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| Traveler Title | P1 Cryomodule Final Assembly Traveler |
| Traveler Abstract | This document outlines the necessary steps to be taken to complete the P1 Cryomodule. It begins with a finished Vacuum Vessel /End Can Assembly, and ends with a completed Cryomodule. Upon completion of this traveler, the Cryomodule will be located in the CMTF with the secondary waveguides and all instrumentation in place, ready for U-tube installation. |
| Traveler ID | P1-CMAWS4-CM-ASSY |
| Traveler Revision  | R1 |
| Traveler Author | J. Fischer |
| Traveler Date | 26-Jan-21 |
| NCR Informative Emails | areilly,drury |
| NCR Dispositioners | fischer,worland |
| D3 Emails | areilly,drury,fischer,worland |
| Approval Names | J. Fischer | K. Worland | A. Reilly | Dave Hamlette |
| Approval Signatures |  |  |  |  |
| Approval Dates |  |  |  |  |
| Approval Title | Author | Reviewer | Project Manager | RADCON Review |

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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. |
| [CRM1207075-0003 RT SPOOL ASSY](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-64342/RIGHT%20SIDE%20WAVEGUIDE%20SPOOL%20ASSY.pdf) | [CRM1207075-0004 LEFT SPOOL ASSY](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-64343/LEFT%20SIDE%20WAVEGUIDE%20SPOOL%20ASSY.pdf) | [CRM1207075-0008 LEFT WAVEGUIDE SPOOL](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-64344/LEFT%20WAVEGUIDE%20SPOOL.pdf) | [CRM1207075-0010 RT WAVEGUIDE SPOOL](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-64345/RIGHT%20WAVEGUIDE%20SPOOL.pdf) | [CRM1207075-0036 RF WINDOW INSTALLATION](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-64346/RF%20WINDOW%20INSTALLATION.pdf) |
| [CRM1207075-0040 LEFT WAVEGUIDE SPOOL](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-64347/LEFT%20WAVEGUIDE%20SPOOL%202.pdf) | [CRM1207075-0041 RT WAVEGUIDE SPOOL](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-64348/RIGHT%20WAVEGUIDE%20SPOOL%202.pdf) | [CRM1207075-0047 WAVEGUIDE PLATING DWG](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-64349/WAVEGUIDE%20CU%20PLATING.pdf) | [CRM1207075-0053 RT SIDE WAVEGUIDE SPOOL ASSY](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-64350/RIGHT%20SIDE%20WAVEGUIDE%20SPOOL%20ASSY%2045.pdf) | [CRM1207075-0054 LEFT SIDE WAVEGUIDE SPOOL ASSY](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-64351/LEFT%20SIDE%20WAVEGUIDE%20SPOOL%20ASSY%2045.pdf) |
| 115800-1006 Center LeftSpool Assy115800-1005 Center RightSpool Assy | 115800-1000 P1 Cryomodule Assembly | 115800-1001 thru 1014 P1 Waveguides, flanges, and spools. | 115800-1015 thru 1018 P1 Topahts and back plates. | Secondary Waveguide Installation Procedure |

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

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| Step No. | Instructions | Data Input |
| 1 | Verify the "P1 Vacuum Vessel and End Can AssemblyTraveler " is complete. | [[LeadTechnician1]] <<SRFCMP>>[[Date1]] <<TIMESTAMP>>[[Comment1]] <<COMMENT>> |
| 2 | Request "Final Cryomodule" kit from inventory and inspect kit for completeness.  | [[KitTechnician2]] <<SRF>>[[Date2]] <<TIMESTAMP>>[[Comment2]] <<COMMENT>> |
| 3 | Transfer Cryomodule from the Assembly room into the CMTF. Use procedure "[Relocating a Cryomodule into the CMTF](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-64352/CP-C100-CM-MOVE-CMTF.pdf)" to perform the task.* Record beamline vacuum level before and after the move.
 | [[CMSN]] <<CMSN>>[[TransferTechnician3]] <<SRFCMP>>[[TransDate3]] <<TIMESTAMP>>[[TransComment3]] <<COMMENT>>[[BeamlineVacBeforeMove]] <<TEXT>>[[BeamlineVacAfterMove]] <<TEXT>>[[Comment3]] <<COMMENT>> |
| 4 | Position the Cryomodule in the Test Cave on floor plates. * Drop plumb bobs from centerline of primary bayonets, both supply and return, to foil targets on floor to orient the Cryomodule.
 | [[PosTechnician4]] <<SRFCMP>>[[PosDate4]] <<TIMESTAMP>>[[PosComment4]] <<COMMENT>>[[IsCryomodulePositioned]] <<YESNO>> |
| 5 | Prep tophat area 8 for secondary waveguide installation. Return end.* Wipe down surrounding area with alcohol and lint free wipes.
* Blow off area with Nitrogen.
* Install portable flowhood over work area, activate.
 | [[VacuumTechnician5]] <<USERNAME>>[[VacDate5]] <<TIMESTAMP>>[[VacComment5]] <<COMMENT>> |

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| Step No. | Instructions | Data Input |
| 6 | Install secondary waveguide, rf window, support structure, and ion pump assembly. Use "[CP-C100-CM-INST-WGSP](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-64353/CP-C100-CM-INST-WGSP-R1.docx)" to perform this work. * Evacuate and leak check the assembly. Record findings.
* Repeat process for all eight waveguides. Record findings.

Use drawings:CRM1207075-0003CRM1207075-0004CRM1207075-0053CRM1207075-0054115800-1005115800-1006115800-1013115800-1014**\*\*\*It is acceptable to install the Secondary Waveguides in the Cryomodule Assembly area as well using same clean practices. The Cryomodule would be placed in the CMTF afterwards.\*\*\*** | [[WGTechnician6]] <<SRFCMP>>[[WGDate6]] <<TIMESTAMP>>[[WGComment6]] <<COMMENT>>[[WaveguideSN8]] <<TEXT>>[[RFWindowSN8]] <<TEXT>>[[LeakCheckUpload8]] <<FILEUPLOAD>>[[WaveguideSN7]] <<TEXT>>[[RFWindowSN7]] <<TEXT>>[[LeakCheckUpload7]] <<FILEUPLOAD>>[[WaveguideSN6]] <<TEXT>>[[RFWindowSN6]] <<TEXT>>[[LeakCheckUpload6]] <<FILEUPLOAD>>[[WaveguideSN5]] <<TEXT>>[[RFWindowSN5]] <<TEXT>>[[LeakCheckUpload5]] <<FILEUPLOAD>>[[WaveguideSN4]] <<TEXT>>[[RFWindowSN4]] <<TEXT>>[[LeakCheckUpload4]] <<FILEUPLOAD>>[[WaveguideSN3]] <<TEXT>>[[RFWindowSN3]] <<TEXT>>[[LeakCheckUpload3]] <<FILEUPLOAD>>[[WaveguideSN2]] <<TEXT>>[[RFWindowSN2]] <<TEXT>>[[LeakCheckUpload2]] <<FILEUPLOAD>>[[WaveguideSN1]] <<TEXT>>[[RFWindowSN1]] <<TEXT>>[[LeakCheckUpload1]] <<FILEUPLOAD>> |
| 7 | Position and weld the RF waveguide support tabs.* Mock up each section using an RF sweep and first section of waveguide.
* Attach brackets and support structure, positioning support tabs.
* Tack weld items to the vacuum vessel. Finish waveguide installation.

Use drawings:CRM1207001-1000 - C100 Cryomodule AssemblyCRM1027001-0001 - R100 Cryomodule Assembly | [[Welder7]] <<SRFCMP>>[[WeldDate7]] <<TIMESTAMP>>[[WeldComment7]] <<COMMENT>>[[WaveguideInstallationComplete]] <<YESNO>> |
| 8 | Prepare the Cryomodule for Cooldown. Use "[Cryomodule Related Operations in the CMTF](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-64354/Cryomodule%20Related%20Operations%20in%20the%20CMTF.docx)" to complete this work. * Position the Cryomodule
* Install and set the JT actuator
* Clean Cryomodule circuits
* Utube prep and install
* Cooldown
* Post testing warmup
 | [[PrepTechnician8]] <<SRFCMP>>[[PrepDate8]] <<TIMESTAMP>>[[PrepComment8]] <<COMMENT>>[[VacuumEstablished]] <<YESNO>>[[GasReturningToCTF]] <<YESNO>>[[UtubesInstalled]] <<YESNO>>[[CryomoduleReadyForCooldown]] <<YESNO>> |