF>>[[BenchRF1Date]] <<TIMESTAMP>>[[BenchRF1Comments]] <<COMMENT>>[[BenchRF1Files]] <<FILEUPLOAD>> |
| 8 | Trim if needed/ repeat Task 7 | [[Trim\_Retest\_Comments]] <<COMMENT>>[[RetestFileUpload]] <<FILEUPLOAD>> |
| ELECTRON BEAM WELDING |
| 9 | Final EBW WeldRecord your nameRecord the Start Date[[EBWTask9Instructions]] <<COMMENT>>EBW INSTRUCTIONS COMMENTS (To be inserted after the webpage is created)EBW full penetration vacuum tight according to detail C on the KICKER CAVITY BODY ASSY drawing JL0078520.Copper parts and a hard copy of the drawings will be delivered to the EBW shop. These parts have been cleaned and bagged, please wear gloves when handling them at all times. Measure the parts need for recording the weld shrinkage before and after welding and record the data. In addition to all standard EBW parameters, please provide pictures and record your setup for this task.Please record any deviation from the standard procedure for this task (i.e. different EBW parameters for EBW task) in the comment box.If the task has a separate traveler associated to it, please select traveler and sequence number.Record the END Date | Person performing this task:[[EBW9Tech]] <<SRF>>[[SampleEBW9\_StartDate]] <<TIMESTAMP>>Describe work, notable events, describe any deviations from the instructions, and upload all associated data files.[[EBW9Deviations]] <<YESNO>>[[EBW9comments]] <<COMMENT>>[[EBW9upload]] <<FILEUPLOAD>>Traveler associated with this step:[[TravelerId]] <<TEXT>>[[TravelerSeqNum]] <<INTEGER>>[[Put link to traveler]] <<NOTE>>[[SampleEBW9\_EndDate]] <<TIMESTAMP>> |
| FREQUENCY MEASUREMENT |
| 10 | Final TestingRecord any comments and upload any files associated to the final rf tests | [[BenchRF2Tech]] <<SRF>>[[BenchRF2Date]] <<TIMESTAMP>>[[BenchRF2Comments]] <<COMMENT>>[[BenchRF2Files]] <<FILEUPLOAD>> |