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| Traveler Title | HHOM Waveguide Fabrication Traveler |
| Traveler Abstract | Stamping and welding Niobium parts to make EIC 197 Crab Prototype HHOM Waveguide |
| Traveler ID | EICCRB-FAB-HHOM-EBW |
| Traveler Revision  | R1 |
| Traveler Author | S. SHANMUGASUNDARAM |
| Traveler Date | 11-Feb-25 |
| NCR Informative Emails | SHANMUG,AREILLY,MOSBY,KDAVIS |
| NCR Dispositioners | HUQUE,SHANMUG,BUTTLES |
| D3 Emails | HUQUE,SHANMUG,BUTTLES,KDAVIS,GEORGED,MOSBY,AREILLY |
| Approval Names | S. SHANMUGASUNDARAM | K. DAVIS | J. BUTTLES | N. HUQUE |
| Approval Signatures |  |  |  |  |
| Approval Dates |  |  |  |  |
| Approval Title | Author | Reviewer | Group Leader | 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. |
| [JL0140353](https://misportal.jlab.org/jlabDocs/documents/versions/177145/download) | [JL0136176](https://misportal.jlab.org/jlabDocs/documents/versions/179137/download) | [JL0140929](https://misportal.jlab.org/jlabDocs/documents/versions/197302/download) | [JL0140358](https://misportal.jlab.org/jlabDocs/documents/versions/177146/download) | [JL0136177](https://misportal.jlab.org/jlabDocs/documents/versions/179139/download) |
| [JL0129149](https://misportal.jlab.org/jlabDocs/documents/versions/185651/download) | [JL0135207](https://misportal.jlab.org/jlabDocs/documents/versions/180558/download) | [JL0141212](https://misportal.jlab.org/jlabDocs/documents/versions/179357/download) | [JL0141211](https://misportal.jlab.org/jlabDocs/documents/versions/179136/download) | [JL0136180](https://misportal.jlab.org/jlabDocs/documents/versions/184197/download) |
| [JL0140820](https://misportal.jlab.org/jlabDocs/documents/versions/202347/download) | [JL0148688](https://misportal.jlab.org/jlabDocs/documents/versions/189099/download) | [11141-S-0033](https://misportal.jlab.org/jlabDocs/documents/70285/download) | [JL0135516](https://misportal.jlab.org/jlabDocs/documents/versions/197270/download) | [JL0127968](https://misportal.jlab.org/jlabDocs/documents/versions/165233/download) |
| [JL0132924](https://misportal.jlab.org/jlabDocs/documents/versions/184471/download) | [JL0171270](https://misportal.jlab.org/jlabDocs/documents/versions/201759/download) | [JL0171269](https://misportal.jlab.org/jlabDocs/documents/versions/201721/download) | [Fabrication Plan](https://jeffersonlab.sharepoint.com/%3Ap%3A/r/sites/EICPartnerProject-TJNAF/Accelerator/RF%20Systems/Cryomodules/197%20MHz%20DVC/Cavity%20Fabrication%20Files/Fabrication%20Plans/HHOM%20Waveguide%20Fabrication%20Plan.pptx?d=w5f7e6c8ddb674a67afe7d4dad82e9100&csf=1&web=1&e=4ez3c1) | [SRF-MSPR-CHEM-NB-ACID-R1](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-261723/SRF-MSPR-CHEM-NB-ACID-R1.pdf) |
| [SRF-MSPR-CHEM-FBH-DEGR-R1](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-261899/SRF-MSPR-CHEM-FBH-DEGR-R1.pdf) |  |  |  |  |

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

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| Step No. | Instructions | Data Input |
| 0 | Enter Serial Number of Finished Part

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| **STEPS** | **WORK CENTER AREAS** | **ACTIONS** |
| 1 | MACHSHOP | Part Forming |
| 2 | MACHSHOP | Part Machining |
| 3 | MACHSHOP | Part Machining |
| 4 | CHEM | BCP |
| 5 | CHEM | BCP |
| 6 | EBW | EBW |
| 7 | EBW | EBW |
| 8 | CMA | Leak Check |
| 9 | MACHSHOP | Part Machining |
| 10 | CHEM | DEGR |
| 11 | INSP | CMM |
| 12 | CHEM | BCP |
| 13 | CHEM | BCP |
| 14 | CHEM | BCP |
| 15 | CHEM | BCP |
| 16 | EBW | EBW |
| 17 | CMA | Leak Check |
| 18 | CHEM | BCP |
| 19 | EBW | EBW |
| 20 | CMA | Leak Check |
| 21 | MACHSHOP | Part Machining |
| 22 | CHEM | DEGR |
| 23 | INSP | CMM |
| 24 | INSP | Acceptance Check |

 | [[HWGFASN]] <<SN>> |
| 1 | Form 2 units of JL0140353 and 2 units of JL0140358 using JL0127968 as the forming die.Use 4.17mm Nb Sheet of appropriate dimension.Upload any relevant images/files. | [[HWGFormTech]] <<SRF>>[[HWGFormTime]] <<TIMESTAMP>>[[HWGFormComment]] <<COMMENT>>[[HWGFormFile]] <<FILEUPLOAD>> |

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| **Step No** | **Instructions** | **Data Inputs** |
| 2 | Use machining fixture JL0132924 to machine weld preps on JL0140353 and JL0140358.Upload any relevant images/files. | [[HWGFormMachTech]] <<SRF>>[[HWGFormMachTime]] <<TIMESTAMP>>[[HWGFormMachComment]] <<COMMENT>>[[HWGFormMachFile]] <<FILEUPLOAD>> |

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| **Step No** | **Instructions** | **Data Inputs** |
| 3 | Machine 4 units of JL0135516 from 2 NbTi sheets, each of dimension 6.5mm x 35m x 320mm. | [[HWGStiffMachTech]] <<SRF>>[[HWGStiffMachTime]] <<TIMESTAMP>>[[HWGStiffMachComment]] <<COMMENT>>[[HWGStiffMachFile]] <<FILEUPLOAD>> |

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| **Step No** | **Instructions** | **Data Inputs** |
| 4 | Perform 15 Microns BCP on both stamped pieces of JL0140353 and JL0140358.Upload any relevant images/files. | [[HWGFormBCPTech]] <<SRF>>[[HWGFormBCPTime]] <<TIMESTAMP>>[[HWGFormBCPComment]] <<COMMENT>>[[HWGFormBCPFile]] <<FILEUPLOAD>> |
| 5 | Perform 15 Microns BCP on Jl0135516.Upload any relevant images/files. | [[HWGStiffBCPTech]] <<SRF>>[[HWGStiffBCPTime]] <<TIMESTAMP>>[[HWGStiffBCPComment]] <<COMMENT>>[[HWGStiffBCPFile]] <<FILEUPLOAD>> |

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| **Step No** | **Instructions** | **Data Inputs** |
| 6 | EBW the 2 units of JL0140353 and 2 units of JL0135516 to make JL0136176 using JL0140820 as the EBW fixture.Upload any relevant images/files. | [[HWGINSN]] <<SN>> [[HWGInEBWTech]] <<SRF>>[[HWGInEBWTime]] <<TIMESTAMP>>[[HWGInEBWComment]] <<COMMENT>>[[HWGInEBWFile]] <<FILEUPLOAD>> |
| 7 | EBW the 2 units of JL0140358 and 2 units of JL0135516 to make JL0136177 using JL0140820 as the EBW fixture.Upload any relevant images/files. | [[HWGOUTSN]] <<SN>> [[HWGOutEBWTech]] <<SRF>>[[HWGOutEBWTime]] <<TIMESTAMP>>[[HWGOutEBWComment]] <<COMMENT>>[[HWGOutEBWFile]] <<FILEUPLOAD>> |

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| **Step No** | **Instructions** | **Data Inputs** |
| 8 | Perform intermediate leak check of JL0136176 and JL0136177 using the Vendor Standard Helium Leak Check Procedure ([11141-S-0033](https://misportal.jlab.org/jlabDocs/documents/70285/download)).Describe the results of the leak check.Upload any relevant images/files. | [[HWGInOutWeldmentsLeakTech]] <<SRF>>[[HInOutWeldmentsLeakTime]] <<TIMESTAMP>>[[HWGInOutWeldmentsLeakComment]] <<COMMENT>>[[HWGInOutWeldmentsLeakFile]] <<FILEUPLOAD>> |
|  | Email the TR to move the welded parts to the machine shop for further machining. | [[EmailTRMoveHWGInOutWeldmentsWeld]] {{SHANMUG}} <<EMAIL>>[[EmailTRMoveHGWInOutWeldmentsWeld]] {{Attention: HWG Traveler Request}} <<EMAILSUBJ>> |

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| **Step No** | **Instructions** | **Data Inputs** |
| 9 | Use machining fixture JL0171270, machine weld preps for both sides of JL0136176. Enter Job Number in the traveler.Use machining fixture JL0171269, machine weld preps for both sides of JL0136177. Enter Job Number in the traveler. Upload any relevant images/files. | [[HWGInOutWeldmentsMachTech]] <<SRF>>[[HWGInOutWeldmentsMachTime]] <<TIMESTAMP>>[[HWGInOutWeldmentsMachJobNumber]] <<INTEGER>>[[HWGInOutWeldmentsMachComment]] <<COMMENT>>[[HWGInOutWeldmentsMachFile]] <<FILEUPLOAD>> |
|  | Email TR to send machined part to CMM.  | [[Email TR HWGInOutWeldments CMM Move]] {{SHANMUG}} <<EMAIL>>[[Email TR HWGInOutWeldments CMM Move]] {{Attention: HHOM Traveller Machine Shop to CMM Move}} <<EMAILSUBJ>> |

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| **Step No** | **Instructions** | **Data Inputs** |
| 10 | Degrease JL0136176 and JL0136177 using the procedure SRF-MSPR-CHEM-FBH-DEGR-R1. | [[HWGInOutWeldmentsDgrsTech]] <<SRF>>[[HWGInOutWeldmentsDgrsTime]] <<TIMESTAMP>>[[HWGInOutWeldmentsDgrsComm]] <<COMMENT>>[[HWGInOutWeldmentsDgrsFile]] <<FILEUPLOAD>> |

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| **Step No** | **Instructions** | **Data Inputs** |
| 11 | Perform intermediate CMM on JL0136176 and JL0136177.Upload any relevant images/files. | [[HWGInOutWeldmentsCMMTech]] <<SRF>>[[HWGInOutWeldmentsCMMTime]] <<TIMESTAMP>>[[HWGInOutWeldmentsCMMComment]] <<COMMENT>>[[HWGInOutWeldmentsCMMFile]] <<FILEUPLOAD>> |
|  | Send part to BCP. |  |

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| **Step No** | **Instructions** | **Data Inputs** |
| 12 | Perform 15 Micron BCP (on weld regions only) on JL0136176 and JL0136177 using the SRF-MSPR-CHEM-NB-ACID-R1 procedure. Upload any relevant images/files. | [[HWGInOutWeldmentsBCPTech]] <<SRF>>[[HWGInOutWeldmentsBCPTime]] <<TIMESTAMP>>[[HWGInOutWeldmentsBCPComment]] <<COMMENT>>[[HWGInOutWeldmentsBCPFile]] <<FILEUPLOAD>> |

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| **Step No** | **Instructions** | **Data Inputs** |
| 13 | Perform 15 Micron BCP on JL0140929 (weld regions only) using the SRF-MSPR-CHEM-NB-ACID-R1 procedure. Upload any relevant images/files. | [[HWGTransitionBCPTech]] <<SRF>>[[HWGTransitionBCPTime]] <<TIMESTAMP>>[[HWGTransitionBCPComment]] <<COMMENT>>[[HWGTransitionBCPFile]] <<FILEUPLOAD>> |
| 14 | Perform 15 Micron BCP on part JL0129149 using the SRF-MSPR-CHEM-NB-ACID-R1 procedure. Upload any relevant images/files. | [[HWGFlangeBCPTech]] <<SRF>>[[HWGFlangeBCPTime]] <<TIMESTAMP>>[[HWGFlangeBCPComment]] <<COMMENT>>[[HWGFlangeBCPFile]] <<FILEUPLOAD>> |
| 15 | Perform 15 Micron BCP on part JL0135207 using the SRF-MSPR-CHEM-NB-ACID-R1 procedure. Upload any relevant images/files. | [[HWGDishTransitionBCPTech]] <<SRF>>[[HWGDishTransitionBCPTime]] <<TIMESTAMP>>[[HWGDishTransitionBCPComment]] <<COMMENT>>[[HWGDishTransitionBCPFile]] <<FILEUPLOAD>> |
|  | Send the three parts to EBW. |  |

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| **Step No** | **Instructions** | **Data Inputs** |
| 16 | EBW JL0136177, JL0129149 and JL0135207 to make weldment JL0141212.Use the EBW fixture JL0148688 for this weldment. Upload any relevant images/files. | [[HWGOFLNGSN]] <<SN>> [[HWGOutFlangeEBWTech]] <<SRF>>[[HWGOutFlangeEBWTime]] <<TIMESTAMP>>[[HWGOutFlangeEBWComment]] <<COMMENT>>[[HWGOutFlangeEBWEmail]] {{SHANMUG}} <<EMAIL>>[[HWGOutFlangeEBWEmail]] {{HHOM Traveler Final Stage EBW Update}} <<EMAILSUBJ>>[[HWGOutFlangeEBWFile]] <<FILEUPLOAD>> |
|  | Send welded part for intermediate leak check. |  |

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| **Step No** | **Instructions** | **Data Inputs** |
| 17 | Perform intermediate leak check on JL0141212.Upload any relevant images/files. | [[HWGOutFlangeLeakTech]] <<SRF>>[[HWGOutFlangeLeakTime]] <<TIMESTAMP>>[[HWGOutFlangeLeakComment]] <<COMMENT>>[[HWGOutFlangeLeakEmail]] {{SHANMUG}} <<EMAIL>>[[HWGOutFlangeLeakEmail]] {{HHOM Traveler Leak Check First Stage Update}} <<EMAILSUBJ>>[[HWGOutFlangeLeakFile]] <<FILEUPLOAD>> |
|  | Send part for BCP. |  |

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| **Step No** | **Instructions** | **Data Inputs** |
| 18 | Do BCP on JL0141212 (weld regions only).Upload any relevant images/files. | [[HWGFirstStageBCPTech]] <<SRF>>[[HWGFirstStageBCPTime]] <<TIMESTAMP>>[[HWGFirstStageBCPComment]] <<COMMENT>>[[HWGFirstStageBCPEmail]] {{SHANMUG}} <<EMAIL>>[[HWGFirstStageBCPEmail]] {{SUBJ LINE}} <<EMAILSUBJ>>[[HWGFirstStageBCPFile]] <<FILEUPLOAD>> |

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| **Step No** | **Instructions** | **Data Inputs** |
| 19 | EBW JL0136176, JL0140929 and JL0141212 to make weldment JL0141211.Use the EBW fixture JL0148688 for this weldment.Upload any relevant images/files. | [[HWGFINALSN]] <<SN>> [[HWGFinalStageEBWTech]] <<SRF>>[[HWGFinalStageEBWTime]] <<TIMESTAMP>>[[HWGFinalStageEBWComment]] <<COMMENT>>[[HWGFinalStageEBWEmail]] {{SHANMUG}} <<EMAIL>>[[HWGFinalStageEBWEmail]] {{VHOM Traveler Final Stage EBW Update}} <<EMAILSUBJ>>[[HWGFinalStageEBWFile]] <<FILEUPLOAD>> |

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| **Step No** | **Instructions** | **Data Inputs** |
| 20 | Perform final leak check.Upload any relevant images/files. | [[HWGFinalStageLeakTech]] <<SRF>>[[HWGFinalStageLeakTime]] <<TIMESTAMP>>[[HWGFinalStageLeakComment]] <<COMMENT>>[[HWGFinalStageLeakFile]] <<FILEUPLOAD>> |
|  | Email TR to move part to machine shop for machining.Upload any relevant images/files. | [[HWGFinalStageLeakEmail]] {{SHANMUG}} <<EMAIL>>[[HWGFinalStageLeakEmail]] {{Attention: HHOM Traveler Move}} <<EMAILSUBJ>>[[HWGFinalStageLeakFile]] <<FILEUPLOAD>> |

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| **Step No** | **Instructions** | **Data Inputs** |
| 21 | Machine transition piece to end dish per drawing no. JL0136180.Upload any relevant images/files. | [[HWGFinalMachTech]] <<SRF>>[[HWGFinalMachTime]] <<TIMESTAMP>>[[HWGFinalMachComment]] <<COMMENT>>[[HWGFinalMachEmail]] {{SHANMUG}} <<EMAIL>>[[HWGFinalMachEmail]] {{VHOM Traveler Final Machining Update}} <<EMAILSUBJ>>[[HWGFinalMachFile]] <<FILEUPLOAD>> |

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| **Step No** | **Instructions** | **Data Inputs** |
| 22 | Degrease JL0136180 using the procedure SRF-MSPR-CHEM-FBH-DEGR-R1. | [[HWGFinalDgrsTech]] <<SRF>>[[HWGFinalDgrsTime]] <<TIMESTAMP>>[[HWGFinalDgrsComm]] <<COMMENT>>[[HWGFinalDgrsFile]] <<FILEUPLOAD>> |

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| **Step No** | **Instructions** | **Data Inputs** |
| 23 | Perform final CMM. Upload any relevant images/files. | [[HWGFinalCMMTech]] <<SRF>>[[HWGFinalCMMTime]] <<TIMESTAMP>>[[HWGFinalCMMComment]] <<COMMENT>>[[HWGFinalCMMEmail]] {{SHANMUG}} <<EMAIL>>[[HWGFinalCMMEmail]] {{HHOM Traveller Final CMM Update}} <<EMAILSUBJ>>[[HWGFinalCMMEmail]] <<FILEUPLOAD>> |

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| **Step No** | **Instructions** | **Data Inputs** |
| 24 | Check Acceptance of Part.Upload any relevant images/files. | [[HWGFinalComment]] <<COMMENT>>[[HWGFinalEmail]] {{SHANMUG}} <<EMAIL>>[[HWGFinalEmail]] {{HHOM Traveller Final Update}} <<EMAILSUBJ>>[[HWGFinalEmail]] <<FILEUPLOAD>> |